BEFORE THE MISSISSIPPI PUBLIC SERVICE COMMISSION

MISSISSIPPI POWER COMPANY **EC-120-0097-00**	**DOCKET NO: 2013-UA-189**

IN RE: PETITION OF MISSISSIPPI POWER COMPANY FOR FINDING OF PRUDENCE IN CONNECTION WITH THE KEMPER COUNTY INTEGRATED GASIFICATION COMBINED CYCLE GENERATING FACILITY

DIRECT TESTIMONY OF

DAVID A. SCHLISSEL

ON BEHALF OF SIERRA CLUB

MARCH 14, 2014

Q. What are your name, position and business address?

A. My name is David A. Schlissel. I am the President of Schlissel Technical Consulting, Inc. My business address is 45 Horace Road, Belmont, Massachusetts 02478.

Q. On whose behalf are you testifying in this case?

A. I am testifying on behalf of the Sierra Club.

Q. Please summarize your educational background and work experience.

A. I graduated from the Massachusetts Institute of Technology in 1968 with a Bachelor of Science degree in engineering. In 1969, I received a Master of Science degree in engineering from Stanford University. In 1973, I received a law degree from Stanford University. In addition, I studied nuclear engineering at the Massachusetts Institute of Technology during the years 1983-1986.

Since 1983, I have been retained by governmental bodies, publicly-owned utilities, and private organizations in 38 states to prepare analyses and expert testimony on engineering and economic issues related to electric utilities. My recent clients have included the U.S. Department of Justice, the Attorney General and the Governor of the State of New York, state consumer advocates, and national and local environmental organizations.

I have filed expert testimony before the Georgia Public Service Commission ("Commission") and state regulatory commissions in Arizona, Texas, New Jersey, Connecticut, Kansas, New Mexico, California, New York, North Carolina, South Carolina, Maine, Illinois, Vermont, Indiana, Ohio, Massachusetts, Missouri, Rhode Island, Wisconsin, Iowa, South Dakota, Minnesota, Michigan, Florida, North Dakota, Mississippi, Maryland, Virginia, Arkansas, Louisiana, Colorado, New Mexico, Oregon, and West Virginia, and before an Atomic Safety & Licensing Board of the U.S. Nuclear Regulatory Commission.

A copy of my current resume is included as Exhibit STC-1. Additional information on my work experience is available at www.schlissel-technical.com.

Q. Have you testified previously before this Commission?

A. Yes. I presented testimony in Commission Dockets Nos. 2009-UA-014 and 2010-UA-279.

Q. What is the purpose of your testimony?

A. Schlissel Technical Consulting was retained to review and evaluate the prudence of economics of Mississippi Power Company's ("Mississippi Power" or "the Company") expenditures on the Kemper County Integrated Gasification Combined Cycle Generating Facility ("Kemper" or "Kemper IGCC Project"). This testimony presents the results of my review to date.

Q. Please summarize your conclusions to date.

A. My conclusions are as follows:

1. The Kemper IGCC Project has faced six main risks: (1) that the cost of building the plant would be significantly higher than the Company was telling the Commission in 2009 and using in its viability analyses; (2) that natural gas prices would be substantially lower than the Company had used in its viability analyses, thereby making the alternatives less expensive; (3) that the Company will have less of a need for the power from Kemper due to either or both of reduced demand and energy forecasts or cancelled plant retirements; (4) that the plant with a first-of-a-kind IGCC technology would not operate as well as the Company was forecasting; (5) CO_2 emissions prices; and (6) that byproduct sales will not produce the revenue projected.

2. The Company rejected the potential for significant increases in the cost of building the Kemper IGCC Project by arguing in its 2009 testimony in

Docket No. 2009-UA-014 that the risks of installing new technology and the risk of capital cost escalation were "unlikely and comparatively insignificant." This was imprudent. A prudent utility would have considered the potential for future Kemper capital cost increases especially because it was proposing to build a plant with a first-of-a-kind IGCC technology at commercial scale. The Company also imprudently failed to consider any uncertainty in its projection of Kemper's future operating performance. Instead of considering these risks, Mississippi Power acted as an aggressive advocate for building Kemper as an IGCC Project, actively downplayed the risk of cost overruns and ignored the potential for poorer long-term operating performance.

3. At the same time that the Company all-but-dismissed the risk of higher capital costs, it aggressively attacked the position that the collapse of natural gas prices that had occurred in 2008 was a long-term change in the gas market that would negatively impact the economic viability of the Kemper IGCC Project. The Company instead continued to use extremely high long-term natural gas prices in the economic analyses it presented in Docket No. 2009-UA-014.

4. Kemper's estimated cost has increased by $2.1 billion, or 70 percent, since the Commission issued a Certificate in 2010. Increases in the cost of building Kemper were inevitable, foreseeable and, in fact, were foreseen. However, the Company failed to heed, and, indeed, affirmatively rejected the warning signs from (1) the industry's overall experience since 2002 with skyrocketing coal plant construction costs and (2) the 26 percent cost increased experienced by Duke Energy Indiana's Edwardsport IGCC Project between late 2007 and late 2009, and the 19 percent increase subsequently announced for Edwardsport in April 2010. Instead of assuming similar cost increases could be experienced at Kemper, Mississippi Power imprudently continued to maintain that the risks any

cost capital cost increases at Kemper were "unlikely and comparatively insignificant."

5. Kemper was subject to a First Mover risk as one of the first two new plants with new IGCC technologies to begin construction in the U.S. since the late 1990s. The industry as a whole was aware of the risks, challenges and uncertainties for companies investing in the first new IGCC plants. In particular, it was generally recognized by 2009 that IGCC projects were vulnerable to dramatically increasing capital costs. For these reasons, although some 27 IGCC projects had been proposed in the U.S. by 2007, all but two of those projects, Kemper and Edwardsport, had been cancelled or placed on indefinite hold.

6. It was widely accepted in the industry by 2009 that coal plant construction costs had, in fact, skyrocketed and were likely to continue to rise in the future. Therefore, Kemper would have been exposed to the risk of higher capital costs even if it had not included a first-of-a-kind IGCC technology at commercial power scale.

7. Kemper also was exposed to a mega-project risk because of its adoption of an expedited 'fast-track' design and construction schedule. This meant that construction was begun before the final plant design was developed. In fact, the Company has acknowledged that none of the final design work had been started as of the time of the certificate docket in late 2009 and early 2010.

8. Mississippi Power re-evaluated Kemper's economic viability in early 2011. However, the Company's new economic viability analyses were biased by a continued failure to consider the potential for significant capital cost increases and by the continued use of extremely high natural gas prices in many scenarios. This was imprudent.

9. Natural gas prices have been very low in recent years and are expected to remain low for the foreseeable future. This means that Mississippi Power's ratepayers will be paying for very expensive power from Kemper during a sustained period of low natural gas prices.

10. This situation could have been avoided if Mississippi Power had seriously considered the very strong likelihood that the cost of building the Kemper IGCC Project would be substantially higher than the Company was claiming in 2009 and 2011. Instead, the Company dismissed the risks of installing a new IGCC technology at Kemper and of capital cost increases as "unlikely and comparatively insignificant."

Q. What prudence standard have you applied in your review of Mississippi Power's management of its resource planning for the Kemper IGCC Project?

A. I have employed the standard commonly used in regulatory reviews of the prudence of utility resource planning. This standard requires that the utility's decisions and actions be evaluated in light of the information that was available to it in the pertinent time frame. Information that is available only through hindsight is given no weight. This standard is based on judgments concerning how reasonable people, with the skill and knowledge attributed to reasonable utility managers should have been expected to cope with the circumstances and problems facing Mississippi Power concerning the Kemper IGCC Project. Although hindsight is not used, prudence does take into account what the utility could have known, had it made the inquiry a reasonable utility would make.

Q. Does this standard require a utility to re-examine its construction program in light of changed circumstances?

A. Yes.[1]

---

[1] IURC Order in Re Northern Indiana Public Service Company, 67 PUR4th, at pages 400-405.

Q. Does the magnitude of the risk to the ratepayer have any relevance to prudence?

A. Yes. Prudence does follow common sense, in that greater risks require a more substantial inquiry on the part of the utility.

Q. In your experience it is prudent utility practice to consider uncertainty in resource planning analyses?

A. Yes. Prudent resource planning considers uncertainty by examining ranges of values for the key input parameters such as plant construction costs, fuel costs, CO_2 costs, loads forecasts, and operating performance. For example, as part of the analyses of the proposed Cliffside Project coal plant that it presented to the North Carolina Utilities Commission, Duke Energy Carolinas examined a number of sensitivities that included a 20 percent higher construction cost for a new coal plant.[2] Indeed, Duke even analyzed a sensitivity reflecting another 20 percent higher capital cost for a new coal plant in November 2006, which was just after the Company had just increased the estimated cost of the Cliffside Project by approximately 47 percent.

Q. Does the prudence standard require a utility to learn from its experience?

A. Yes. While utilities are not expected to have perfect foresight, learning from experience is "certainly a reasonable effort in any marketplace…"[3]

Q. What research have you undertaken in preparing this testimony?

A. I have reviewed Mississippi Power's Original Petition filed on June 28, 2013, its August 9, 2013 Initial Submittal of Prudently Incurred Costs, and its December 13, 2013 Supplemental Filing in Support of Prudence. I also drafted four sets of data requests that Mississippi Power and the Company's incomplete responses to

---

2 Supplemental Testimony of Janice D. Hager on behalf of Duke Energy Carolinas, November 29, 2006, North Carolinas Utilities Commission Docket No. E-7. SUB 790, at page 6, line 1.

3 Indiana Utility Regulatory Commission ("IURC") Order in Cause No. 41338-GCA4, at page 19.

those requests. In addition, I have reviewed the Company's responses to the discovery submitted by the other active parties.

I also have reviewed the evidentiary record, including the testimony and transcripts, from Commission Docket No. 2009-UA-014 in which the Company sought a certificate to build Kemper. In addition, as part of my ongoing work, I regularly review materials related to the operations, costs, and financial and economic risks associated with proposed and existing coal-fired power plants as well as current and projected natural gas and coal prices.

Q. Have you been able to complete your assessment as of this time?

A. No. I have not been able to conduct a full and detailed review of Mississippi Power Company's management of the Kemper IGCC Project for several reasons. First, unlike every one of the more than twenty prudence reviews in which I have participated, Mississippi Power has not yet filed a real affirmative explanation of why Kemper's capital cost has increased by approximately $2 billion, or 70 percent, since late 2009. Nor has the Company provided a detailed defense of the prudence of its management of the Project. Instead, the Company has merely filed a number of short pieces of testimony that address general points rather than showing (1) that the increases in the cost of the Kemper IGCC Project were unavoidable, beyond its control and could not be reasonably anticipated and (2) that the Company reasonably considered the economic viability of completing Kemper as an IGCC Project in light of the uncertainties in plant construction costs, natural gas prices, CO_2 emissions costs and byproduct sales revenues. Despite retaining its prudence consultants last June, the Company is withholding its main prudence case until the filing of its rebuttal testimony that will be right before the hearings in this proceeding.

Second, the Company has refused to provide numerous documents that utilities regularly provide during discovery. These withheld documents include, for example, the utility's internal evaluations of the confidence levels in its cost projections. For a "mega-project" like Kemper, the measures used to estimate costs would be expected to have very substantial documentation, including examination of uncertainties in capital cost by management. The documentation MPC has produced is modest and has essentially no discussion of this issue.

Third, the Company was extremely slow in providing responses to some of the Sierra Club's data requests. Most importantly, on August 22, 2013, the Sierra Club requested that Mississippi Power provide the minutes and presentations from internal Company meetings related to Kemper. Limited materials, in redacted form, were not provided until November 7, or more than two months after they were requested. More complete, but still substantially redacted, responses to this request were not provided until early in 2014.

Finally, the Company has severely redacted many of the documents it has provided. For example, as I will explain later in this testimony, the Company has redacted just about all of the materials related to its visits to Duke Energy Indiana's Edwardsport IGCC Project and its discussions with Duke's management personnel for Edwardsport. I can see no reason why these materials have been redacted other than to prevent the Sierra Club from learning what Mississippi Power knew about the escalating costs and the serious problems being experienced at Edwardsport, the only other IGCC Project under construction in the U.S.

Nevertheless, I believe that the information I have reviewed suggests strongly that the Company's spending of approximately Five Billion Dollars on Kemper has not been prudent and that the Project should either not have been undertaken in the first place or should have been reconsidered and cancelled in 2010 or 2011 before substantial expenditures had been made.

Q. **Why is the information that Mississippi Power has not provided important in an assessment of the prudence of the Company's Kemper-related expenditures?**

A. Sierra Club's Second Motion to Compel and Rebuttal in Support of Second Motion to Compel details the reasons that the information that Mississippi Power has refused to provide ought not to be withheld .

This information is critical to completing a full prudence review of the Kemper County IGCC Project. For example, the information that the Company learned during its discussions with and sites visits to the Edwardsport IGCC Project is plainly relevant in that the costs and problems experienced at Edwardsport should have and did inform the Company practices. Edwardsport was and remains the only other IGCC plant under construction in the U.S. What the Company learned about Edwardsport is relevant to this prudence review even if Mississippi Power would rather not share what it learned with the Sierra Club and the Commission.

