

**BEFORE THE  
GEORGIA PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF GEORGIA POWER  
COMPANY'S ELEVENTH SEMI-ANNUAL  
VOGTLE CONSTRUCTION MONITORING  
REPORT**

**DOCKET NO.: 29849**

**PUBLIC DISCLOSURE**

**DIRECT TESTIMONY  
AND EXHIBITS  
OF  
STEVEN D. ROETGER  
WILLIAM R. JACOBS, JR., PhD.**

**ON BEHALF OF THE  
GEORGIA PUBLIC SERVICE COMMISSION  
PUBLIC INTEREST ADVOCACY STAFF**

**November 21, 2014**

## **Table of Contents**

<u>I.</u>	<u>INTRODUCTION</u>	
<u>II.</u>	<u>STATUS OF PROJECT</u>	
<u>III.</u>	<u>SCHEDULE ANALYSIS AND CHALLENGES</u>	20
<u>IV.</u>	<u>RECOMMENDATIONS</u>	34

### **Exhibits:**

STF-SR/WRJ-1	Resume of Steven D. Roetger
STF-SR/WRJ-2	Resume of William R. Jacobs, Jr., Ph.D.

## **I. INTRODUCTION**

**Q. PLEASE STATE YOUR NAMES, TITLES AND BUSINESS ADDRESSES.**

**A.** My name is Steven D. Roetger. I am an analyst for the Georgia Public Service Commission. My business address is 244 Washington Street, S.W., Atlanta, Georgia, 30334. My name is William R. Jacobs, Jr., Ph.D. I am an executive consultant with GDS Associates, Inc. My business address is 1850 Parkway Place, Suite 800, Marietta, Georgia, 30067.

**Q. MR. ROETGER, PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.**

**A.** I hold a Bachelor of Business Administration degree from Georgia State University. I have been employed by the Georgia Public Service Commission since September of 2008, primarily in the capacity as the team lead for the Vogtle Unit 3 and 4 Project under Docket No. 29849. Also, I was a Public Interest Advocacy Staff team member for the Vogtle certification, Docket No. 27800, and an Advisory team member for various other proceedings. Prior to joining the Georgia Public Service Commission I held various positions in either an accounting or finance capacity for firms in different industries. My resume is included in Exhibit SR/WRJ-1.

**Q. DR. JACOBS, PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.**

A. I received a Bachelor of Mechanical Engineering in 1968, a Master of Science in Nuclear Engineering in 1969 and a Ph.D. in Nuclear Engineering in 1971, all from the Georgia Institute of Technology. I am a registered Professional Engineer and a member of the American Nuclear Society. I have more than thirty years of experience in the electric power industry including more than twelve years of nuclear power plant construction and start-up experience. I have participated in the construction and start-up of seven nuclear power plants in this country and overseas in management positions including start-up manager and site manager. As a loaned employee to the Institute of Nuclear Power Operations (“INPO”), I participated in the Construction Project Evaluation Program, performed operating plant evaluations and assisted in development of the Outage Management Evaluation Program. Since joining GDS Associates, Inc. in 1986, I have participated in rate case and litigation support activities related to power plant construction, operation and decommissioning. I have evaluated nuclear power plant outages at numerous nuclear plants throughout the United States. I served on the management committee during construction of Plum Point Unit 1, a 650 Megawatts Electric (“MWe”) coal fired power plant. As a member of the management committee, I assisted in providing oversight of the Engineering, Procurement and Construction (“EPC”) contractor for this Project. I have assisted the Georgia Public Service Commission as the Independent Construction Monitor in providing oversight of the Vogtle 3 and 4 Project since August 2009. My resume is included in Exhibit STF-SR/WRJ-2.

