BEFORE THE GEORGIA PUBLIC SERVICE COMMISSION
STATE OF GEORGIA

In Re: Review of Proposed Revisions and Verification of Expenditures Pursuant to Georgia Power Company's Certificate of Public Convenience and Necessity for Plant Vogtle Units 3 and 4, Eighth Semi-annual Construction Monitoring Report	)	**Docket No. 29849**

DIRECT TESTIMONY AND EXHIBITS OF STEVEN C. PRENOVITZ
ON BEHALF OF NUCLEAR WATCH SOUTH

I. INTRODUCTION

Q. Please state your name, profession, and business location.

A. My name is Steven C. Prenovitz, Management Consultant/MBA, Norcross, Georgia

Q. Mr. Prenovitz, please summarize your educational and professional experience.

A. I am a graduate of Northeastern University, Boston, MA with a BS/BA in finance and economics. I received an MBA in Management from Suffolk University, Boston, MA.

I co-developed a process that integrates strategic planning, operational analysis, and implementation management to produce both rapid short-term gains and enduring long-term benefits which I use to help organizations develop and translate strategic thinking into effective business performance. My expertise is in the areas of finance, economics, marketing, strategic planning and implementation, quality management, and

organizational development using an interdisciplinary approach to solve problems and identify/create opportunities.

Organizations served, and/or worked for, include --- Dow Corning, Scott Fertilizer, Coca Cola, Foote & Davies, AT&T, Southern Company, U.S. Franchise Systems (Microtel), Suburban Lodge, Holiday Inn, the Georgia Aquarium, and Gwinnett County Public Schools. In addition, have worded with several consulting firms, community development organizations, minority businesses, and consumer groups.

Published articles include *Financial Decline of the Electric Utility Industry* and *How to Translate Strategy into Operational Results* and articles for the **Atlanta Journal-Constitution** which focus on electric utility issues and Plant Vogtle. Also conducted management education seminars in financial management and planning for the federal government, the American Management Association, and Coca Cola.

Q. Did you appear before the Georgia Public Service Commission (PSC) (Commission) regarding rates and the Vogtle 1 & 2 construction project?

A. Yes. I served as an expert witness in a 1983 Georgia Power rate case (Docket #3397-U) where I testified that there is a strong correlation between major rate increases and an aggressive capital expenditure program. I performed a financial feasibility study of Vogtle 1 & 2 and testified in the Georgia Power finance hearing in April 1986 (Docket #3554-U).

Q. Have you previously appeared before the Georgia PSC regarding Vogtle 3 & 4?

A. Yes. I have appeared as a public witness in the Vogtle 3 & 4 hearings on several occasions and conducted cross-examination on two occasions. This is my first appearance in the Vogtle 3 & 4 case as an expert witness.

Q. What qualifies you to testify as in expert in this case?

A. In addition to my education and professional experience, I have studied the history of Vogtle and participated in the 1987 Vogtle prudency hearings. I attended the Vogtle 1&2 hearings (which extended over three months); heard witness testimony; read, analyzed, and reviewed expert witness testimony, and conducted extensive cross-examination of major witnesses. In 1986, I prepared and defended a 100-page analysis regarding financing authority to continue major capital budgeting programs, specifically Vogtle 1&2 before this commission. This testimony received no cross-examination from Georgia Power.

I have studied and analyzed Vogtle 3&4. Many of my predictions made as a public witness in 2009 have materialized and provide a historical benchmark for the project's status. Many of my predictions concerning Vogtle 1 and 2 have also materialized.

Q. On whose behalf are you testifying in the 8th Semi-Annual Vogtle Construction Review?

A. Consumer advocacy group Nuclear Watch South.

Q. What are the issues in this case?

A. First, whether there is any necessity to expand electric generating capacity by continuing construction of additional Vogtle reactors in accordance with O.C.G.A. § 46-3A-7(b). Second, whether the Commission should scuttle current Vogtle expansion as more beneficial to Georgia ratepayers. Third, if the PSC does not scuttle Vogtle 3&4 whether it should approve or reject the request to increase certified capital costs for Vogtle expansion. Fourth, whether the stipulation should be rejected. Fifth, whether the Commission should approve expenditures on Vogtle expansion in the reporting period.

Q. What is the purpose of your testimony?

A. To support the Commission both to challenge Georgia Power's assumptions and to offer a constructive perspective , as to why Plant Vogtle expansion is both not needed and not financially feasible. Additionally, I bring independent, critical expertise in examining Vogtle's feasibility and prudence using sound financial, economic, managerial, strategic, marketing and quality management principles. It is the mandate of the Commission to balance the needs of Georgia Power and its shareholders with that of Georgia Power's customers, as mandated by the US Supreme Court. My testimony provides an alternative perspective and a framework for considering the feasibility and benefit to Georgia residents for continuing or canceling Vogtle.

Q. What information sources do you rely upon in your testimony?

A. Georgia Power data, obtained from the 2012 Southern Company Form 10-K report filed with the SEC, Georgia Power's 2002 to 2012 annual reports, Georgia Power pre-filed direct testimony, cross-examination of Georgia Power witnesses (McKinney and Leach) and several exhibits and publications.