The company's evaluations of the reliability of cost estimates are critical in that, for a project of Kemper's size and import, a reasonable utility would have estimated the cost level at which it could be confident that its projections were accurate. As explained later in this testimony, the only evaluations of the reliability of the cost levels which Mississippi Power has produced here – and it has not even produced these to the Sierra Club - [redacted] If Mississippi Power did not carry out any evaluations at a higher confidence level for a project of the magnitude of Kemper, then its actions in essence were per se imprudent. If it did carry out such evaluations, they should be produced.

The purported value of Kemper was based in part on the sales of its byproducts. The byproduct sales contracts were not signed at the time the certificate was issued. However, the contracts later signed were redacted before being produced.

This information is important to assessing the Company's decision to continue with the Kemper project.

Finally, the interview notes taken during Pegasus Global's interviews of the Project team are likely to yield significant and entirely relevant information regarding the team's thought processes and actions and will undoubtedly inform Dr. Galloway's audit. It serves no purpose but the Company's to deny Intervenors access to the same information. As Sierra Club noted in its Second Motion to Compel, Dr. Galloway's notes of the interviews she and her team conducted during its prudence review of the Edwardsport IGCC Project were provided to intervenors in the Indiana Utility Regulatory Commission's ("IURC") Cause No. 43114 IGCC-4S1.

Q. Have the other types of documents that Mississippi Power has so far refused to provide typically been given to intervenors during discovery in power plant construction prudence reviews?

A. Yes.

KEMPER IGCC PROJECT RISKS

Q. What are the main risks that the Kemper IGCC Project has faced since the Company filed its testimony in 2009 requesting a certificate to build the plant?

A. The Kemper Project has faced the following six main risks: (1) that the cost of building the plant would be significantly higher than the Company was telling the Commission in 2009 and using in its viability analyses; (2) that natural gas prices would be substantially lower than the Company had used in its viability analyses, thereby making the alternatives less expensive; (3) that the Company will have less of a need for the power from Kemper due to either or both of reduced demand and energy forecasts or cancelled plant retirements; (4) that the plant with a first-of-a-kind IGCC technology would not operate as well as the Company was forecasting; (5) that CO_2 emissions prices ultimately will be higher than were anticipated in 2009; and (6) that byproduct sales will not produce the revenue projected.

Q. What was the Company's position in Docket No. 2009-UA-014 concerning these risks?

A. The tenor of Mississippi Power's attitude towards the potential for significant increases in the cost of building the Kemper IGCC Project was provided by Company witness Flowers' testimony that the risks of installing new technology and the risk of capital cost escalation were "unlikely and comparatively insignificant."[4]

At the same time that the Company all-but-dismissed the risk of higher capital costs, it aggressively attacked the position that the collapse of natural gas prices that had occurred in 2008 was a long-term change in the gas market that would negatively impact the economic viability of the Kemper IGCC Project. Instead, the mostly extraordinarily high natural gas prices used by Mississippi Power in the economic viability analyses it presented in Docket No. 2009-UA-014 assumed that the then-recent collapse of natural gas prices was but a blip and was not the game changer that other leading utilities and observers predicted.

The Company failed to provide any assessment of the economic viability of the IGCC Project if Kemper does not perform as well as the Company has projected for its future equivalent availability, new MW output, heat rate or net generation. This was not an unreasonable expectation given that Kemper is a first-of-a-kind plant with new IGCC technology that has never been used at commercial power scale.

[4] Phase Two Direct Testimony of Kimberly D. Flowers, at page 13, lines 12-18, and Tr. 1399.

Q. Was this prudent?

A. No. A reasonable utility would have conducted a fair and balanced set of economic analyses and would have considered the potential for future Kemper capital cost increases especially because it was proposing to build a plant with a first-of-a-kind IGCC technology at commercial scale. A reasonable utility also would have considered the potential that the Project would not operate as well as was being forecast at the time. Instead of doing that, Mississippi Power acted as an aggressive advocate for building Kemper as a new IGCC Project, and actively downplayed the risk of cost overruns and ignored the potential for poorer operating performance that the Company was projecting.

Q. Do the Company's internal documents and its testimony from Docket No. 2009-UA-014 suggest why it took that position?

A. Yes. Mississippi Power wanted to take advantage of the federal subsidies available for a new IGCC plant. The Company was well aware of the risks associated with a very tight construction schedule in a very large "first-of-a-kind" project. However, the Company elected to press ahead and did not mention these risks to the Commission. Further, the Company's [redacted] However, the Company's repeated refusal during Docket No. 2009-UA-014 to agree to a cost cap in spite of its belief that the risks associated with installing the new IGCC technology and capital cost increases were "unlikely and comparatively insignificant" further shows that Mississippi Power wanted its ratepayers, not its owners, to bear the risk that its gamble on being a First Mover on IGCC technology was ill placed.

Q. Just to be clear, Company witness Flowers testified in Docket No. 2009-UA-014 that Mississippi Power had developed scenarios around a reasonable range of key uncertainties so that it and the Commission could consider both qualitatively and quantitatively the "consequences" that arise under varying scenarios."[5] In fact, did the Company examine a reasonable range for all of the <u>key</u> uncertainties?

A. No. In the economic analyses it presented to the Commission in 2009 as part of its Phase Two filing, the Company did not consider a range of uncertainty for the capital cost of the proposed Kemper IGCC Project, a critically important uncertainty for the Project. Instead, the Company merely relied upon the cost estimate from its Front End Engineering Design ("FEED") study with a rather small six percent contingency. Nor did the Company look at any uncertainty in the Project's future operating performance. At the same time, although Mississippi Power did look at a range of values for future CO_2 and natural gas prices, the gas prices it used were extremely high, as I discussed in my Phase Two testimony in Docket No. 2009-UA-014, and as I will discuss further below.

The Company did present a 'break-even' capital cost analysis as part of its rebuttal filing. However, as I will explain later in this testimony, that 'break-even' analysis actually showed that if the 26 percent estimated capital cost increase that had already been experienced by late 2009 at the Edwardsport IGCC Project (the only other IGCC Project under construction in the U.S. and two years ahead of Kemper) was considered then building Kemper as an IGCC Project was only the lower cost scenario in the Company's highest natural gas cost cases. Building the alternative natural gas-fired combined cycle plant would be the lower cost option in all of the other natural gas scenarios considered by the Company even accepting all of Mississippi Power's other assumptions.

---

[5] Phase Two Direct Testimony of Kimberly D. Flowers, at page 12, lines 15-19.

The Risk of Significantly Higher Kemper Capital Costs

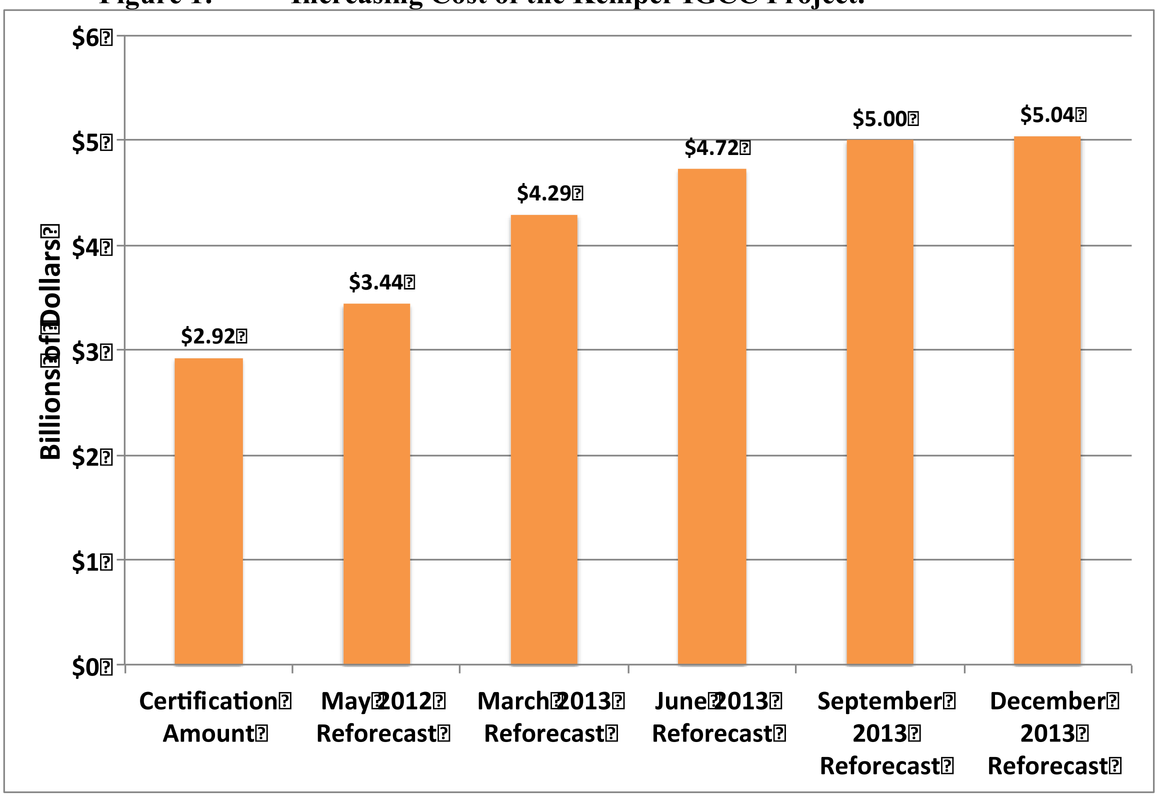
Q. What estimated cost for the Kemper IGCC Project did the Company present in its testimony in Docket No. 2009-UA-014?

A. The Company projected an estimated total cost of approximately $2.97 billion for the Project at the time of the Certification Docket in late 2009/early 2010.

Q. By how much has Kemper's estimated cost increased since that time?

A. The increasing cost of the Kemper IGCC Project is presented in Figure 1, below:

Figure 1: Increasing Cost of the Kemper IGCC Project.



Thus, Kemper's estimated cost has increased by $2.1 billion, or 70 percent, since the Commission issued a Certificate in 2010.

Q. Should Mississippi Power have anticipated these cost increases?

A. Yes. The cost increases that have been experienced by the Kemper IGCC Project were inevitable, foreseeable and, in fact, were foreseen.

Q. What evidence should have led the Company to conclude that significant increases in the cost of the Kemper IGCC Project beyond the $2.97 billion estimate it presented in Docket No. 2009-UA-014 were inevitable?

A. At the time that it sought and received the certificate to build Kemper from the Commission, the Company knew that the Kemper IGCC Project would be a first-of-a-kind IGCC plant, and, therefore, would clearly be exposed to significant risks and uncertainties. At the same time, industry experience beginning around 2002 showed that coal plant construction costs were skyrocketing. This potential for higher costs was especially acute at Kemper given the relatively incomplete state of project engineering during 2007 and 2008. Finally, Kemper's large size (in investment dollars), the planned involvement of multiple suppliers and contractors and an extended "fast-track schedule" exposed the Company to a "mega-project" risk that added to the cost and schedule uncertainty surrounding the Project.

First Mover Risks

Q. What was the status of IGCC technology in 2009 when Mississippi Power sought a certificate from the Commission?

A. Although new IGCC designs were being proposed by vendors and architecture-engineering firms and being considered by a handful of utility and merchant companies around the U.S., the technology was generally considered to be "unproven," "immature," and "still in its infancy."[6] In fact, only one other IGCC project, Duke Energy Indiana's Edwardsport IGCC Project, was under construction. All of the other proposed IGCC plants had either been cancelled, or were on hold. Moreover, while a number of studies and articles cited potential

[6] *Utilities split on readiness of IGCC*, Power Magazine, October 15, 2006.

long-term benefits to future IGCC plants, there was no serious disagreement in the industry after about 2004 that a company that chose to be a first mover in building a new IGCC unit would face significant technology-related cost and performance risks and uncertainties. By and large, the only companies that were saying that there were little or no risk associated with new IGCC projects were those seeking to profit from their development.

For example, in March 2004 the National Association of Regulatory Utility Commissioners ("NARUC") released its Final Report titled *An Analysis of the Institutional Challenges to Commercialization and Deployment of IGCC Technologies in the U.S. Electric Industry; Recommended Policy, Regulatory, Executive and Legislative Initiatives*.

This Report presented the results of a survey of a wide range of IGCC experts and institutional stakeholders. The survey was intended to identify and prioritize the challenges that needed to be overcome to expand the deployment of IGCC plants. The survey was designed to rank each of the challenges in accordance with its relative significance.[7]

The results of the survey were striking. Financial items were clearly viewed as being the most significant challenge to IGCC deployment. Three financial issues were ranked as "Top-Tier" items, with scores of 4.00 and higher:

- Higher capital cost than NGCT (mean score = 4.41)
- Doubts regarding commercial availability of IGCC (mean score = 4.11)
- Increased risk due to higher up front development costs (mean score = 4.02)

[7] NARUC Report, at page 22.