**Q. WHOM ARE YOU REPRESENTING IN THIS PROCEEDING?**

A. We are representing the Georgia Public Service Commission (“Commission”) Public Interest Advocacy Staff (“Staff”).

**Q. MR. ROETGER, WHAT IS YOUR INVOLVEMENT WITH THE VOGTLE 3 AND 4 PROJECT?**

A. Since Docket No. 27800, I have been directly involved in the oversight of the Vogtle Unit 3 and 4 Project (“Project”) as part of the Staff team. I have closely monitored the Project with Dr. Jacobs since its inception. I also testified in the Eighth and the Ninth/Tenth Semi-Annual Vogtle Construction Monitoring (“VCM”) proceeding.

**Q. DR. JACOBS, WHAT IS YOUR INVOLVEMENT WITH THE VOGTLE 3 AND 4 PROJECT?**

A. I am the Commission’s Independent Construction Monitor (“CM”) for the Project. As such, my duties are to assist the Staff in providing regulatory oversight of all aspects of the Project and to keep the Commission informed of significant Project issues or changes in the projected cost and schedule as they occur. I have presented testimony in the First, Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth and Ninth/Tenth Semi-Annual VCM proceedings describing the construction monitoring activities, the status of the Project and any concerns or significant issues that I identified.

**Q. WHAT IS YOUR ASSIGNMENT IN THIS PROCEEDING?**

Our assignment is to present the results of the Staff's and CM's Project oversight from certification of the Project to the present with emphasis on the time period covered by the Eleventh Semi-Annual VCM Report, January 1, 2014 through June 30, 2014. We will describe the current status of the Project and will update the Commission on issues that have the potential to impact the schedule or cost of the Project that have been discussed in prior testimony in this docket and identify any new issues that have arisen since the Ninth/Tenth Semi-Annual VCM proceeding. Finally, we will make a recommendation regarding the \$198 million of costs submitted by Georgia Power Company ("Company") for verification and approval.

**Q. PLEASE DESCRIBE THE CONSTRUCTION MONITORING PROGRAM THAT THE STAFF AND INDEPENDENT CONSTRUCTION MONITOR HAVE IMPLEMENTED TO MONITOR THE CONSTRUCTION OF THE VOGTLE 3 AND 4 PROJECT.**

A. The Staff and the CM continue to be very active in monitoring the Project. These activities include monthly meetings with Staff and Company personnel to discuss Project status, regular trips to the Vogtle Project site to observe the Monthly Project Review meeting and to witness firsthand construction activities and progress. The CM has observed readiness review meetings in which Company and Consortium personnel review the Consortium's plan for key activities. In addition, the CM team has continued its review of the Company's process for handling Project invoices from Westinghouse ("WEC") and Chicago Bridge & Iron ("CB&I"). This includes review of the Project cost

control procedures and sampling of processed invoices. Other activities conducted by the Staff Vogtle Construction Monitoring team include:

- Review of Weekly Metrics reports issued by the Company;
- Review of Monthly Project status reports issued by the Company;
- Review of Monthly EPC status reports;
- Review of the Company's Semi-Annual VCM Reports;
- Preparation of discovery requests for additional information as needed following review of the monthly status reports, semi-annual construction monitoring reports or meetings with the Company;
- Participation in Nuclear Regulatory Commission ("NRC") public meetings;
- Review of public correspondence between the Company and the NRC via the NRC website;
- Review of correspondence between the Consortium and the Company;
- Review of trade articles and journals related to new nuclear power plant development.
- Witnessing significant construction activities including:
  - Unit 3 Setting of Containment Vessel first ring;
  - Unit 3 CA05 set in the Nuclear Island;
  - Unit 3 CA01 sub-modules upended on the platen in the Module Assembly Building ("MAB").