II. GENERAL OVERVIEW

Q. What is the financial history of nuclear power?

A. From the 1930s through the mid 1960s, adding additional utility electrical generating capacity lowered fixed costs which, combined with significant load growth, caused rates to consistently decrease about 1% annually. This trend began to dramatically change in the mid 1960's (*Financial Decline of the Electric Utility Industry, Rural Electrification*, September 1983, Prenovitz) (Exhibit 1)

From its inception nuclear power was marketed to the public as safe, reliable, low-cost

energy with the ~~now infamous~~ slogan "power too cheap to meter." Investors and contractors were shielded from nuclear accident liability by the Congressional Price-Anderson Act and the U.S. government committed to move radioactive spent nuclear fuel from reactor sites to a permanent repository in 1998.

However, these promises about nuclear energy were never realized. For a variety of reasons, highlighted in a **Forbes** article (February 11, 1985) (Exhibit 2) the opposite happened and costs escalated to unimaginable levels. Vogtle 1&2 costs alone escalated 1245% from $660 million for four reactors to $8.87 billion. The **Forbes** article labeled the U.S. nuclear power program "the largest managerial disaster in business history." It also noted that "only the blind or the biased can now think that most of the money has been well spent." [**Forbes** Magazine, February 11, 1985, p. 4-5] (Exhibit 2)

Q. What is the current financial experience with nuclear reactor construction?

A. After a 30-year interval in new reactor construction, the heavily marketed "Nuclear Renaissance" jump-started more than 30 reactor projects which have now been cancelled or suspended, with the exception of two reactors at Vogtle in Georgia and two at Summer in South Carolina. Streamlined regulation, pre-approved reactor designs and reactor sites, modular construction using imported parts, low-priced loans from the U.S. treasury, guaranteed profits and Construction Work In Progress investment from customers were envisioned to create an environment for the success of nuclear energy in Georgia. The net result of these collective measures was to transfer most of the financial risk from Southern Company's investors to Georgia Power ratepayers.

In addition to the nearly complete suspension of new nuclear reactor construction in the U.S., the rate at which older reactors are being shutdown has significantly increased.

Georgia Power (and SCE&G in South Carolina which is building the two reactors at Summer) are experiencing major contractor problems, delays and cost overruns. In fact,

at the present time, suppliers for the AP1000 reactors under construction at Vogtle are having quality assurance and delivery problems (U.S. Nuclear Regulatory Commission, Notice of Violation, 11-14-12) (Exhibit 3). Additionally, Georgia Power and their contractors are suing each other over who is responsible for $925 million in cost overruns.

Q. What is the role of Public Service Commissions?

A. The Supreme Court established the guiding principles for how rates are to be set. FPC (Federal Power Commission) v. Hope Natural Gas Co. - 320 U.S. 591 (1944) describes the role of the Public Service Commission as "the fixing of 'just and reasonable' rates, [which] involves a balancing of the investor and the consumer interests" and then goes on to say, "regulation does not insure that the business shall produce net revenues." 315 U.S. p. 315 U. S. 590.
http://supreme.justia.com/cases/federal/us/320/591/case.html

Q. What is the role of the Georgia PSC in regulating the Vogtle expansion project?

A. The Commission is in a difficult position because it hears almost exclusively from Georgia Power witnesses and the PSC Public Interest Advocacy (PIA) staff consultants who consistently support the Vogtle expansion and have yet to question whether it would be prudent to scuttle the project. Nuclear Watch South is the first intervener to produce an expert witness to offer an independent opinion in the Vogtle Construction Monitoring Review (VCMR) hearings.

In the previous two VCMR hearings, PIA engineer and project monitor, William Jacobs, outlined many problems with the project, yet did not challenge the feasibility of the Vogtle project. PIA economist Philip Hayet's analysis has consistently ignored sunk costs, which is biased toward finding the Vogtle expansion feasible. Under this

methodology, project costs could escalate toward infinity and still be considered feasible.

Georgia Power's feasibility studies and testimony have consistently been biased toward project completion. For instance, Georgia Power has not kept its cost commitments. Kyle Leach testified on July 18, 2013, that Georgia Power did not commit to a budget, it was just a forecast and further, that a forecast is not really a commitment.

The Mississippi Public Service Commission recently took a firm stand with cost overruns at Mississippi Power's Ratcliffe Plant in Kemper (often referred to as "Kemper"). This provides a recent, relevant model for the Georgia PSC to assert effective regulatory authority over Georgia Power's Vogtle expansion. (Hereafter, any referral to transcript, citations will be supplied in a supplemental filing.)

Q. In the Eighth Semi-Annual Construction Monitoring Report (VCMR) for Vogtle Units 3&4, Georgia power commits "to communicating clearly and comprehensively with our customers and all Georgians." (p. 5) Is Georgia Power keeping this commitment?

A. No. Georgia Power's application to build Vogtle and subsequent reviews and testimony has consistently contained redacted sections. Georgia Power has argued that it requires "trade secret protection." and that releasing certain information would place them at a competitive disadvantage. Georgia Power is a monopoly and has no real competition.

By allowing Georgia Power to redact information for "trade secret protection" the commission has, in effect, allowed Georgia Power to withhold critical information from the public that makes it difficult for the public to either validate or disprove Georgia Power's feasibility studies and the assumptions that support their conclusions. Lack of information also makes it hard for the public to evaluate PSC decisions. Georgia Power

invoked trade secret protections to avoid releasing the actual cost history regarding Vogtle's construction until well after the commencement of the Vogtle expansion. It was only Helen O'Leary's insistent cross-examination on behalf of Georgia Watch that Vogtle 1&2's cost history is in the public record.