Nearly two-thirds of the respondents ranked higher capital costs than NGCT as the single most significant challenge to IGCC deployment.[8]

The key technological challenge identified by the survey was the chance of low plant availability. With a mean score of 4.14, the chance of low plant availability was the second most critical challenge overall in the survey results. Other significant concerns were skepticism regarding IGCC technology in general and the general lack of IGCC operating experience.[9]

In summary, the survey results showed that financial issues represented the most critical challenges to IGCC deployment. The areas of greatest concern included the relatively high capital cost of IGCC power plants and doubts about their commercial viability, along with one technical concern – the chance of low plant availability.[10]

In early 2007 Florida Power & Light ("FPL") decided to build a new Ultra Supercritical Coal Plant ("USCPC") instead of an IGCC unit. The company explained the basis for this decision to the Florida Public Service Commission in February 2007:

> At the most basic level, USCPC technology is proven and reliable in large scale utility applications. In contrast, IGCC is not proven and reliable in large scale utility applications. This is demonstrated by the fact that there are only four operating coal-fired IGCC plants in the world, two of which are small (less than 300 MW), and are demonstration projects. USCPC units have been built commercially and have satisfied projections of cost, efficiency, reliability, and environmental performance. In contrast, existing IGCC units have not been built commercially, and despite the economic advantage of receiving substantial government funding have not met projections of cost, efficiency, reliability, and environmental performance. **The "next generation" IGCC plants expected to be operational in the 2011-2015 period will be in the 600 MW range. None of the next generation IGCC units**

8 Id, at page 28.

9 Id, at page 29.

10 Id, at page 32.

> **have been built; therefore such units have not been proven to be cost-effective, reliable, and to deliver acceptable environmental performance.** For all of these reasons, both the current and next generation of IGCC plants are insufficient to meet the fuel diversity goals of FPL for its customers.[11] (Emphasis added)

FPL's decision not to pursue IGCC technology was based, in significant part, on a Clean Coal Technology Study that had been prepared for that company in January 2007 by Black & Veatch. In this Study, Black & Veatch concluded that "Cost, schedule and plant availability issues cause IGCC projects to have higher financial risk than conventional PC or CFB power generation projects:"

> Details regarding the guarantee levels for cost, schedule and performance; the associated liquidated damages clauses and risk premium; and availability assurances are not well defined at this time. It is expected that the standards for contractual arrangements between owners and constructors will evolve based on the experiences of the next generation of IGCC project development.[12]

A September 2008 *IGCC Technology Overview and Site Feasibility* evaluation of gasification technology by the Dairyland Power Cooperative in Wisconsin similarly noted the immature nature of IGCC technology and the risks associated with undertaking new IGCC Projects:

> Reliability – The few existing commercial applications of gasification or IGCC technology have proved to be extremely unreliable. While several utilities have proposed IGCC projects, almost all have been put on hold or rejected by state public service commissions because of the lack of proven reliability and high cost.[13]

And:

11 Direct Testimony & Exhibit of David N. Hicks on behalf of Florida Power & Light, in Florida Public Service Commission Docket No. 07-0098-EI, at page 11, lines 5-22.

12 Florida Power & Light Clean Coal Technology Selection Study, January 2007, Exhibit DNH-2, at page 54 of 110.

13 *IGCC Technology Overview & Genoa Site Feasibility*, September 3, 2008, Dairyland Power Cooperative, at page 1.

> IGCC technology is still in its infancy with only limited commercial applications in existence. These initial operations have proven to be extremely unreliable in comparison to existing coal technologies….
>
> *   *   *   *
>
> … Many experts hope that the next generation of IGCC will have availability which is more in line with current industry expectations; but the current state of the technology has not demonstrated that level of availability. Current and near-term IGCC plants must be viewed as technically feasible, but not delivering the cost or the performance to be economically attractive.
>
> *   *   *   *
>
> A number of studies have looked at "market barriers" to widespread IGCC implementation. IGCC "uncertainties" include lack of standard plant design, performance guarantees and high capital costs. These uncertainties call into question whether the technology is commercially viable today. IGCC veteran Stephen D. Jenkins testified in January 2007 that IGCC technology will not be ready for six to eight years, has limited performance and emissions guarantees, and that commercial-scale carbon dioxide capture and storage has not been demonstrated.[14]

In fact, as recently as June 2010, a *Coal Technology Selection Study Update* prepared by Black & Veatch for the Tri-State Generation and Transmission Association and the Sunflower Electric Power Corporation similarly concluded that:

> Though the demonstration of these five commercial coal-fueled IGCC plants has provided benchmarks for expected capacity and environmental performance, uncertainty still remains regarding availability, reliability and cost. The complexity and relative immaturity of the IGCC process increases opportunities for deficiencies in design, vendor-supplied equipment, construction, operation, and maintenance. The high risks of capital cost overruns and low availability in the first few years of operation have

[14] Id, at page 6.

> presented obstacles to the development of non-subsidized coal-fueled IGCC projects.[15]

Q. Have you seen any evidence that Black & Veatch communicated this same conclusion directly to Mississippi Power?

[redacted]

Q. Was it generally recognized that IGCC projects were vulnerable to dramatically increasing capital costs?

A. Yes. For example, a July 1, 2007 editorial by the Editor-in-Chief of Coal Power Magazine warned about "IGCC Sticker Shock:"

> Former Illinois Senator Everett Dirksen once observed, "A billion here and a billion there, and pretty soon you're talking real money." The same can be said about skyrocketing estimated costs of integrated gasification combined cycle (IGCC) plants as their designs are fleshed out. The higher price tags shouldn't be a surprise – the more you learn about the complexity of a project, the higher your guess about its costs will go.
>
> These escalating cost estimates are especially important to ratepayers in West Virginia and Virginia, where the first next-generation IGCC plants (IGCC 2.0, if you will) are scheduled to be built. An earlier contended was a site in Ohio, but that state's Public Utilities Commission disallowed utility recovery of the development costs of a project there….
>
> PRICEY PLANT

---

[15] Holcolm Expansion Project, Coal Technology Selection Study Update, Black & Veatch, June 18, 2010, at page 3-18.

[16] See page 185 of SC-MPC-1-4_SUPP_ATT C_MRB 2009_CONFIDENTIAL_IV.

This June, Appalachian Power (an AEP subsidiary) proposed rate increases to cover the $2.23 billion cost of building an IGCC unit capable of being retrofitted for carbon capture at its Mountaineer Power Plant in New Haven, W.Va. "[The rate hikes] wouldn't be immediate," according to AEP spokesman Pat Hemlepp. "By the time the [unit] goes into operation [in 2012], the total [increase would be just a little less than 12%," he added. Ditto for Virginia ratepayers, who also would see their bills rise by an average 12%. Both increases would be phased in as costs are incurred.

AEP says that the new IGCC unit is needed to address load growth likely restrictions on CO2 emissions. It makes sense from that perspective, but it raises a question: Should ratepayers be responsible for funding development of an unproven technology, whose raison d'etre is meeting carbon caps that may not be imposed for many years, if ever?

OTHER OPTIONS

*　　　*　　　*　　　*

Tough decisions on IGCC face state utility regulators charged with balancing the technology's development risks. If a utility pushes the IGCC envelope too far, a plant may not perform as advertised, or not at all. If its costs are made recoverable, the bill will end up in the laps of ratepayers, not the utility's shareholders.

It seems to me that ratepayers should not assume any additional cost, performance, or scheduling risks over those presented by other, less-expensive and more-mature generation technologies. In balancing those risks, regulators should give IGCC-enamored utilities the opportunity to earn a higher than usual return on their investment – after the project has proven successful.

Fair allocation of the incremental costs and rewards of IGCC should be the goal of every state public service commission, as its ratepayers' eyes and ears. At the end of the day, the shareholders who elected the management team to make wise technology decisions should pay the freight if those decisions go south.

Corporate management teams come and go, but a bad project lives forever.[17]

[17] Speaking of Coal Power: IGCC Sticker Shock. Coal Power Magazine, July 1, 2007.

Q. How many new IGCC projects actually had been proposed in the U.S. by about 2007?

A. In her September 2011 testimony concerning the Edwardsport IGCC Project, Mississippi Power witness Galloway noted that by early 2007 gasification development was now nationwide and included a list of some 27 IGCC projects.

Q. How many of these projects actually had started construction by the time that Mississippi Power was seeking a certificate for the Kemper IGCC Project?

A. Only the Edwardsport IGCC Project had actually started construction in the U.S. as of late 2009. All of the other projects had been cancelled, indefinitely postponed or were on hold.

Q. Have any of the developers of the cancelled IGCC projects indicated why those plants were cancelled?

A. Yes. A number of the developers publicly explained the rationales for their decisions to cancel proposed IGCC projects. For example, Tampa Electric, the owner of the Polk IGCC unit that Duke said it was using as the basis for the initial design of Edwardsport, cancelled a proposed IGCC plant in the fall of 2007 due to uncertainty related to CO_2 regulations, particularly capture and sequestration issues, and the potential for related project cost increases. According to a company press release, “Because of the economic risk of these factors to customers and investors, Tampa Electric believes it should not proceed with an IGCC project at this time,” although it did say that it remained steadfast in its support of IGCC as a critical component of future fuel diversity in Florida and the nation.

Other companies also had cancelled proposed IGCC projects by 2009 when Mississippi Power was aggressively pushing ahead with the Edwardsport IGCC Project. Some examples include:

- In June 2007, the Tondu Corp. announced that it was suspending plans to build a planned 600 MW IGCC facility in Texas citing high costs and other concerns related to technology and construction risks.[18]
- Xcel Energy announced in October 2007 that it was deferring indefinitely its plans to build an integrated gasification combined cycle plant ("IGCC") in Colorado because the development costs were higher than the utility originally expected.[19]
- The Orlando Utilities Commission announced in November 2007 that it was cancelling the coal gasification portion of a 285-megawatt IGCC plant at the Stanton Energy Center. Construction will continue on the natural gas-fired combined cycle generating unit. The Commission cited the impact of possible federal and state regulations related to future emissions restrictions in the state of Florida as the primary reason for terminating construction.[20]

Q. Is there any reason to believe that Mississippi Power was not aware of the cancellation of these projects or the factors that had led to those cancellations?

A. No. The Company either knew or should have known from public sources the reasons why other proposed IGCC projects were being cancelled.

Q. Did state regulatory commissions express concern about the uncertainties surrounding IGCC technology and the potential for increasing capital costs?

A. Yes. Although the Indiana and West Virginia Commissions did approve certificates for proposed IGCC projects, other state commissions rejected rate recovery for costs related to proposed IGCC plants. As a result, these projects were cancelled.

For example, the Minnesota Public Utilities Commission refused in August 2007 to approve an agreement under which Xcel Energy would have purchased power from a proposed IGCC facility due to concerns over the uncertainties surrounding

---

18 http://www.reuters.com/article/companyNewsAndPR/idUSN1526955320070615

19 Denver Business Journal, October 30, 2007.

20 http://www.ouc.com/news/releases/20071114-secb.htm.

the plant's estimated construction and operating costs and operating and financial risks.[21]

At the same time, the Virginia State Corporation Commission refused to require Virginia ratepayers of Appalachian Power Company to bear any of the costs of the Company's proposed IGCC plant citing uncertainties of costs, technology, and unknown federal mandates.[22] The Commission also found that "… APCo has no fixed price contract for any appreciable portion of the total construction costs; there are no meaningful price or performance guarantees or controls for this project at this time. This represents an extraordinary risk that we cannot allow the ratepayers of Virginia in APCo's service territory to assume."[23]

The Commission also noted the uncertainties surrounding federal regulation of carbon emissions and carbon capture and sequestration technology and costs, and observed that the Company was asking for a "blank check."[24] On this basis, the Commission concluded that "We cannot ask Virginia ratepayers to bear the enormous costs – and potentially huge costs – of these uncertainties in the context of the specific Application before us."[25]

Q. Has Company witness Galloway agreed that there were risks and challenges for a company investing in the first new IGCC plants and that the industry as a whole was aware of these risks, challenges and uncertainties?

A. Yes.[26]

---

21 Order in Docket No. E-6472/M-05-1993, dated August 30, 2007, at pages 16-19.

22 Final Order in Case No. PUE-2007-00068, April 14, 2008. Available at http://scc.virginia.gov/newsrel/e_apfrate_08.aspx.

23 Id, at page 5.

24 Id, at page 10.

25 Id, at page 10.

26 Phase II Responsive Testimony of Dr. Patricia D. Galloway in Indiana Utility Regulatory Commission Cause No. 43114-IGCC-4S1, dated September 9, 2011, at page 90, lines 14-17.

Q. Did the Company acknowledge these risks and uncertainties in its testimony in Docket No. 2009-UA-014?

A. No. As explained earlier in this testimony, the Company testified that the risks associated with installing new technology at Kemper were "unlikely and comparatively insignificant."

Q. Did the Company acknowledge the risks of being a First Mover in a new IGCC technology in its internal meetings and documents?

A. Yes. For example:

- [redacted]
- [redacted]
- [redacted]
- [redacted]

---

27 Docket No. 2009-UA-014, at Tr. 1359, lines 21-23.

28 Sierra Club-MPC 1-4 Supplemental Attachment I, at page 8 of 8.

29 Kemper IGCC January 18, 2011 Production Meeting, at Sierra Club-MPC 1-4 Supplemental Attachment K, at page 1 of 169 and Mississippi Power Kemper IGCC Project Update presentation at the December 13, 2010 meeting of the Nuclear/Operations Committee of the Southern Company Board of Directors, Sierra Club-MPC Attachment 1-4 Attachment I, at page 2 of 14.