## II. STATUS OF PROJECT

**Q. PLEASE DESCRIBE THE PROJECT SCHEDULE.**

A. The Consortium continues to make acceptable progress on non-Nuclear Island activities such as the Turbine Island and related equipment, cooling towers, and plant support structures. The Consortium's September 2014 Integrated Project Schedule ("IPS") terminates at December 31, 2015. Therefore, a complete IPS through the Commercial Operation Date ("COD") of each unit has not been provided to Staff. Of particular concern to the Staff is that in the present VCM, the Company has not reaffirmed the forecast CODs provided in the Ninth/Tenth VCM of late 2017 for Unit 3 and late 2018 for Unit 4 or provided revised CODs for the Project stating only that:

The Company is working with the Contractor to establish the most detailed and comprehensive integrated schedule to date. In May 2014, the Contractor completed and provided to the Company a significant update to the Integrated Project Schedule ("IPS"). This updated IPS showed activities through 2015, and the Contractor has recognized the existence of challenges to several long-term activities, including fabrication, assembly and installation of structural modules and shield building modules. In recent months, Contractor performance in schedule adherence for critical path activities has resulted in additional schedule pressure to the project.

<sup>1</sup>

It is Staff's understanding that the Contractor has developed a complete IPS through CODs of the Units and that the Company and Contractor are in commercial negotiations to allow the Company to review and assess this schedule. Although Staff has been told of this development, Staff is not aware of the key Project dates in this IPS.

---

<sup>1</sup> Direct Testimony of David Clem, Kyle Leach and David McKinney, Pg. 6, line 23 through Pg. 7, line 5

**Q. THE COMPANY’S TESTIMONY THAT YOU CITE ABOVE MENTIONS THE MAY 2014 IPS. WHAT IS THE SIGNIFICANCE OF THIS IPS?**

A. As discussed in our testimony in the Ninth/Tenth VCM, the May 2014 IPS was developed after the Contractor completed a detailed and lengthy review of the remaining engineering activities required to complete the Project. The May 2014 IPS was presented as a “locked down schedule” against which the progress of the Project would be measured going forward. However, this IPS only presents detailed Project activities through December 2015. Beyond 2015, it is our understanding the Consortium has recognized that significant mitigation efforts will be required to maintain the current CODs. These mitigation plans were not developed as of the issuance of the “locked down” schedule and the Contractor stated that they would need three to five months to develop these mitigations activities.

**Q. TO DATE HAS THE STAFF BEEN PROVIDED WITH A COMPLETE IPS THAT INCLUDES THE MITIGATION ACTIVITIES NEEDED TO MAINTAIN THE LATEST FORECAST CODS?**

A. No, we have not been provided a full IPS and have not been informed of the planned mitigation activities. Thus, at this time, we are unable to conduct an assessment of the IPS through the CODs of the Units.

**Q. HAS THE CONSORTIUM ACHIEVED THE TARGET DATES FOR SIGNIFICANT ACTIVITIES AS SHOWN IN THE MAY 2014 TARGET SCHEDULE?**

A. No they have not. Many of the critical activities have slipped since issuance of the May 2014 IPS.

**Q. HAVE YOU DONE ADDITIONAL ANALYSIS OF THE PROJECT SCHEDULE?**

A. Yes we have. Our additional schedule analysis is provided in Section III of this testimony.

**Q. WHAT IS THE CURRENT STATUS OF THE PROJECT BUDGET?**

A. The Company's current estimate of Total Project Cost is \$6,704 million which is \$591 million above the certified amount of \$6,113 million. Total Project Cost consists of construction/capital cost and financing cost. The current Total Project Cost estimate is based on the current in-service dates of the fourth quarter of 2017 and 2018 for Units 3 and 4, respectively. This is unchanged from the forecast presented in the Ninth/Tenth VCM. As discussed above and explained in more detail in Section III of this testimony, the in-service dates assumed by the Company are not supported by a complete IPS (that includes activities to Project completion) and, as a result, the forecast Total Construction and Capital Costs are also unsupported.