Q. Has Georgia Power always withheld information from the public in hearings about Plant Vogtle?

A. No. Testimony filed with the PSC in Vogtle 1&2 hearings was not redacted. During Vogtle 1&2 hearings, the intervenors had, in addition to full disclosure, the right to file discovery requests, a right that is absent in the current Vogtle hearings.

The commission should revoke any policy that allows Georgia Power to withhold information. The company is redacting vital information such as load forecasts and fuel price forecasts, information which does not fit the definition of "trade secret." By making the information to which Georgia Power and the PSC have access available to all, the PSC will receive better input from independent parties and be better equipped to make decisions which are beneficial to the people of the State of Georgia.

III. LOAD FORECASTING & VOGTLE'S CAPACITY CONTRIBUTION

Q. Please explain your chart titled: Georgia Power Key Financial & Operating Data (Exhibit 4)

A. The chart consists of eleven (11) years of data from the period 2002- 2012. All data were obtained from Georgia Power's annual reports and the 2012 Southern Company 10-K. Calculations were made from this data.

It focuses on these areas: revenue, volume, capacity, and net plant asset growth (derived from analyzing net plant in service data), price, fuel costs and capacity over a 10-year

period.

The chart includes calculations for: capacity utilization, and embedded cost per Kw of net plant assets. There are also calculations for annual growth rates. For comparison purposes Vogtle 3&4 budgets, cost per Kw and capacity are also listed.

The annual compound growth rate (annual rate % on the chart) of these items are also calculated over the 10-year period . [2002-2012]

The one period exception is price increase calculations for three fuel types — coal, nuclear, gas. Because data was not available from the referenced sources for 2002-2004 and the gas price for 2005 was a statistical anomaly, the annual growth rates were calculated from 2006-2012. (Exhibit 4)

Q. What are the key points from the chart in assessing Georgia Power's need for Vogtle reactors 3&4 capacity?

A. The key figures are the volume sales (in Kwh) which are flat over the 10 -year period and capacity utilization which has declined steadily from 71% to 54% during this period. (Exhibit 4)

Q. Does Georgia need the additional capacity from reactors 3&4?

A. Load forecasting is the core process which drive capital expenditure decisions, *i.e.*, building new power plants; as consistently stated by GA Power witnesses. Utilities are mandated to provide adequate capacity to their service areas, a responsibility which Georgia Power has shown it takes seriously. Because Georgia Power has redacted so much data it is difficult, but not impossible, to determine their actual forecasts. In the July 18, 2013, public hearing, Georgia Power witnesses Leach and McKinney were unable to testify about either current load forecasts or load forecasts for the past few

years.

A reasonable estimate about the forecasts that Georgia Power used can be constructed. In Georgia Power's first Vogtle expansion certification filing in 2009, the company forecast the need for an additional 8,000 MW of capacity from 2008-2018. [Prenovitz 2009 testimony, Exhibit 5, p.3] That is a 4.1% annual growth in capacity, which should be driven by its load forecasts. Since Georgia Power forecast a 4.1% annual growth rate in capacity, it is conservative to assume both a 3% load and a 2% load growth rate.

Even using the assumption of a 3% - 2% load forecast, Georgia Power's forecasts are consistently too high. Georgia Power Key Financial & Operating Data Chart (exhibit 4) shows the annual sales volume growth (Kwh) for total sales has annually declined (-0.3%) from 87.5 B Kwh to 85.3 B Kwh over the 10-year period. Retail sales volume increased less than 1% annually (0.8%), 75.4 B Kwh to 81.7 B Kwh for the same period. Therefore, load growth, that is, demand for Georgia Power's product volume of electricity measured in Kwh is basically flat in contrast to 3% or 2% load growth projection.

Q. Is there is easy way to evaluate the penalties of miscalculating a load forecast?

Yes. In finance it is called the rule of 72. Quite simply, take any forecast number, divide that number into 72, and the answer will provide a close estimate as to how long it will take to double anything (in this case product demand). A common application is how long will it take to double your money at a given annual interest rate. In load forecasting the question is how long will it take for demand to double.

4.1% annual growth rate will double in	=	17.56	years
3% annual growth rate will double in	=	24	years
2 % annual growth rate will double in	=	36	years
1 % annual growth rate will double in	=	72	years
0.5% annual growth rate will double in	=	144	years
(-.3)% annual growth rate will double in	=	infinity	

As the growth rates decline, the penalties for basing a high cost Capital Expenditure program on these forecasts becomes increasingly more severe. In the above example, the penalty of having the load growth come in a 1% v. 3% annually, is 48 years. No need to go lower. That can produce expensive and unneeded capacity.

Q. Is this capacity forecast supported by historical growth rates in Georgia Power's capacity?

A. No. In their application, Georgia Power forecast they would require an additional 8,000 MW of capacity from 2008-2018, which equaled a 4.1% annual capacity growth rate. The historical growth rate in plant capacity from 1997-2007 was only 1% annually (14,437 Mw to 15,995 Mw). From 1977-2007, a 30-year period, capacity growth was 1.4% annually (10,452 Mw to 15,995 Mw). (Exhibit 5)

Georgia Power's capacity forecasts are more than three times greater than both their 10-year and 30-year historical actual capacity additions.