[redacted]

Q. Did the Company tell the Commission in Docket No. 2009-UA-014 that it believed tha[redacted]

A. No. I believe that they did not tell this to the Commission.

Q. Do you have any comments on the following conclusion of what Company witnesses have described as the independent October 2008 *Technology Risk Assessment of the Kemper County IGCC Plant Design* - [redacted]

A. Yes. I have three comments. First, without disparaging the expertise of the two authors of the assessment, it wasn't really "independent," as both authors worked for Southern Company. Second, as I have described above, their conclusion that [redacted]" [redacted] is contrary to the general industry view I have discussed above. Finally, even if it were true that the construction risks for Kemper were not materially greater than the risks for any other coal-fired major construction projects that would not mean that the risks were necessarily "unlikely or comparatively insignificant." As I will discuss in the next section of my testimony, since 2002 the estimated costs of even those new coal plants using the more traditional pulverized coal technologies increased by 100 percent or more in just a few years.

---

30 Sierra Club-MPC 1-4 Supplemental Attachment I, at page 11 of 12.

Skyrocketing Coal Plant Construction Costs

Q. Would it have been reasonable in 2009 and 2010 to expect that the construction cost of the Kemper Project would increase substantially over time even if the Project employed more traditional coal technologies instead of the new and untested combination of technologies being in employed in a first of its kind IGCC plant?

A. Yes. There would have been a significant risk of a substantial cost increase even if Kemper had been a typical pulverized coal plant instead of an IGCC Project with new technology. In fact, coal power plant construction costs had risen dramatically since 2000 as a result of a worldwide competition for design and construction resources, equipment, and commodities like concrete, steel, copper and nickel. Terms like "staggering" and "skyrocketing" have been used to describe these cost increases. Coal-fired power plants that were estimated to cost $1500 per kilowatt in 2002 are now projected to cost in excess of $3500 per kilowatt.

Almost every proposed coal-fired power plant of which I am aware experienced large cost increases in the years 2005-2010. For example, the estimated per unit construction cost of Duke Energy Carolina's Cliffside Project increased by 80 percent just between the summer of 2006 and June 2007. Similarly, AMP-Ohio cancelled its proposed Meigs County coal plant in the fall of 2009 after the estimated cost of the plant increased by 37 percent only thirteen months after the previous estimate had been issued.

Q. Was it widely accepted in the industry by 2009 that coal plant construction costs had, in fact, skyrocketed and were likely to continue to rise in the future?

A. Yes. For example, a June 2007 report by Standard & Poor's, *Increasing Construction Costs Could Hamper U.S. Utilities' Plan to Build New Power Generation*, reported that:

> As a result of declining reserve margins in some U.S. regions … brought about by a sustained growth of the economy, the domestic power industry is in the midst of an expansion. Standing in the way are capital costs of new generation that have risen substantially over the past three years. Cost pressures have been caused by demands of global infrastructure expansion. In the domestic power industry, cost pressures have arisen from higher demand for pollution control equipment, expansion of the transmission grid, and new generation. While the industry has experienced buildout cycles in the past, what makes the current environment different is the supply-side resource challenges faced by the construction industry. A confluence of resource limitations have contributed, which Standard & Poors' Rating Services broadly classifies under the following categories
>
> - Global demand for commodities
> - Material and equipment supply
> - Relative inexperience of new labor force, and
> - Contractor availability
>
> **The power industry has seen capital costs for new generation climb by more than 50% in the past three years, with more than 70% of this increase resulting from engineering, procurement and construction (EPC) costs. Continuing demand, both domestic and international, for EPC services will likely keep costs at elevated levels. As a result, it is possible that with declining reserve margins, utilities could end up building generation at a time when labor and materials shortages cause capital costs to rise, well north of $2,500 per kW for supercritical coal plants and approaching $1,000 per kW for combined-cycle gas turbines (CCGT).** In a separate yet key point, as capital costs rise, energy efficiency and demand side management already important from a climate change perspective,

> become even more crucial as any reduction in demand will mean lower requirements for new capacity.[31] (Emphasis added)

In July 2007, the president of the Siemens Power Generation Group told the New York Times that "There's real sticker shock out there."[32] He also estimated that in the preceding 18 months alone, the price of a coal-fired power plant had risen 25 to 30 percent.

Moreover, a September 2007 report on *Rising Utility Construction Costs* prepared by the Brattle Group for the EDISON Foundation similarly concluded that:

> Construction costs for electric utility investments have risen sharply over the past several years, due to factors beyond the industry's control. Increased prices for material and manufactured components, rising wages, and a tighter market for construction project management services have contributed to an across-the-board increase in the costs of investing in utility infrastructure. These higher costs show no immediate signs of abating.[33]

Q. Should the industry-wide experience with skyrocketing power plant construction costs have warned Mississippi Power that the cost of building the Kemper IGCC Project could increase substantially over time?

A. Yes. Mississippi Power should have accepted and acknowledged that Kemper would be subject to the same risks of significantly higher costs as other coal-fired projects. Instead, as I will explain below, the Company dismissed the risk of further cost increases as "unlikely and comparatively insignificant" and failed to consider the potential for higher plant capital costs each time it reconsidered the economic viability of completing Kemper as an IGCC Project.

Mega-Project Risk

---

31 *Increasing Construction Costs Could Hamper U.S. Utilities' Plans to Build New Power Generation*, Standard & Poor's Rating Services, June 12, 2007, at page 1. A copy of this report is included in Exhibit DAS-G-10.

32 "Costs Surge for Building Power Plants, *New York Times*, July 10, 2007.

33 *Rising Utility Construction Costs: Sources and Impacts*, prepared by The Brattle Group for the EDISON Foundation, September 2007, at page 31. A copy of this report is attached as Exhibit DAS-G-11.

Q. Were there any other risks of which Mississippi Power should have been aware at the time of the Certificate Docket and the subsequent start of construction at Kemper?

A. Yes. Kemper was exposed to what has been called a mega-project risk. A mega-project is an expensive project expected to cost more than $1 billion that involves an extended construction schedule, a fast-track schedule and the involvement of multiple suppliers and multiple contractors.

Q. What is the significance of the fact that Kemper was a mega-project?

A. Being a mega-project added significantly to the cost and schedule uncertainty surrounding the Kemper IGCC Project.

Q: Does this "mega-project risk" have any special significance for a company the size of Mississippi Power?

A: Yes. Mississippi Power is a very small utility. Kemper was expected to approximately double the size of Mississippi Power's balance sheet. A company that small undertaking a project the size of Kemper obviously presents practical risks even beyond those present when a larger company undertakes such a project.

Q. Have you seen any publicly available assessments of the risks associated with mega-projects that were available to Mississippi Power at the time it sought a Certificate for Kemper in 2009 and when construction began in 2010?

A. Yes. A 2003 book, entitled *Megaprojects and Risk: An Anatomy of Ambition*, noted the following concerning the risks associated with mega-projects and the potential for costs overrunning the initial estimates:

> A main cause of overruns is a lack of realism in initial cost estimates. The length and cost of delays are underestimated, contingencies are set too low, changes in project specifications and designs are not sufficiently taken into account, changes in exchange rates between currencies are underestimated or ignored, so is geological risk, and quantity and price changes are

> undervalued as are expropriation costs and safety and environmental demands. Many major projects also contain a large element of technological innovation with high risk. Such risk tends to translate into cost increases, which often are not adequately accounted for in initial cost estimates.[34]
>
> And:
>
> As documented in this and the previous chapters, the risks associated with major infrastructure projects are substantial. Key factors contributing to risk are the facts that the investment will be irreversible and the viability highly dependent on general economic development. Given the magnitude of the uncertainties involved, feasibility studies of major projects with risk analysis are less than useful since such studies will often deceive decision makers and the general public regarding the outcomes of projects. Risks cannot be eliminated from major projects, but they can be acknowledged and their impacts reduced through careful identification and by allocation of risks to those best suited to manage them.[35]

Q. Does Mississippi Power witness Galloway agree that mega-projects involve substantial cost and schedule risks?

A. Yes. In her 2011 testimony concerning Duke Energy Indiana's Edwardsport IGCC Project, Dr. Galloway testified that mega-projects are generally defined within the industry as very large-capital investment projects (costing more than $1 billion U.S. dollars) that attract a high level of public attention or political interest because of substantial direct and indirect impacts on the community, environment, and companies that undertake such projects.[36] Dr. Galloway also testified that other attributes of a mega-project include:

- Execution of an engineered facility or structure which is complex or unusual;
- An extended construction schedule (greater than 4 years);

---

34 At page 12.

35 At page 84.

36 Direct Testimony of Patricia D. Galloway, Petitioner's Exhibit PP in Cause No. 43114 IGCC-4S1, March 10, 2011, at page 6, lines 15-19.

- Multiple equipment and material suppliers;
- Multiple specialty trade contractors;
- Multiple project stakeholders/investors; and
- Multi-national party stakeholder involvement.[37]

She also noted that the challenges that one faces on a typical construction project are orders of magnitude less challenging than one faces on a mega-project.[38]

Dr. Galloway also testified that:

> All mega-projects are executed on a fast-track schedule simply due to the fact that sequential staging adds a tremendous amount of time to the already extended duration to complete a mega-project. As noted above, the more time it takes to execute a mega-project the less reliable the future project condition predictions. And, the less reliable the future project condition predictions, the higher the probability that those conditions will change. Moreover, the cost on a mega-project and the accumulating finance charges usually dictate completion of the project as soon as feasible.[39]

Q. Do you agree with this definition?

A. Yes.

Q. How do you interpret the term "fast-track schedule" used by Dr. Galloway in her Edwardsport testimony?

A. A "fast-track" schedule means that there is not a completed project design when construction is started. A key factor for effective project management, therefore, is to make sure that the necessary engineering analyses and designs are completed on a phased coordinated schedule in time to support equipment and commodity procurement and sufficiently ahead of construction to support the planned construction activities and schedule.

---

[37] Id, at page 6, line 20, to page 7, line 3.

[38] Id, at page 7, lines 9-11.

[39] Id, at page 13, lines 13-20.

Q. What was the status of the design for the Kemper IGCC Project as of the time of the 2009 Certificate docket?

A. According to the Company, the detailed design for the Project had not yet begun.[40] Consequently, the Kemper IGCC Project was fully exposed to the risks and the dangers of a "fast-track" schedule.

Q. Is there any reason to believe that Mississippi Power was unaware at any time that Kemper would be a mega-project and would be subject to the risks that Dr. Galloway associates with such a project?

A. No.

Q. Please summarize your testimony concerning the capital cost risk that Mississippi Power faced as a result of the decision to build the Kemper IGCC Project?

A. Mississippi Power faced three inter-related risks that were widely recognized at the time the Company decided to build the Kemper IGCC Project:

- A First Mover risk with both financial and technological components;
- The risk of skyrocketing plant construction costs caused by industry-wide factors;
- The mega-project risks caused by (a) an extended construction duration; (b) a fast-track design and construction schedule, (c) the need to manage and coordinate multiple suppliers and contractors.

These risks, together, meant that it was extremely likely, if not absolutely certain, that the actual cost of the Kemper IGCC Project would be significantly higher than the Company estimated in its 2009 application for a certificate in Commission Docket No. 2009-UA-014.

---

[40] Id, at page 36, lines 3-5.

Q. Did you warn the Company about the high risk of future construction cost increases at Kemper?

A. Yes. I testified in Docket No. 2009-UA-014 there were significant risks of a higher construction cost and an extended construction schedule at Kemper due to the following factors:

- Kemper was a first-of-a-kind project employing several technologies, that is, the TRIG gasification technology and a CO_2 capture technology that had not yet been used on the commercial scale at which they would be used at Kemper.
- Kemper had an expedited (that is, a "fast-track") schedule that did not allow for the entire project to be designed before the start of construction.
- The experience of Duke Energy's Edwardsport IGCC Project provided a warning of what could happen at Kemper.[41]

Q. Were any of the elements of the then-current Kemper Project construction cost estimate subject to cost caps?

A. No. The Company had said that "Unless fixed by third-party contract when executed, none of the estimates contained in the Company's filing [were] subject to contractual 'cost-caps.'"[42]

Q. Why is the construction cost history of the Edwardsport Project relevant to the question of whether Kemper was likely to experience further cost increases during construction?

A. Duke Energy Indiana's Edwardsport plant was the only IGCC project that was then under construction in the U.S. The two operating IGCC plants in the U.S. both had been completed in the 1990s. As I noted earlier, all of the other IGCC

[41] Phase Two Direct Testimony of David A. Schlissel in Docket No. 2009-UA-014, dated December 7, 2009, at page 35, line 8, through page 41, line 20.

[42] Id, at page 35, lines 16-18.