As reported in the Company's 11<sup>th</sup> VCM report, as of June 30, 2014 the Company's Total Construction and Capital Cost expenditures of \$2,797 million was \$34 million under the August 2014 re-forecast<sup>2</sup> budget-to-date amount of \$2,831 million and Total Construction Schedule Finance Cost of \$642 million was \$3 million under budget. As described in our testimony in previous VCM proceedings, these budget variances are primarily due to timing differences between actual expenditures and the budget and should not impact Total Project Cost. More plainly, the Project is under budget because the Consortium has not completed the milestones necessary to receive milestone payments as anticipated in the Company's current budget. Thus, the Consortium has been paid less at this time than projected by the Company's current budget because they have not accomplished work according to scheduled milestones.

**Q. WHAT IS THE BREAKDOWN OF THE \$198 MILLION IN COSTS THE COMPANY IS REQUESTING IN THIS VCM?**

A. The \$198 million in costs the Company requests be verified and approved consists of three major cost categories as shown in the table below:

(Millions of \$)	Eleventh VCM
<b>Certified Capital</b>	
<b>EPC Base</b>	
Fixed Semi Annual Escalation	\$ 65
Indexed Escalation	11
Other Fixed Escalation	31
<b>Total EPC Base</b>	<b>107</b>

<sup>2</sup> The Company re-forecasts its budget twice per year; once in February and again in August.

<b>EPC Escalation</b>	
Fixed Semi Annual Escalation	15
Indexed Escalation	2
Other Fixed Escalation	11
<b>Total EPC Escalation</b>	<b>27</b>
<b>QA, Compliance and Operations &amp; EPC Scope Change</b>	51
<b>Ad Valorem</b>	7
<b>Test Fuel Offsets</b>	0
<b>Transmission Interconnection</b>	5
<b>Total Construction &amp; Capital Cost</b>	<b>\$198</b>

- EPC Base costs consist of milestone payments received by WEC and CB&I upon completion of the specific work related to the milestone. WEC also receives monthly progress payments to cover the cost of its engineering, procurement and project management activities.
- Owners Costs include oversight by the Company, licensing costs and the costs of owner scope activities such as construction of the needed transmission facilities.

**Q. WHAT FUTURE RISKS COULD RESULT IN ADDITIONAL COST TO THE PROJECT?**

A. Significant future risks that could result in additional cost to the Project continue to be the risks identified in our testimony in the Ninth/Tenth VCM. These risks include additional schedule delay beyond the current forecasted delayed CODs; the outcome of the current litigation between the Owners and the Consortium; the resolution of current change orders submitted by the Consortium; and, the submittal of potential additional change orders by the Consortium. In our opinion, progress to date on the Project has not significantly reduced the potential impact of these risks. The costs resulting from

additional schedule delay include increased capital cost, financing cost, and replacement fuel cost.

**Q. DID THE STATUS OF THE LITIGATION CHANGE IN THE CURRENT VCM PERIOD?**

A. Staff and the CM are unaware of any change in the status of resolution of the litigation. However, per the Company's 10-Q dated June 30 2014, on May 22, 2014 the Consortium filed an amendment to its counterclaim alleging that:

(i) the design changes to the DCD imposed by the NRC have delayed module production and the impacts to the Contractor are recoverable by the Contractor under the Vogtle 3 and 4 Agreement and (ii) the changes to the basemat rebar design required by the NRC caused additional costs and delays recoverable by the Contractor under the Vogtle 3 and 4 Agreement. The Contractor did not specify in its amended counterclaim claimed amounts relating to these new allegations, but such additional claimed amounts could be substantial.

**Q. HAVE EITHER OF THESE TWO ADDITIONAL CONSORTIUM CLAIMS BEEN QUANTIFIED?**

A. Staff and the CM believe, based on conversations with SNC senior management, that counterclaim (ii) has been quantified by the Consortium at approximately XXXXXXXXXX (100% ownership) as received by the Company post the Eleventh VCM period.

**Q. HAS COUNTERCLAIM (i) BEEN QUANTIFIED BY THE CONSORTIUM?**

A. The Staff and CM do not have knowledge of the quantification for item (i) except that the amounts related to these new allegations ‘could be substantial’, as stated in the above excerpt.