Q. How much has Georgia Power's capacity increased in the past five years (2007-2012)?

A. As the Georgia Power Key Financial and Operating Data Chart (exhibit 4) highlights, capacity increased from 15,995 Mw to 17,984 Mw, which is 2.4% annually. However, during this time frame, Georgia Power's capacity utilization factor declined

from 73% to 54%.

Q. What is the significance of these figures?

A. Georgia Power forecasts were for 4.1% growth in capacity, but in the key five-year period that coincides with the Vogtle expansion, capacity growth was 2.4%. Because Georgia Power's capacity utilization factor declined from 73% to 54% in the same period, it is clear that expanding Vogtle's capacity was not, and is not now needed.

IV. IS EXPANDING PLANT VOGTLE ECONOMICALLY FEASIBLE?

Q. What is the difference between economic analysis and financial analysis?

The two disciplines are very similar but there are some differences. Economic analysis often relies on economic modeling and making broad assumptions about the focus of their analysis. One example is to ignore sunk costs. Another is to focus on a limited range of options for comparative purposes, such as comparing Vogtle to only two alternatives, when there may be several.

Financial analysis tends to be more grounded and focuses on the financial data, found in financial statements, when available. Financial analysis tends to be more practical than the economic analysis. Key concerns are project impact on company's financial situation and financial risk. In these proceedings (VCMR) no expert witness representing either the company or the PIA staff has presented analysis of data generated from Georgia Power's financial statements, 10-K's, and annual reports.

Q. Do you have financial analysis to submit?

A. Yes. I have compiled a chart called **Vogtle Budget / Break Even Analysis** (Exhibit 6).

Q. Please explain the chart highlighting Vogtle's budgets and Georgia Power's break-even analysis regarding the Vogtle Project.

A. **<u>Section I</u> Vogtle Budget** (based on 8th VCMR ending 12/31/12)

Section I reconstructs the Vogtle budget using Georgia Power data from both written testimony and testimony during cross-examination of Georgia Power witnesses McKinney and Leach. Georgia Power's new capital construction cost forecast increased by $381 million to $6.85 billion through December 31, 2012. The witnesses testified the project spent $2.57 billion through the same period, including capital and finance costs. The "Cost to Complete" is now $4.28 million. Given Georgia Power's 46% ownership of the project, the total cost to complete Vogtle now stands at $9.3 billion ($4.28 billion divided by .46).

The revised Vogtle budget does not include the $925 million cost overruns in litigation between Georgia Power and Vogtle co-owners and Vogtle contractors Westinghouse and Shaw (now owned by CB&I). Using an assumption that Georgia Power will split this cost 50-50% with the contractors, Georgia Power's 46% share of the cost overruns increases the cost-to-finish estimate by another $210 million for an adjusted capital cost estimate of $7.06 billion (Georgia Power's share), and $15.36 billion for the entire Vogtle project.

<u>Section II</u> Vogtle Break Even Analysis, Project Feasibility

(using Georgia Power projections)

This section disputes the statement by both Georgia Power witnesses and PSC witness Philip Hayet that the Vogtle expansion forecast remains overwhelmingly favorable even at the new forecast (Leach-McKinney testimony, p. 5). In cross-examination, Georgia Power was asked at what cost the Vogtle expansion would become unfeasible. The witnesses gave an estimate of an additional $2 to $3 billion (Georgia Power's share of the expansion). Using a mid-point of $2.5 billion, it can be calculated that Georgia

Power believes that its share of the Vogtle expansion can increase to $9.35 billion before it becomes unfeasible. For the entire Vogtle expansion project, the feasibility ceiling is $20.33 billion.

Section III Vogtle Break Even vs. Georgia Power Asset Base

(Georgia Power 2012 Annual Report)

Section III uses two key statistics from Georgia Power's 2012 Annual report: (1) Georgia Power's Net Plant in Service (after depreciation) = $18.8 billion [*NOTE* net plant assets include: generation, transmission, distribution and general assets, after depreciation]; and (2) Georgia Power's Gross Generating Plant (before depreciation) = $14.6 billion.

Q. What conclusion do you make from the figures on the Vogtle Budget / Break Even Analysis? (Exhibit 6)

A. Georgia Power's net plant assets in service comprise almost $19 billion *[source: Georgia Power 2012 annual report, p.34*]. Vogtle's Break Even figure of $20 billion, exceeds all of Georgia Power net plant assets in service. Georgia Power, in effect, argues that the Vogtle project has a greater value to its customers, and the company, than all of the company's existing net plant assets, which include: generation, transmission, distribution, and other.

Georgia Power's "gross generation plant," which is the actual cost of the generating assets, without depreciation, is $14.6 billion *[source: Georgia Power Annual Report, p. 41].* If we apply a 33% depreciation factor, the net generating assets are worth about $10 billion. This means Vogtle, according to Georgia Power's own numbers, is worth twice as much as all of Georgia Power's total *net* generating assets (after depreciation).

The total Vogtle expansion contributes 2,200 MW of capacity, of which 1,000 Mw is Georgia Power's share. Georgia Power's existing asset base (2012) is 17,894 Mw capacity, almost 1700% more than Vogtle's contribution.

No project that produces so little capacity and so much cost is feasible. The Vogtle expansion project does not even pass the "math reasoning" standard taught in Georgia's elementary schools. Nor could it withstand a major corporation's (in a competitive environment) capital expenditure committee review process.