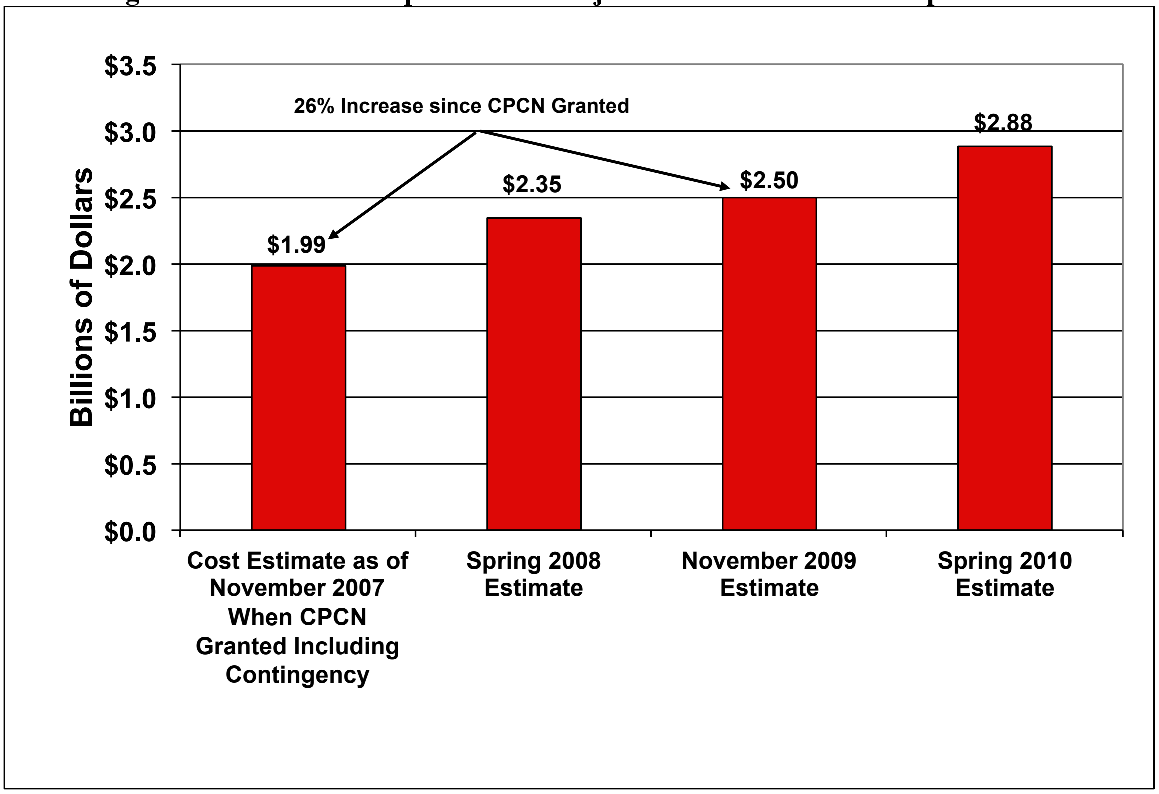
plants proposed in recent years for the U.S. had been cancelled or were on indefinite hold.

Therefore, even though the specific IGCC technologies were different between the two Projects, Edwardsport was a ‘canary in the coal mine’ that should have alerted Mississippi Power to the design evolutions, commodities growth and other problems and cost increases that could be expected at Kemper. Moreover, both IGCC projects were using “fast-track” engineering and construction where construction was begun before the plant’s detailed engineering had been completed.

Q. What had been the construction cost experience of the Edwardsport IGCC Project through the end of 2009?

A. As shown in Figure 2, below, Edwardsport’s estimated construction cost had increased from the $1.985 billion cost estimated in 2007 at the time the Indiana Commission approved the project, to $2.35 billion in November 2009. This represented a 26 percent increase in just two years.

Figure 2: Edwardsport IGCC Project Cost Increases 2007-April 2010.



Q. What were the causes of the 26 percent increase in the estimated cost of the Edwardsport IGCC Project between November 2007 and November 2009?

A. Duke Energy Indiana reported to the Indiana Commission that "...despite [the Company's] best efforts to rigorously manage the Edwardsport IGCC Project, we have experienced design modifications and scope growth above what was anticipated from the preliminary engineering design, adding capital costs to the Project."[43] Duke witness Womack subsequently explained the underlying causes of the latest Edwardsport cost increase as follows:

> As the [Edwardsport] Project moves out of the engineering phase and into full construction, we have experienced design modifications and scope growth above what was anticipated from

[43] Duke Energy Indiana Verified Petition, November 24, 2009.

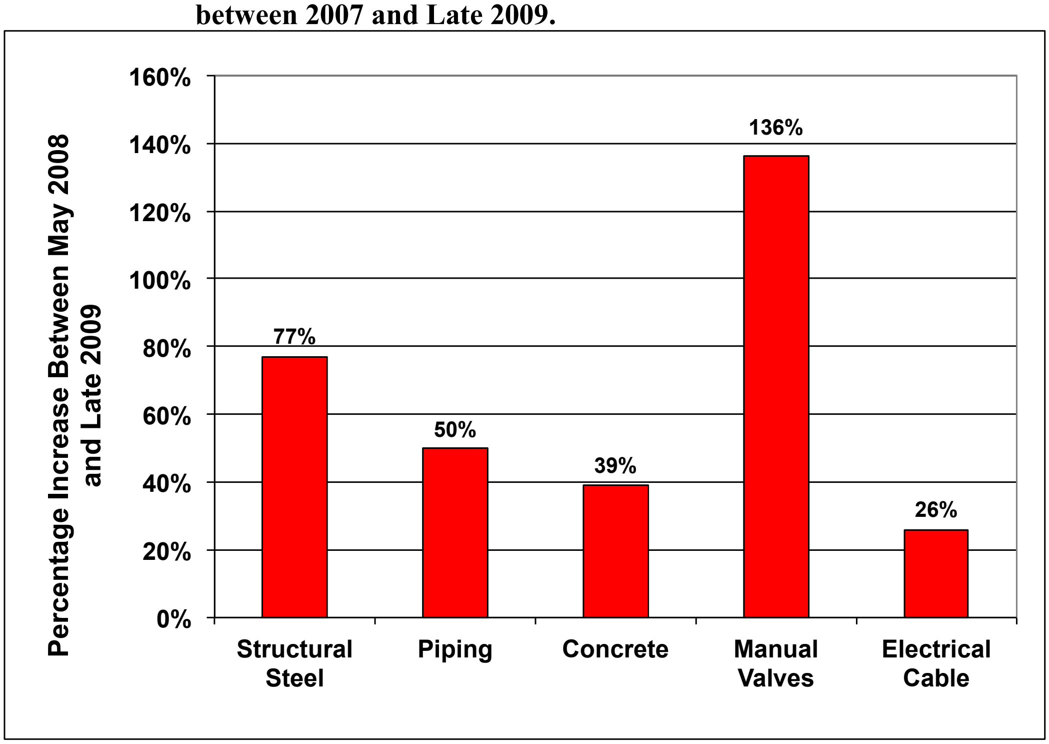
> the preliminary engineering design, adding significant capital costs to the Project.[44]

And:

> The primary causes of the cost increase from the time of the IGCC-3 petition [May 2009] and testimony until now are scope growth due to design development and the increased cost of support services that accompany such scope growth. As the engineering and design work has progressed, the required amount of concrete, steel, pipe, valves, electrical wire, etc., had grown.[45]

As a result, the quantities of commodities used in building Edwardsport had jumped significantly since the plant had been certified in late 2007, as can be seen in Figure 3, below:

Figure 3: Increases in Edwardsport Estimated Construction Commodities between 2007 and Late 2009.



[44] Testimony and Exhibits of W. Michael Womack in Indiana Utility Regulatory Commission Cause No. 43114 IGCC-4, filed December 22, 2009, at page 4, lines 16-19.

[45] Id, at page 15, lines 12-16.

Q. Was this information about the cost increases at the Edwardsport IGCC Project publicly available?

A. Yes. The Duke Energy Indiana testimony reporting Edwardsport's cost increases and schedule delays, and the developments causing these increases and delays, was available on the Indiana Utility Regulatory Commission's website.

Q. What was your conclusion in Docket No. 2009-UA-014 regarding the estimated construction costs that Mississippi Power should use in its economic viability analyses for the Kemper Project?

A. For the above reasons, I recommended that Mississippi Power's economic assessments should reflect the significant risk of higher plant construction costs by including scenarios in which the cost of the proposed Kemper IGCC Project is 20 percent and 40 percent above the currently estimated cost.

Q. Would completion of Kemper as an IGCC plant have been the lowest cost option in these scenarios?

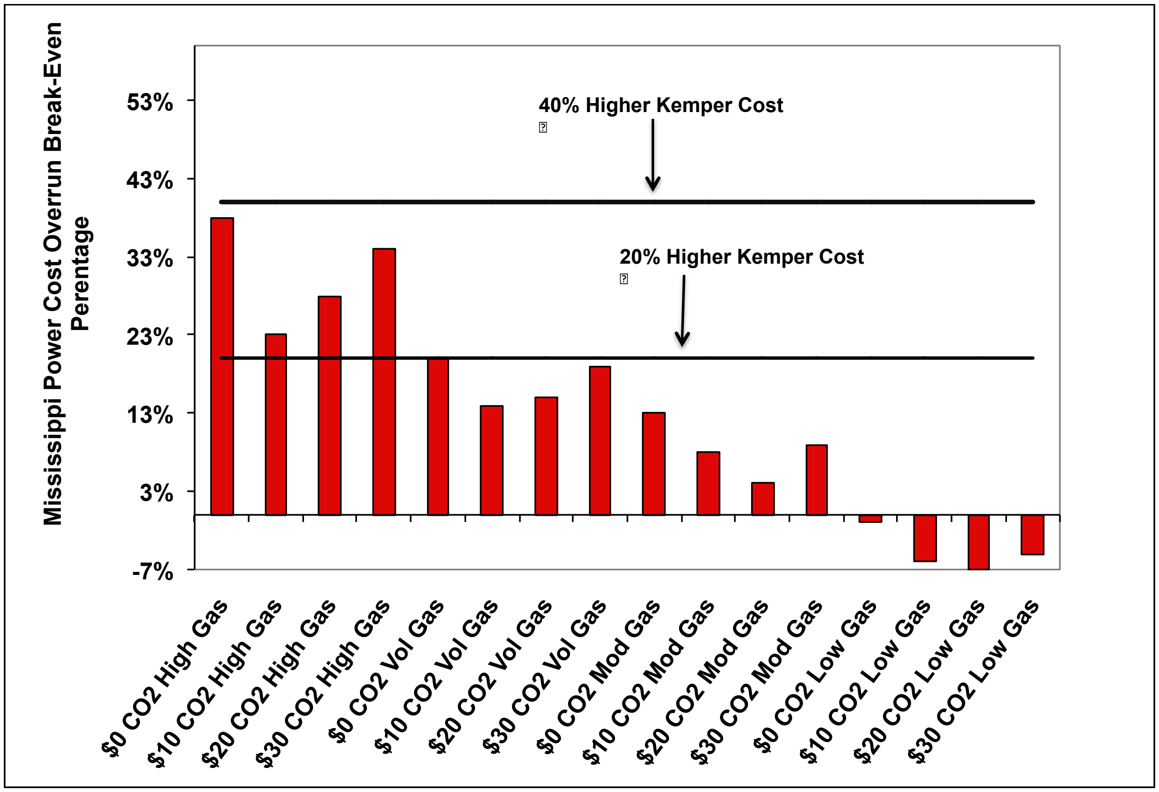
A. In his Phase Two Rebuttal Testimony, Company witness Anderson provided an assessment of the impact of cost overruns at Kemper by asking the following question "How much of an overrun could the Project experience and still be the best self-build alternative when compared to the next best alternative, a natural gas-fired combined cycle" plant.[46] He also testified that this assessment would provide an indication of how robust the Kemper Project was when it comes to total capital cost.[47]

Figure 4, below, compares the results of Mr. Anderson's assessment to the 20 percent and 40 percent increases in the estimated capital cost for Kemper that I recommended that Mississippi Power consider in its economic viability analyses.

[46] Phase Two Rebuttal Testimony of Thomas O. Anderson in Docket No. 2009-UA-014, at page 11, lines 1-6.

[47] Id, at lines 6-7.

Figure 4: Results of Company Witness Anderson's "Break-Even" Capital Cost Analysis vs. Range of 20% to 40% Increases Recommended by Witness Schlissel in Docket No. 2009-UA-014.