Q. What is the math reasoning standard?

A. Elaine Prenovitz, my wife, was an elementary school teacher for 40 years in DeKalb and Gwinnett Counties, teaching math and reading to 4th and 5th graders. More specifically, she taught the children who either failed, or were at risk of failing, Georgia proficiency tests, required for promotion.

She taught her students to ask a basic question: does ~~this~~ their answer make sense? This is known as "math reasoning." For example when adding two whole numbers, the answer should be a greater value. When subtracting, the bottom-line should be a smaller value than the top number. She required her students to think, rather than blindly cranking out math calculations. Her teaching methodology proved quite successful in bringing her students up to grade level proficiency, and beyond.

Q. What does your wife's fifth math lessons have to do with a multi-billion nuclear construction project?

Georgia Power has consistently stated in their testimony that Vogtle expansion costs can increase well above the estimated $15 - $16 billion current budget, and still remain feasible [VCMR, Feb, 2013, P.2]. This statement defies both common sense and business sense.

Why?

According the Vogtle/Break-Even chart (exhibit 6), Georgia Power estimates their part of the project can reach $9.34 billion, and the total project over $$20 billion before the Vogtle expansion project becomes unfeasible.

Georgia Power's net plant in service (2012) was under $19 billion, and its generating plant is service (before depreciation) was $14.6 billion.

These numbers do not make sense. It is imprudent for Georgia Power to spend more than its total net assets combined to complete the Vogtle reactors which will contribute so little additional capacity (1000 Mw- Georgia Power, 2200 Mw total). It makes even less sense as Georgia Power's sales volume growth indicates that even this minimal capacity addition (1000/17,984 = 6%) is not needed.

Q. What conclusion can be drawn from this discussion?

A. The Commission should curtail Georgia Power from adding more than $15 billion worth of additional generating capacity that is not supported by the market realities of its business.

V. THE HIGH FINANCIAL RISK OF EXPANDING PLANT VOGTLE

Q. How would you assess the risk of building the "first of its kind" nuclear units in the U.S. in over 30 years, from a financial and business perspective?

A. Enormous. The new Vogtle reactors will be, with the August 1, 2013, cancellation of Florida Power & Light's $24 billion AP1000 reactor project in Florida, the most expensive power plant ever built in the U.S. As shown above, Georgia Power's current forecast to complete Vogtle is already approaching $16 billion. Indeed, Georgia Power

often justifies its request to recover cost overruns and increase the capital cost certification , by invoking the many uncertainties of building a "first-of-its-kind" nuclear reactor. It should be remembered, that no one forced GA Power to build the first new nuclear reactor in 30 years.

From a financial perspective this puts the company and its customers at great risk. An internal Georgia Power feasibility study conducted 40 years ago accurately outlines the risks of nuclear construction. Forty years later, its observations are still relevant. The study, authored by Georgia Power Vice-President H.H. Strozier referred to nuclear's benefits as "questionable economics."

> The nuclear units require more lead-time; we have little control over the costs, as well as the scheduled completion date. Operating costs other than fuel will be higher than for an equivalent fossil unit because of more expensive personnel. [Source: Strozier Study, 1972. Exhibit 7]

Additional financial risks derive from the possibility that all costs over the original budget could, and should, be disallowed, and the company will have to absorb cost overruns. There are also prudency issues yet to be considered, much less resolved. Georgia Power's sister company, Mississippi Power is absorbing hundreds of millions of disallowances for cost overruns concerning the "first-of-its-kind" plant in Kemper, Mississippi.

The business risk of Vogtle is also significant because Georgia Power does not need the additional capacity. New capacity, especially nuclear, has very high fixed costs, which puts considerable pressure on the company and regulators to continually increase rates. This is negative for the residential and business population of Georgia. This also exerts tremendous pressure on this Commission to effectively deal with this unfolding financial and rate crisis.

Q. Are Georgia Power's feasibility studies objective?

A. No. It is a basic principle in financial management and capital budgeting that feasibility studies are driven by the assumptions that support them. The math is straightforward. The assumptions made and not made determine the "answer." Therefore the analysis must examine not only the alternatives stated, but also alternatives that may not be listed in the particular study, but are very relevant.

The most obvious omission from consideration by Georgia Power is that the nuclear option was and is only compared to certain other generating options, specifically coal and gas, and only focuses on a fuel cost comparison. Comparing generating options and fuel costs alone is too limiting.

There was, and is, the option of not building a large, "first-of-its-kind power plant," at all. Not building new reactors and incurring the financial risks that they entail is a practical option that has been consistently ignored. There are two key reasons the no-build option is so attractive. (1) Cost: Vogtle's cost per KW is over $6700, compared to GPC's embedded cost per KW of $1,046, and (2) Vogtle's capacity is not needed (nor was it needed when the project began). Georgia Power's most cost-effective option is not to build large expensive, high-risk power reactors, at all. The high costs and risks combined with Georgia Power's steadily declining capacity utilization factor from 71% to 54%, highlights this conclusion.

Q. What is an Incremental Economic Analysis and how is it used by both Georgia Power and staff witness Philip Hayet to support Vogtle expansion's continued feasibility?

A. Incremental Economic Analysis ignores all sunk costs, and focuses solely on projected future costs compared to other alternatives. As Mr. Hayet described in his December 16, 2009, testimony:

So, the notion of the costs that have already been spent as being sunk is something that you do ignore and we're just simply pointing that out, that's the company's practice, we agree with it and that's fairly industry standard. (2009 transcript: p. 203, L 3-7)

Q. What is the problem of relying on Incremental Economic Analysis and ignoring sunk costs?

A. It can lead to serious financial problems, perhaps even financial suicide. Several utilities went bankrupt in the 1980's ((**Forbes**, 2010) (Exhibit 8). Relying on an incremental analysis to evaluating the feasibility of complex projects was a contributing factor.

This type of thinking escalated the actual costs of Vogtle 1&2 from $660 million to $8.87 billion (1245% cost overrun). Vogtle's budget did not increase $8 billion at one time. It got there incrementally over 15 years. If the Commission knew in the early 1970s that Vogtle was going to miss its original budget by over $8 billion, it is reasonable to conclude they never would have approved the project.

Q. Is Incremental Economic Analysis an example of the "Boiling Frog syndrome"?

A. Yes. The famous story goes like this: if a frog is placed in boiling water, it will immediately jump out. However, if the frog is placed in water at room temperature that is slowly and incrementally heated to a boiling point, it will continue to adapt its new environment. Unable to perceive the coming danger the frog will eventually boil to death. The story is a metaphor for the inability or unwillingness of people and organizations to perceive and react to significant and dangerous changes, that occur gradually.

Q. Are there generally accepted economic principles that support the "no build" strategy?

A. Yes. Fundamental micro-economics teaches that a firm produces a product or invests in additional capacity to the point where MR > MC. Margin revenue (MR) is the additional revenue we can generate by selling an extra unit of output (product). Marginal cost (MC) is the additional cost of producing and selling one more unit of output.

If the marginal revenue, also know as incremental revenue, is greater than marginal cost (incremental cost), the additional income obtained from this unit or plant investment, will be greater than the additional expense to produce and sell it. This is a sound investment.

On the other hand, if the expected revenue is less than the marginal cost of adding new plant capacity, the additional revenue will be less than the additional cost. Under this scenario the decision would be not to invest in the additional marginal unit of capacity. This is an unsound investment.

Q. How does this economic principle apply to Plant Vogtle?

A. Georgia Power's Key Financial and Operating data chart (Exhibit 4, line #8) shows the existing (embedded) cost per Kw = $1,046 Kw. Vogtle 3&4's cost per Kw = $6,773, 5.5 X the embedded cost per Kw.

From this simple chart we can predict with a high degree of accuracy that the only way Georgia Power can recoup this investment is by increasing rates. In a competitive environment, the market would not allow the firm to recover such in investment by price increases. In a monopolistic environment, such an option is a possibility when the regulators are not vigilant. This is happening in Georgia with Vogtle. This was

happening in Mississippi with Kemper, but not any more. The Mississippi commission has become much more vigilant and assertive in its oversight of the Kemper project. Hopefully, this will soon occur in Georgia.

Q. What does this analysis tell us?

Georgia Power's commitment to controlling its costs so they will not have to consistently seek additional rate and other types of financial relieve, is not a major priority. Remember in addition to rates, GPC also recovers costs associated with CWIP, environmental fees, and also fuel costs. Controlling costs is not a major strategic commitment of the company.

The aggressive growth oriented strategy perused by Southern Company in both GA and MS is not in the best interest of their customers. The reason is grounded in basic economic theory. The company is adding capacity that is both high in cost, and not needed. That is a fiscally irresponsible combination.

VI. GEORGIA POWER'S REQUEST FOR $381 MILLION CERTIFIED CAPITAL COST INCREASE SHOULD BE DENIED

Q. How should the Commission respond to Georgia Power's request to raise the certified capital cost for Vogtle by $381 million to $6.85 billion?

A. The Commission should hold Georgia Power to its original agreement and commitment. Georgia Power and Southern Company's top executives are on record promising that Vogtle reactors 3&4 will not be a repeat of the Vogtle 1&2 problems. The Commission should not force Georgia ratepayers to shoulder the well documented costs overruns of building a nuclear plant, especially a nuclear plant that is not needed.

In January 2008 **Georgia Trend Magazine** then-Georgia Power CEO Mike Garrett said, "It's time to turn to nuclear and look to see if it's time to start this nuclear

renaissance in the country. ***The plants will be – should be – less expensive than the ones that we've built in the past.*"** [**Georgia Trend**, January 2008, Exhibit 9, emphasis added]

In a 2010 AJC editorial column, Georgia Power Executive Vice President, Joseph A. "Buzz" Miller, responded "Yes" to the question, "Can Georgia Power Contain Costs of Plant Vogtle Reactors?" [**Atlanta Journal-Constitution**, September 16, 2010, Exhibit 10]

In November 2012, Southern Company CEO Thomas Fanning described the $900 million+ law suit between Georgia Power and their contractors as, "a normal part of doing business." (Atlanta Journal-Constitution, November 5, 2012, Exhibit 11) Mr. Miller stressed what he characterized as major improvements in the construction process, citing components to be built off-site in Lake Charles, LA, delivered in sections to the construction site where a large crane would position the sections into place. "It's like a giant erector set," said Mr. Miller. (**Forbes**, Exhibit 8)

During cross-examination of Georgia Power's witnesses David McKinney and Kyle Leach , Kevin Green, attorney representing Georgia Power also quoted the **Forbes** 2010 article, stating that the company has the reputation on Wall Street as one of the best-managed utilities: "If someone's going to build a nuke, it probably should be Southern." (Exhibit 8)

Warren Buffett offers a different perspective:

> When a management with a reputation for brilliance tackles a business with a reputation for bad economics, it is the reputation of the business that remains intact.