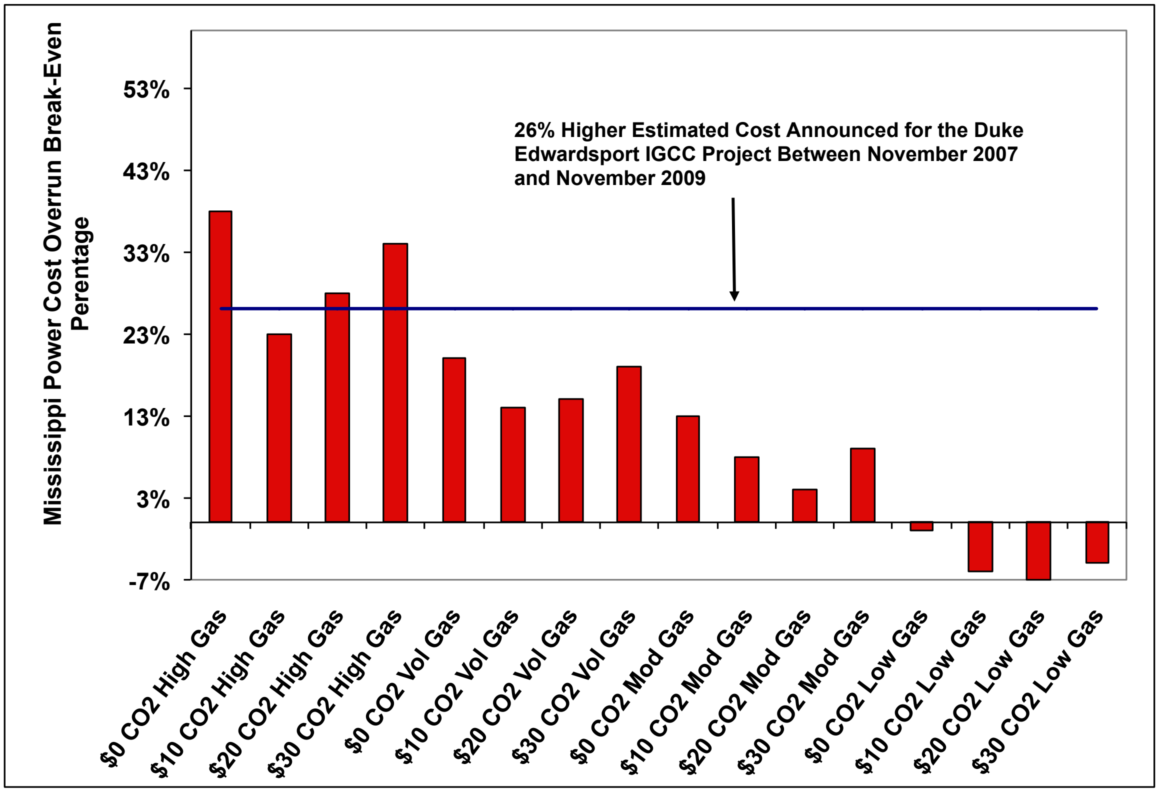


As can be seen, if a 20 percent higher cost estimate for Kemper had been considered, the IGCC Project would have been the more expensive alternative in eleven of the sixteen scenarios examined by Mr. Anderson. If a 40 percent higher cost estimate for Kemper had been considered, the IGCC Project would have been the more expensive alternative in all sixteen of the scenarios.

Q. How did the results of Mr. Anderson's "break-even" capital cost analysis compare with the 26 percent cost increase that had been announced in November 2009 for the Edwardsport IGCC Project?

A. Figure 5, below, compares the results of Mr. Anderson's "break-even" capital cost analysis with a 26 percent increase in the Project's estimated cost, comparable to the total increase that had been announced for the Edwardsport IGCC Project.

Figure 5: Results of Company Witness Anderson's "Break-Even" Capital Cost Analysis vs. A 26% Increase Comparable to the Total Increase that Had Been Announced for the Edwardsport Project as of November 2009.



As can be seen from Figure 5, a natural gas combined cycle unit would have been the more economic alternative in 13 of the 16 natural gas/CO_2 price scenarios if it had been assumed that the capital cost of the Kemper IGCC Project would increase by the same 26 percent that the estimated cost of the Edwardsport IGCC Project had increased since a certificate had been issued for that plant.

Q. Didn't the Commission's Independent Evaluator, the Boston Pacific Company, also assume higher capital costs when it compared Kemper with a number of IPP bids?

A. Yes. [redacted] This was too limited a range given that there was abundant evidence by late 2009/early 2010 that the cost of building a new coal power plant, especially one with new IGCC technology could increase by substantially more than [redacted] percent. For example, as I have noted above, the estimated cost of the Edwardsport IGCC Project had risen by 26 percent in less than its first two years of detailed design and construction.

By late 2009 almost every coal plant construction program, even those with more traditional, and hence less risky, technologies had experienced skyrocketing construction costs. For example:

- AMP Ohio cancelled the proposed Meigs County coal plant in November 2009 after the project's estimated construction cost had increased by 37 percent a mere six months after another estimated cost had been issued.
- The estimated construction cost of Wisconsin Power & Light's proposed Nelson Dewey 3 coal plant increased by approximately 47 percent between February 2006 and September 2008.

Q. **Are you just picking a few isolated examples in the preceding answer?**

A. No. Skyrocketing and staggering plant construction cost increases was an industry-wide issue after 2002, as the Moody's and Brattle Group reports I cited earlier in this testimony show.

Q. **Given these circumstances was the range of possible construction cost increases considered by Boston Pacific Company adequate?**

A. No. Limiting Kemper to only a potential [redacted] percent capital cost increase was not reasonable given what was happening in the industry in 2009 and 2010.

Q. **In fact, didn't [redacted]**

A. Yes. The January 25, 2010 "Report of the Independent Evaluator" prepared by Boston Pacific Company noted that [redacted]

[redacted]

Q. What was the Company's response in Docket No. 2009-UA-014 to your warnings and those from [redacted]

A. As noted earlier, the Company held firm to its testimony that the risks of installing new technology and the risk of capital cost escalation were "unlikely and comparatively insignificant."[50] Company witnesses also repeatedly and aggressively sought to dismiss the risks of installing a new technology and of capital cost escalation by emphasizing Mississippi Power's confidence in its cost estimate and the Southern Company's experience in building new power plants on budget. For example, Company witness Turnage testified that "Ill bet my paycheck that Mr. Anderson can bring this thing in on time, under budget…."[51] Company witness Anderson similarly repeatedly testified how confident they were in their latest cost estimate.[52] Mr. Anderson and Mr. Topazi, Mississippi Power's President and CEO, also emphasized the Company's excellent track record in building new power plants.[53]

---

48 At page 2.

49 Docket No. 2009-UA-014, Tr. page 1196, lines 5-21.

50 Phase Two Direct Testimony of Kimberly D. Flowers, at page 13, lines 12-18, and Tr. 1399.

51 Docket No. 2009-UA-014, at Tr. 1894.

52 For example, see Tr. 1145/1146 and Tr. 1390.

53 For example, see Tr. 1065.

Q. Was it prudent for Mississippi Power to dismiss the risks of installing a new technology and of capital cost escalation as "unlikely and comparatively insignificant?"

A. No. The Company should have learned from the 26 percent capital cost escalation that the Edwardsport IGCC Project had experienced between November 2007, when it received a certificate from the Indiana Commission, and November 2009. This dramatic increase in construction costs at the only other IGCC Project under construction in the U.S. should have warned Mississippi Power that, as had happened at Edwardsport, Kemper also would be susceptible to the same design evolution and growth in plant size (and consequently, quantities of bulk commodities that would be required). Instead, the Company dismissed the Edwardsport experience.

Q. Was the Company prudent to rely on its acknowledged expertise and experience in building new power plants as evidence that the capital cost of building Kemper would not increase dramatically over its then-current estimate?

A. No. The use of technologies untested at the scale of a commercial power plant and in an untested combination carried its own considerable risk regardless of the acknowledged expertise of the developer, as did the building of any new coal-fired mega-project. Although, the Southern Company was an acknowledged leader in building new power plants, so was Duke Energy, and as I explained in my testimony in Docket No. 2009-UA-014 and my opening statement, at Edwardsport Duke experienced problems that led to substantial increases in the Project's construction cost and schedule that it testified were beyond its control. There was no reason to expect that Southern Company would be able to avoid all of the same problems that had led to Edwardsport's capital cost increasing by 26 percent between 2007 and 2009.

Q. Shouldn't the fact that Mississippi Power had prepared a detailed FEED Study for the Kemper IGCC Project have given the Company the confidence a reasonable utility would require that the Project would not experience any significant capital cost increases?

A. No. Duke Energy Indiana prepared a FEED Study for the Edwardsport Project before it sought a certificate from the Indiana Utility Regulatory Commission. Yet that Company, which also had an excellent track record and reputation in building new power plants, ran into unanticipated problems that had led to a 26 percent increase in the estimated cost of the Edwardsport IGCC Project in less than its first two years of construction.

Q. Did you ever review Duke's FEED Study for Edwardsport?

A. Yes. Duke provided a confidential version of the Edwardsport FEED Study during discovery in the 2007 docket in which the Indiana Commission reviewed its application to build the Project and in the later dockets in which the prudence of the Project's actual costs was evaluated.

Q. Did the fact that Duke Energy Indiana had prepared a detailed FEED study protect that Company against significant cost increases at Edwardsport?

A. No.

Q. Have you ever reviewed Mississippi Power Company's FEED study for Kemper?

A. No. Mississippi Power has refused to provide a copy for my detailed review during discovery either in Docket No. 2009-UA-014 or in this proceeding.[54]

[54] I understand that counsel for the Sierra Club was allowed to review the FEED study but not make copies. This was not a reasonable opportunity to review such a study in the detail needed.

Q. Have you nevertheless seen any evidence that the FEED study for Kemper did not provide a reasonable guarantee against significant capital cost increases?

A. Yes. [redacted]

> [redacted]

[redacted]

> [redacted]

---

[55] Provided as Sierra Club-MPC 1-6 Supplemental Attachment C, at page 144 of 173.

[56] Id, at page 22 of 173.

Q. Did the Black & Veatch *Readiness Review* comment on the proposed Kemper construction schedule?

A. Yes. [redacted]

[redacted]

[redacted]

A. Yes.

Q. Did the Company evaluate any such capital cost increases in its Kemper economic viability analyses?

A. Not that I have seen.

Q. Was this *Final Readiness Review Report* available during the hearings in Docket No. 2009-UA-014?

A. No. It is dated February 26, 2010. However, the same information was obviously available to the Company during the February 2010 hearings on the Kemper project in Docket No. 2009-UA-014.

---

[57] Id, at page 20 of 173.

Q. Did the Company's supreme confidence in its then-current cost estimate for Kemper translate into a willingness to agree to a cap on the cost that could be recovered from its ratepayers?

A. No. Company witnesses in Docket No. 2009-UA-014 repeatedly refused to agree to a cost cap. MPC witnesses testified that the Company could not agree to bear the risk of cost overruns, because the company would then be perceived as less credit-worthy, to the detriment of its customers. The Company did, however, eventually propose a 33% cap on certain project costs, and then agreed to a 20% cap on certain costs.

RISK OF POOR OPERATING PERFORMANCE

Q. Did Mississippi Power acknowledge that Kemper might experience some problems that would reduce the plant's availability during its early years of operation?

A. Yes. The Company assumed a ramp up schedule that increased Kemper's projected availability from 59.05 percent in 2014, its first year of operation, to 89.30 percent in 2021.

Q. Was this a prudent assumption?

A. Yes. It has been my experience that almost all new plants experience problems during their initial years.

Q. Did the Company prepare any scenarios in its economic viability analyses for Kemper that reflected the possibility that the plant's long-term availability would be lower than 89.30 each year?

A. Not that I have seen.

Q. Was this prudent?

A. No. Kemper represents a first-of-a-kind plant using a new combination of technologies that is untested at the scale of a commercial power plant. There is no actual operating experience with the combination of the same technologies at the same scale. Therefore, the Company should have explored the economic viability of completing Kemper as an IGCC Project if it is assumed that its long-term operating performance does not achieve the 89.30 percent availability target.

Q. How could it have done this?

A. The Company could have run scenarios with long-term annual availabilities 5, 10 and 15 percent below the 89.30 target.

NATURAL GAS PRICE RISKS

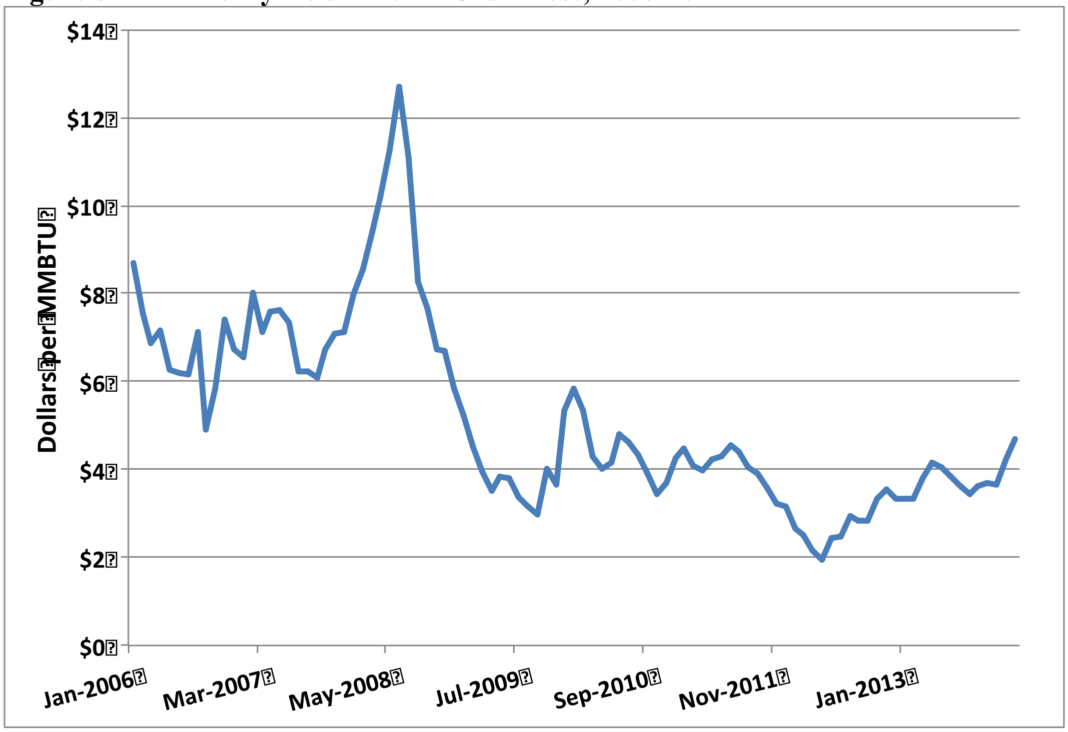
Q. What risk did natural gas prices pose in 2009 for the economic viability of the Kemper IGCC Project?