During cross-examination July 18, 2013, Mr. McKinney said, "Absolutely we can control costs. These are good forecasts."

Georgia Power's senior management should be held accountable for both their actions and their promises. Only the Commission can assure that happens.

Q. Should Georgia Power and Southern Company executives testify before the Georgia Public Service Commission?

A. Yes. Georgia Power, unlike in the Vogtle 1&2 hearings, has not proffered key decision makers within the company to provide testimony to the Public Service Commission. Georgia Power has been relying on witnesses Mr. Kyle Leach, a Director four levels removed from Georgia Power CEO, Paul Bowers and Mr. David McKinney, a VP who is two levels removed from Paul Bowers.

Senior management of Georgia Power with decision making power should be presenting and defending Georgia Power's case. The commission should seek as witnesses:

- Joseph A. "Buzz" Miller who was involved in the original decision to start Vogtle 3&4. Mr. McKinney reports directly to Mr. Miller. He was profiled in the 2010 **Forbes** article (exhibit 8), and wrote an article for the **Atlanta Journal-Constitution** (exhibit 10).
- Paul Bowers, Georgia Power CEO a key decision-maker at Georgia Power.
- Ron Hinson, Georgia Power CFO, (chief financial officer)
- Tom Fanning, Southern Company CEO who can, in addition to testifying about Plant Vogtle, provide testimony about the similar case in Mississippi.
- Mike Garrett, former Georgia Power CEO predicted the new reactors should cost less than the old in his **Georgia Trend** interview.

Q. What can these top executives contribute that the previous witnesses could not?

A. This short list of top corporate officials are key decision-makers who make, and can change, policy. When Georgia Power witnesses Leach and McKinney were questioned

about Georgia Power's willingness to cap Vogtle's costs and absorb any amount over the agreed cap they could only testify to the official company line, which is "No."

The aforementioned potential witnesses have both the ability and authority to give more valuable testimony. They were in on the decision to build Plant Vogtle and were intimately involved with consideration of the key risk factors. Ron Hinson, Georgia Power's new CFO's ability to testify to the financial impact and feasibility of Vogtle, would prove most useful.

Q. Georgia Power projects on pages 6 & 7 of its direct testimony that the total customer rate impact of the Vogtle additional reactors will be 6-8% and that it would have been 12% without CWIP in the rate base. Is that rate forecast correct?

A. No. Just as Georgia Power's load forecasts historically have been too high, Georgia Power's forecasts regarding rate impact on customers has been too low. The 6-8% rate increase will be the very low end. The assumptions that must materialize to keep rates at this level can be found on page 36 of the Vogtle Construction Monitoring Report (Feb 2013).

1. $500 million upfront is assumed from advanced cost recovery, including CWIP in the rate base. This is not a savings to the customer, since they already paid for it as "Nuclear Construction Cost Recovery" fees, in advance. In accounting terms, it was a prepaid expense.

2. $700 million in savings is assumed from "Productions Tax Credits" offered by the U.S. government. This credit is highly speculative as evidenced by the following Georgia Power disclosure:

> To recognize the uncertainty in the underlying assumptions behind the PTC calculations, only 50 percent of the expected tax credits are assumed in the Company's economic evaluation (VCMR, p. 36)

3. $800 million is assumed in projected interest savings. This, too, is highly speculative and impossible to accurately forecast over the long term. In fact, if the problems associated with Plant Vogtle's cost overruns (about $1.8 billion to date, factoring in the $925 million cost overrun currently in litigation), and the additional problems Southern Company is experiencing with the "first-of–its-kind" Ratcliffe carbon-capture coal plant in Mississippi (a projected $1 - $2 billion cost overrun), will likely have a negative impact on both Georgia Power's and Southern Company's bond rating. A lower bond rating translates into higher interest rates.

Q. What would be an accurate forecast for Georgia Power rates for Plant Vogtle?

A. Reviewing the Georgia Power Key Financial and Operating Data chart, we can see that over the past 10 years, Georgia Power's rates have increased a little under 5% annually. Looking closely at the residential rates (marked with an asterix *) we see that these rates do not include the impact of CWIP, environmental, and municipal fees. Adding these charges back into the rate structure produces a higher rate increase.

Although the public has not been furnished enough information to establish the rate increase with certainty, since the rate has consistently been increasing by 5% annually, over 10 years, it is reasonable to conclude the rate impact of Vogtle will be considerably greater than 6 – 8%.

Q. What is happening in Mississippi with the Ratcliffe coal plant and what relevance does that have to Georgia and Plant Vogtle?

A. Southern Company owns both Georgia Power which is building Plant Vogtle and Mississippi Power which is building Plant Ratcliffe (often called "Kemper" because of its location). Both plants are "first-of-its-kind" projects. Both projects are experiencing major cost overruns and construction delays. Both projects have generated considerable criticism from the public, and, in the case of Plant Ratcliffe, from the Mississippi Public Service Commission. Mississippi Power's new president, Ed Holland has publicly acknowledged that cost overruns were not built into the original $2.4 billion estimate stating "that was a mistake."

The Mississippi Public Service Commission has demanded a cap on Plant Ratcliffe's cost at original $2.4 billion certification and Southern Company is reportedly absorbing hundreds of millions of dollars in cost overruns. The full amount has yet to be determined. However, the AJC reported (8-1-13) that Southern Co took almost a $300 million after tax loss as the result of the problems with the Kemper plant.

Nuclear Watch South urges the Georgia Public Service Commissioners to consult with its colleagues in Mississippi to gain a comprehensive understanding of these issues, how the Mississippi commission is responding to them, and its potential application to the state of Georgia and Plant Vogtle expansion.

Given the promises of Georgia Power and Southern Company top executives and its ongoing claims that rates will only increase by 6-8%, the Commission should reject Georgia Power's request for a $381 million increase in the capital cost certification for Vogtle.

VII. STIPULATION BETWEEN PUBLIC INTEREST ADVOCACY STAFF AND GEORGIA POWER SHOULD BE DENIED

Q. Please describe the stipulation produced by the Public Interest Advocacy Staff and Georgia Power Company on July 30, 2013.

A. The stipulation requests approval from the Commission: 1) to withdraw the request to raise the certified capital costs by $381 million and hold future requests for increase in certified capital costs in abeyance until Vogtle 3 is completed and, further, absolves PIA staff from testifying on these costs; 2) to recover $209 million spent July 1-December 31, 2013; 3) to waive the obligation to file the 9th Vogtle Construction Monitoring Report until the 10th VCMR deadline in 2014.

Q. Is the stipulation balanced with respect to the interests of Georgia Power, Georgia Power's investors, and the ratepayers?

A. No. The stipulation does a grave disservice to Georgia Power's residential and small business customers who are bearing the cost of Vogtle expansion by ignoring the cost increases, quality, and managerial issues which are necessary for weighing the prudency of continuing to construct Vogtle reactors. Also, the fact that Georgia Power and their contractors combined for a $900 million+ cost overrun, is hardly a justification to allow Vogtle 3 to be completed, without any staff or public review.

Also, this was a closed agreement between the company and the PSC staff. No other parties were allowed, or even aware, of these negotiations. This gives the appearance of a collusive and unhealthy relationship between the regulated, and those responsible for regulating them. In the future, all parties should be included in such discussions and negotiations.

Finally, the semi-annual Vogtle 3&4 Construction Monitoring Reports are the public's major tangible source of information and protection from construction, quality and cost problems; systemic of large nuclear constructions projects in general, and the Vogtle expansion project, in particular. Georgia Power's obligation to adhere to the report schedule should be strictly enforced. The recent hearing should have no bearing on Georgia Power's ability to produce the January 1 – June 30, 2013 9th VCMR.

The Commission should reject the stipulation in its entirety.

X. CONCLUSIONS & RECOMMENDATIONS

Q. Mr. Prenovitz, will you please summarize your conclusions & recommendations for the Commission?

Conclusions

- The Commission should scuttle current Vogtle expansion as more beneficial to Georgia Power's ratepayers.
- Vogtle expansion's capacity is not needed now, nor was it needed when the project began.
- Georgia Power's strategic focus is on completing the Vogtle expansion project, regardless of the costs and risks. This strategy has serious financial consequences for both Georgia Power and its customers but will consistently produce higher rates. Key assumptions made by Georgia Power regarding the Vogtle expansion project are biased toward completion and not consider the "no build" option.
- Plant Vogtle expansion is not economically feasible.
- Vogtle's costs, both actual and projected, defy both business sense and common sense. Vogtle cannot be worth up to $20 billion, as Georgia Power claims, when all of Georgia Power's total net plant assets are worth less than $19 billion (2012).
- The Commission should deny Georgia Power's request for $381 million certified capital cost increase.
- Georgia Power forecasts are historically wrong, by a wide margin. Load forecasts are consistently too high. Rate impacts on customers and Vogtle capital costs forecasts are historically too low.

- Georgia Power missed its original budget by a wide margin and seeks to have its residential and small business customers pay for it. The Mississippi commission dealt with a similar issue with Plant Ratcliffe, and capped its costs.
- As a result of Plant Ratcliffe's cost overruns and its regulatory treatment, Southern Company took a $297 million after tax loss in the second quarter 2012.
- The stipulated agreement entered into between GA Power and the staff is not in the best interests of the customer. There was no transparency. All other parties/intervenors were excluded.

Recommendations

- Deny Georgia Power's applications for additional funding and changing the certification.
- Reject the stipulation agreement between the company and the staff, in its entirety.
- Call Georgia Power's Senior Management to testify before this commission
- Cut the losses and cancel the Vogtle project now. Better to absorb a loss of $5 billion+ now, rather than an additional $10 - $15 billion going forward, with an unfeasible project, producing unneeded capacity.
- Require transparency by GA Power in both meetings regarding rate impacting issues and in providing important information to the public. No more redacted testimony. No more secret meetings.
- If the commission decides not to cancel Vogtle immediately, consider the following:
- Cap Vogtle costs, as was done with Georgia Power's sister company, Mississippi Power regarding the Kemper project.
- Contact the Mississippi commission to learn how they responded to Plant Ratcliffe's massive cost-overruns.
- Put Georgia Power on notice that this commission intends to hold

comprehensive prudency hearings regarding all major aspects of the Vogtle project: planning, cost control, management, constructions, decision-making.

Q. Mr. Prenovitz, does this conclude your testimony? ?

A. Yes.