A. Quite simply, lower natural gas prices made the gas alternatives to completing Kemper as an IGCC plant much more economically attractive.

Q. Had there been any significant changes in the natural gas market in recent years?

A. Yes. As shown in Figure 6, below, natural gas prices collapsed in the middle to late months of 2008 as a result of new supplies from what are called unconventional sources (mainly shale gas).

Figure 6: Henry Hub Natural Gas Prices, 2006-2014.



The identification of these unconventional sources has been described as a structural change and a “seismic shift” in the natural gas market:

> Perhaps the largest change that has affected the Project economics is the sharp decline in natural gas prices, both current prices and those forecasted for the longer-term. The prices have declined in large part as a result of a structural change in the natural gas market driven largely by the increased production of domestic gas through unconventional technologies. The decline in the long-term price of natural gas has caused a shift in the economics of the Repowering Project, with the Project currently – and for the first time – projected to have a negative value over a wide range of outcomes as compared to a gas-fired (CCGT) resource.[58]
>
> 4. Recent Natural Gas Developments
>
> Until very recently, natural gas prices were expected to increase substantially in future years. For the decade prior to 2000, natural gas prices averaged below $3.00/mmBtu (2006$). From 2000 through May 2007, prices increased to an average of about

[58] *Report and Recommendation Concerning the Little Gypsy Unit 3 Repowering Project*, submitted by Entergy Louisiana to the Louisiana Public Service Commission, April 1, 2009, at pages 6-8.

> $6.00/mmBtu (2006$). This rise in prices reflected increasing natural gas demand, primarily in the power sector, and increasingly tighter supplies. The upward trend in natural gas prices continued into the summer of 2008 when Henry Hub prices reached a high of $13.32/mmBtu (nominal). The decline in natural gas prices since the summer of 2008 reflects, in part, a reduction in demand resulting from the downturn in the U.S. economy.
>
> *   *   *   *
>
> However, the decline also reflects other factors, which have implications for long-term gas prices. During 2008, there occurred a seismic shift in the North American gas market. "Non-conventional gas" – so called because it involves the extraction of gas sources that previously were non-economic or technically difficult to extract – emerged as an economic source of long-term supply. While the existence of non-conventional natural gas deposits within North America was well established prior to this time, the ability to extract supplies economically in large volumes was not. The recent success of non-conventional gas exploration techniques (e.g., fracturing, horizontal drilling) has altered the supply-side fundamentals such that there now exists an expectation of much greater supplies of economically priced natural gas in the long-run….
>
> *   *   *   *
>
> Of course, it should be noted that it is not possible to predict natural gas prices with any degree of certainty, and [Entergy Louisiana] cannot know whether gas prices may rise again. Rather, based upon the best available information today, it appears that gas prices will not reach previous levels for a sustained period of time because of the newly discovered ability to produce gas through non-traditional recovery methods…[59]

Entergy's conclusion that there has been a seismic shift in the domestic natural gas industry was confirmed in early June 2009 by the release of a report by the American Gas Association and an independent organization of natural gas experts known as the Potential Gas Committee, the authority on gas supplies. This report concluded that the natural gas reserves in the United States are 35 percent higher than previously believed. The new estimates show "an exceptionally strong and

[59] Id, at pages 17, 18 and 22.

optimistic gas supply picture for the nation," according to a summary of the report.[60]

The structural change in the natural gas market as a result of these new gas supplies has an important impact on the resource planning of companies like Mississippi Power. In particular, as a result of the existing and expected long-term supply glut, the then-current and project prices of natural gas had dropped considerably. This led many companies, including Entergy Louisiana in April 2009, to cancel proposed new coal-fired plants. Entergy explained to the Louisiana Commission that it no longer believe that a new coal plant would provide economic benefits for its customers due to its then-current expectation that future natural gas prices would be much lower than previously anticipated.

Q. Was Mississippi Power aware of this "structural" change in the natural gas market?

A. Yes.

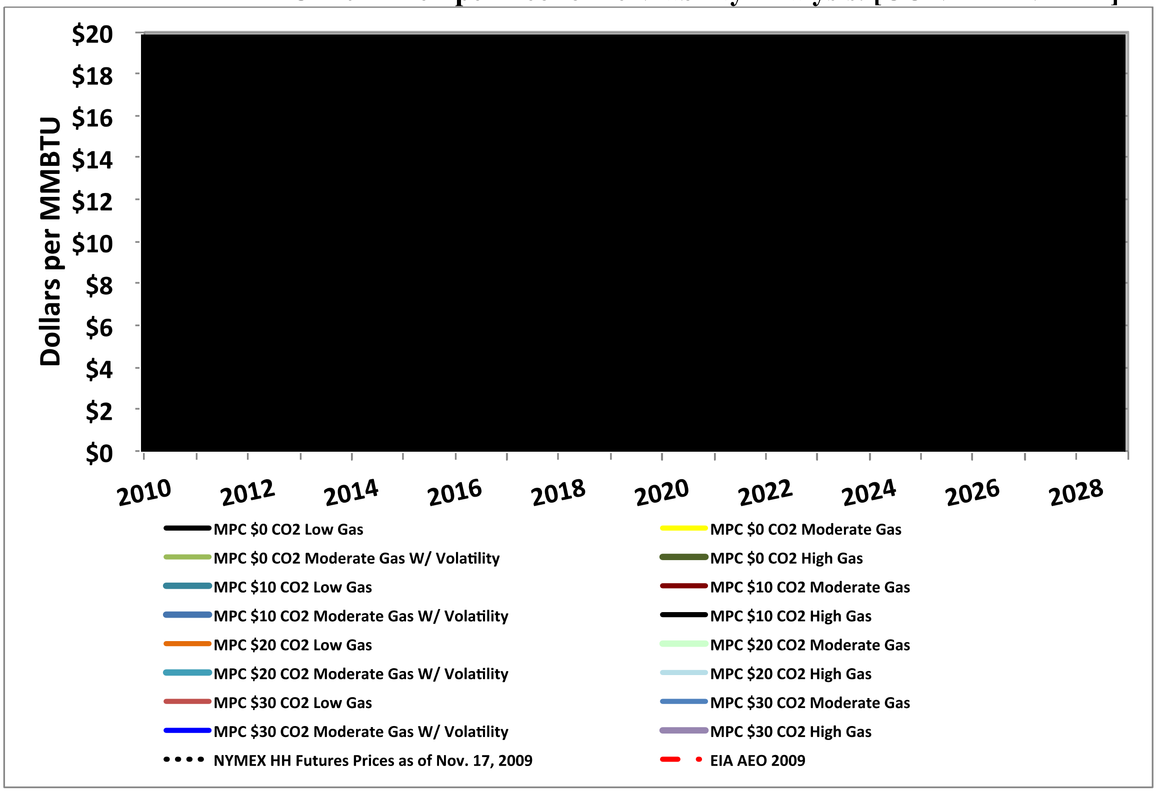
Q. Did the natural gas prices that the Company used in the economic analysis presented in its Phase Two Testimony in Docket No. 2009-UA-014 reflect this change in the natural gas market?

A. No. As shown in Figure 7, below, the Moderate, the Moderate with Volatility and the High scenarios examined in the Company's December 2009 Kemper economic viability analysis assumed natural gas prices that were significantly higher than both the then-current NYMEX Henry Hub futures prices and the March 2009 EIA AEO long-term natural gas price forecast. Only the Company's Low gas price forecast was comparable to the EIA's AEO March 2009 long-term gas price forecast although even this Low gas price forecast was substantially higher than the then-current NYMEX futures prices and the EIA AEO 2009 long-term forecast.

---

[60] *Estimate Places Natural Gas Reserves 35 percent Higher*, New York Times, June 9, 2009.

Figure 7: Natural Gas Prices Used in MPC December 2009 Docket No. 2009-UA-014 Kemper Economic Viability Analysis. [CONFIDENTIAL]



Consequently,

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Q. What impact did these high natural gas prices have on the results of the Company's December 2009 economic analysis?

A. The use of very high natural gas prices significantly tilted the viability analysis against the natural gas-fired alternatives and in favor of building the Kemper IGCC Project.

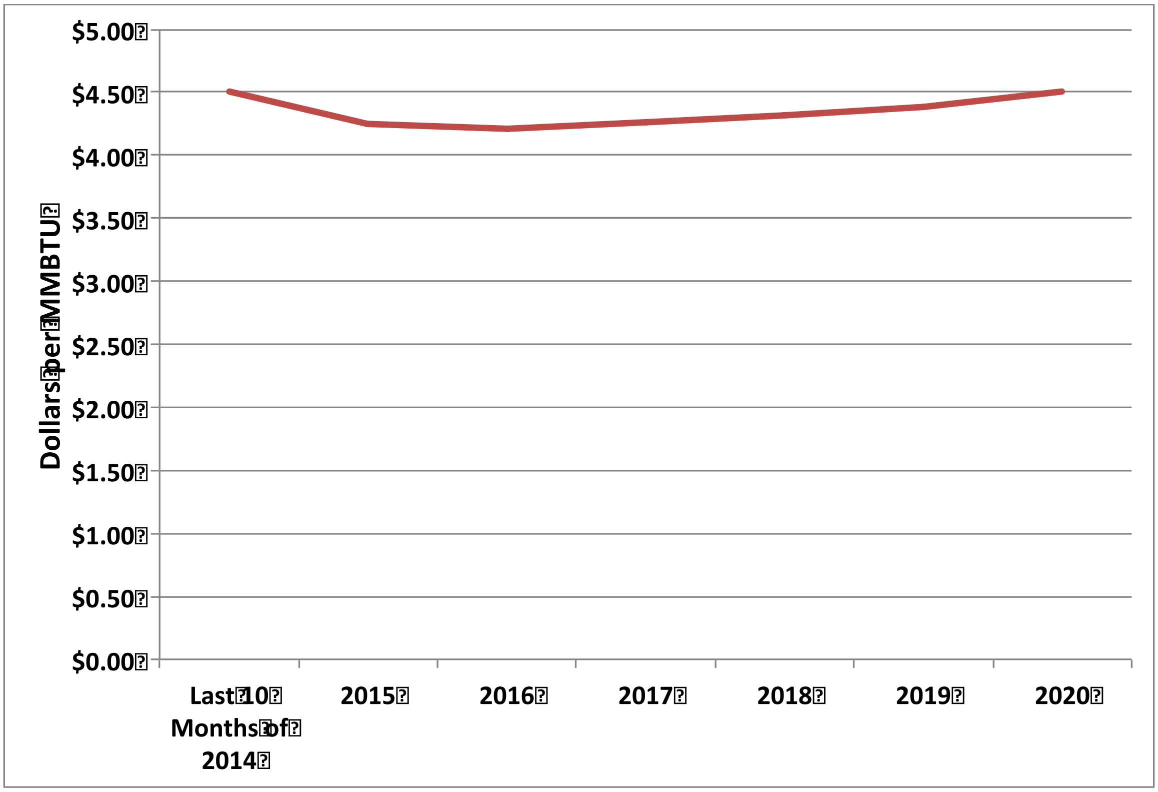
Q. Have actual Henry Hub natural gas prices been anywhere near the prices projected by the Company in 2009 or 2011?

A. No. As indicated in Figure 6, above, actual Henry Hub prices have been around \$3-\$4 per MMBTU.

Q. Are future natural gas prices expected to increase dramatically in coming years?

A. As shown in Figure 8, below, current NYMEX Henry Hub futures prices show 2020 prices at about the same level as 2014 prices, that is, no increase in annual natural gas prices over the next six years even after the recent cold winter.

Figure 8: NYMEX HENRY HUB Natural Gas Price Futures as of March 13, 2014.



Q. What does this mean for Mississippi Power's ratepayers?

A. The Company's ratepayers will be paying for very expensive power from Kemper during a sustained period of low natural gas prices.

Q. Could this situation have been avoided?

A. Yes. This situation could have been avoided if Mississippi Power had seriously considered the very strong likelihood that the cost of building the Kemper IGCC Project would be substantially higher than the Company was claiming in 2009. Instead, the Company dismissed the risks of installing a new IGCC technology at Kemper and of capital cost increases as "unlikely and comparatively insignificant."

MISSISSIPPI POWER'S ECONOMIC VIABILITY ANALYSES AFTER THE CLOSE OF THE RECORD IN DOCKET NO. 2009-UA-014

Q. Did the Company reanalyze the economic viability of completing Kemper as an IGCC Project at any time in 2010 after the end of the hearings in Docket No. 2009-UA-014?

A. No.

Q. When did the Company next evaluate the economic viability of completing Kemper as an IGCC Project?

A. According to the Company's monthly reports to the Commission for March 2011 it appears that the Company prepared a new Kemper viability analysis sometime in the early months of 2011. This viability analysis compared Kemper against building a new natural gas-fired combined cycle unit. The Company's monthly report to the Commission states that the analysis included updated inputs for load forecast, fuel forecast, inflation forecast, and emissions allowance cost forecast.

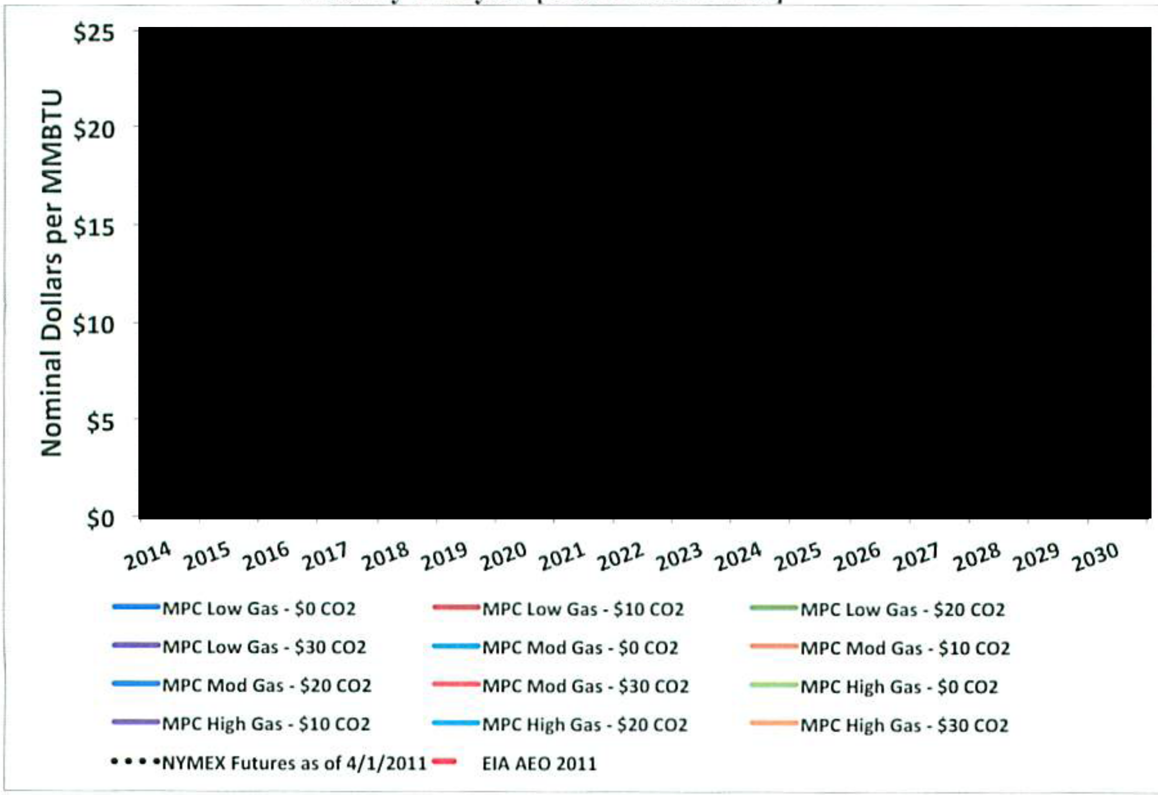
Q. What were the results of the Company's new economic viability analyses?

A. The new economic analyses showed that the gas-fired combined cycle unit was the lower cost alternative under the Company's Low natural gas prices while Kemper was the lower cost alternative under the Moderate and High gas prices.

Q. Did the Company use a reasonable set of natural gas prices in this viability analysis?

A. No. As shown in Figure 9, below, the Company again used a set of very high Moderate and High natural gas prices in its 2011 Kemper economic viability analysis as it had done in the December 2009 analysis it presented in Docket No. 2009-UA-014. This biased the analysis in favor of Kemper and against the natural gas combined-cycle alternative.

Figure 9: Natural Gas Prices Used in MPC Early 2011 Kemper Economic Viability Analysis. [CONFIDENTIAL]



As can be seen in Figure 8, the Moderate and High natural gas prices used by Mississippi Power in its 2011 Viability Analysis were very high compared to the then-current NYMEX Henry Hub futures prices and the EIA's AEO 2011 Base long-term price forecast.

For example, as shown in Figure 9:

[redacted]

[redacted]

[redacted]

Q. What had happened to actual natural gas prices and the NYMEX futures prices in the approximately eleven to twelve months between the close of the hearings in Docket No. 2009-UA-014 and the Company's 2011 economic viability analysis?

A. As can be seen in Figure 6, above, actual natural gas prices had remained very low in the eleven to twelve months between the filing of the Company's Phase Two economic viability analysis and its 2011 analysis. During the same period, NYMEX futures prices for the years 2014-2021 had dropped by an average of 7-8 percent.

Q. What impact did the use of very high Moderate and High natural gas price scenarios have on the results of the 2011 economic viability analysis?

A. The use of these high gas prices biased the results of the Moderate and High cases against the natural gas alternative and in favor of Kemper. Their use also overstated the economic benefits of completing Kemper.

Q. Was the use of such high natural gas prices reasonable?

A. No. It was not reasonable. Given the recent history of natural gas prices, NYMEX futures prices and the EIA AEO 2011 projections, it would have been prudent to use the Company's low case as its Moderate or Mid Case with high and low price scenarios 20 to 30 percent above or below those low prices.

Q. Did the Company look at a range of capital costs for Kemper in its 2011 economic viability analysis to account for uncertainty in the Project's construction costs?

A. No. It appears from the Company's report to the Commission that it looked at only one capital cost. It further looks that the Company did not include a new Kemper capital cost as one of the updated inputs considered in the viability analysis. [redacted]

Q. Was this prudent?

A. No. As I discussed earlier, Kemper was exposed to significant cost risks that the Company had imprudently dismissed in Docket No. 2009-UA-014. By the spring of 2011, there was evidence that the very same stresses and problems that had led to the 26 percent cost increase in the Edwardsport IGCC Project by late 2009 and to a subsequent $380 million increase in April 2010, were being experienced at Kemper.

Q. Why should Company management have considered higher capital cost scenarios in its 2011 economic viability analysis if the Project was subject to the cost cap adopted by the Commission?

A. The reality was, and is, that the cost cap adopted by the Commission is not a hard cap. Instead, there are a number of significant exclusions that would impact the overall economic viability of the Project. These exclusions include but are not limited to: beneficial capital, the mine CO_2 pipeline, ash storage, and AFUDC.

---

[61] See Sierra Club-MPC 1-4 Supplemental Attachment C MRB2011, at pages 59, 68 and 69.

Q. What evidence should have shown Company management by the spring of 2011 that the Kemper IGCC Project was going to experience significantly higher capital costs than it had claimed in early 2010 in Docket No. 2009-UA-014?

A. The following information represents some of the information that by the spring of 2011 would have led a reasonable person to consider that the Kemper Project could experience significantly higher capital costs going forward.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

62 See Sierra Club-MPC 1-4 Supplemental Attachment K at page 277 of 492.

63 See Sierra Club-MPC 1-4 Supplemental Attachment K at page 391 of 492.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]te

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted].

---

64 Id, at pages 20-24

65 Id, at page 30.

66 See Sierra Club-MPC 1-4 Supplemental Attachment K, at page 103 of 104.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Q. Earlier you discussed the increase in the estimated cost for Edwardsport IGCC through November 2009. Had the estimated cost of the Edwardsport IGCC Project increased again after the certification hearings for Kemper were held in February 2010?

A. Yes. As shown in Figure 2, above, the estimated cost of the Edwardsport IGCC Project was increased to $2.88 billion in April of 2010. This represented an approximate 45 percent increase since the plant had received a certificate from the Indiana Commission in late 2007.

---

67 See Sierra Club-MPC 1-4 Supplemental Attachment K, at page 28 of 129.

68 See Sierra Club-MPC 1-16 Supplemental A1, at pages 20-24

69 See Sierra Club-MPC 1-4 Supplemental Attachment I, at page 11 of 12.

Q. Did Duke publicly explain the reasons for this increase?

A. Duke witness Haviland explained in public testimony that the estimated cost of the Edwardsport IGCC Project had increased as a result of this being a new technology that could not be estimated up front as accurately as conventional technology:

> Because the IGCC Project is the first commercial power generation plant of its size using this technology ever built anywhere in the world, the design has evolved in unforeseen ways when complexities and complications are discovered that cause changes in the FEED Study design assumptions.[70]

Duke witness Haviland also explained that it had become apparent that the IGCC Project that Duke was building had significantly more scope that the FEED Study had estimated and that, "in other words, the plant is just a bigger plant than we expected."[71] He further testified that "Although a reasonable FEED Study was performed to develop the expected scope and quantities for the IGCC Project, there was, and still is, no existing plant of this type and size for the FEED Study to base its estimates upon. This is unique technology and a first of its kind plant of this size."[72] As a result, Mr. Haviland explained, as the final engineering progress, Duke determined that some of the Edwardsport FEED Study estimates "were off by a large percentage."[73]

Q. Were these factors also relevant to Kemper?

A. Yes. Although Mr. Haviland obviously was not testifying about Kemper, the specific points he raised were clear red-flashing warning signs for that Project.

70 Testimony of Richard W. Haviland, Cause No. 43114, IGCC-5, dated June 2, 2010, at page 8.

71 Id, at page 5, lines 19-22.

72 Id, at page 5, line 22, to page 6, line 4.

73 Id, at page 6, lines 20-21.

Q. Was Mississippi Power aware of this new increase in the cost of the Edwardsport Project?

A. Yes. Exhibit STC-2 is a Duke Energy Indiana e-mail to that company's President reporting that a Randall Rush, the GM, Gasification Technology at the Southern Company, had called twice on Monday April 19, 2010, three days after the new Edwardsport cost estimate had been released. The e-mail further reported:

> Southern has called twice today re: Edwardsport, requesting an opportunity to talk to us about Friday IURC filing [i.e., the new cost increase]. They are concerned that there will be an impact with the Alabama commission re: Kemper County (a similar IGCC plant) and they would like to be able to answer some of their anticipated questions gleaning info from us…. They'd like to talk today.

Q. Did Mississippi Power also visit the Edwardsport site and talk with representatives of Duke Energy Indiana about construction costs and problems?

A. Yes. The materials provided by Mississippi Power show that Mississippi Power did in fact visit Edwardsport in both 2010 and 2011 and talk with Duke about construction at the project. However, Mississippi Power has redacted just about everything related to Edwardsport from the documents it has provided to the Sierra Club. These documents (included as Exhibit STC-3) include (1) ten almost completely redacted pages of a report at the October 21, 2010 Kemper IGCC Project Production Meeting on a visit to Edwardsport[74]; (2) a completely redacted page on "Edwardsport Site Visit Take-aways" from a presentation at the Southern Company February 15, 2011 Board of Directors Meeting on TRIG Development[75]; and (3) two completely redacted pages from a report on an October 2011 Edwardsport site visit.[76]

---

[74] Sierra Club-MPC 1-4 Supplemental Attachment K, at pages 187-195 of 492.

[75] Sierra Club-MPC 1-4 Supplemental Attachment H, at page 8 of 20.

[76] Sierra Club-MPC 1-20 Supplemental EC Attachment E, pages 13 and 14 of 19.

Q. Was it reasonable or appropriate for Mississippi Power to redact all the information about what they learned from their visits to Edwardsport from the documents they've provided to the Sierra Club during discovery?

A. No. I can think of no reason why Mississippi Power would redact all of those materials except to prevent me from letting the Commissioners know how much it knew about the costs and problems being experienced at Edwardsport.

Q. Does this complete your testimony at this time?

A. Yes.

CERTIFICATE OF SERVICE

I, Robert B. Wiygul, counsel for Sierra Club do hereby certify that in compliance with RP6.122(2) of the Commission's Public Utilities Rules of Practice and Procedure (the "Rules").

(1) An original and twelve (12) true and correct copies of the filing have been filed with the Commission by United States Postal Service this date to:

Brian U. Ray, Executive Secretary
Mississippi Public Service Commission
501 N. West Street, Suite 201-A
Jackson, MS 39201

(2) An electronic copy of the filing has been filed with the Commission via e-mail to the following address:

efile.psc@psc.state.ms.us

(3) A copy of the filing has been served via Email and/or by U.S. Mail to all parties to the following:

Ben Stone (MPC)	bstone@balch.com
Shawn Shurden (MPSC)	shawn.shurden@psc.state.ms.us
J. Kevin Watson (Ergon, Inc)	kwatson@wjpalaw.com
Jeremy Vanderloo (Energy MS, Inc)	jvande1@entergy.com
Michael Adelman (Blanton)	adelst33@aol.com
Queshaun Sudbury	queshaun.sudbury@gmail.com
Dennis W. Miller (Martin)	dmiller@joneswalker.com
Jennifer E. McNair (Denbury)	jennifer.mcnair@arlaw.com
John H. Geary, Jr. (Treetop)	jgeary@cctb.com

This the 14th day of March, 2014.

Robert B. Wiygul

Robert B. Wiygul (MS Bar #7348)
Waltzer Wiygul & Garside
1011 Iberville Drive
Ocean Springs, MS 39564