**Q. IS THE SAME LANGUAGE FOUND IN THE COMPANY’S MOST RECENT 10-Q FOR THE PERIOD ENDING SEPTEMBER 30, 2014?**

A. Yes.

**Q. PLEASE SUMMARIZE THE PENDING ALLEGATIONS AND KNOWN AMOUNTS IN THE CURRENT LITIGATION.**

A. The table below shows the known amounts (100%) currently being litigated:

<u>Description of Allegation</u>	<u>Amount</u> <u>(Million)</u>	
Shield Building Design Changes	\$600	*
Structural Modules Design	\$74	*
Late COL/No LWA	<u>\$244</u>	*
Sub-Total	\$918	*
██████████	\$████	**
Total Known Claims	\$████	
<u>Yet To Be Quantified Claims</u>	<u>Amount</u>	
Delayed Module Production	Unknown	

\* In 2008 dollars subject to escalation

\*\*Presumed 2012/2013 dollars

**Q. PLEASE DESCRIBE THE CONSTRUCTION PROGRESS THAT HAS BEEN MADE IN THE NUCLEAR ISLANDS DURING THE ELEVENTH VCM PERIOD.**

A. Significant construction progress has been accomplished in the Unit 3 and Unit 4 nuclear islands during the first six months of 2014, the 11<sup>th</sup> VCM period. These accomplishments include:

- Initial deliveries of Unit 3 CA01 sub-modules to the Vogtle site in January 2014;
- Placement of Unit 4 CR10 on the Nuclear Island on February 25, 2014;
- Setting of structural module CA20 in the Unit 3 Nuclear Island on March 8, 2014;
- Placement of the Unit 4 Containment Vessel Bottom Head pedestal on April 10, 2014;
- Setting the Unit 4 Containment Vessel Bottom Head on May 8, 2014;



- The first Unit 3 CA01 sub-module, CA01-03, was upended and set on the MAB platen on May 10, 2014. Setting this sub-module on the platen marks the beginning of assembly of CA01;
- Placement of concrete under the Unit 3 CVBH to 82 ft., 6 in. on June 23, 2014.

**Q. PLEASE DESCRIBE CONSTRUCTION ACCOMPLISHMENTS IN THE UNIT 3 AND UNIT 4 NUCLEAR ISLANDS SINCE JUNE 30, 2014.**

Although not in the Eleventh VCM period, progress has continued in the Project Nuclear Islands (“NI”) after June 30, 2014. This progress includes:

- Placement of concrete in the Unit 3 Nuclear Island inside the CVBH to elevation 80 ft., 6 in. on September 26, 2014;
- The first concrete placement inside Unit 4 containment, consisting of 360 cubic yards, was completed on September 18, 2014;
- Setting of the Unit 3 CA05 module in the Nuclear Island on October 20, 2014.
- Setting of the Unit 3 first ring of the Containment Vessel on October 3, 2014.

**Q. WHY DOES STAFF FOCUS MOST OF ITS ATTENTION ON ACTIVITIES RELATED TO THE NUCLEAR ISLAND?**

A. The NI encompasses the vast majority of the risks associated with nuclear design, procurement, and construction. Another reason for focusing on the nuclear island activities is that all identified parallel critical paths are tied to the NI or relate to the digital information and control system.

**Q. PLEASE DESCRIBE THE ACCOMPLISHMENTS IN THE BALANCE OF PLANT (NON-NUCLEAR) AREA.**

A. The Consortium continues to make significant progress in the Balance of Plant areas with the work being completed generally on schedule. During the Eleventh VCM period, erection of Unit 3 turbine building structural steel continued and all three condensers have been installed. Installation of permanent plant equipment has continued in the Unit 3 turbine island including:

- Main feedwater pumps;
- Feedwater heater drain tanks;
- Auxiliary boiler feedwater pumps.

The Unit 3 cooling tower has reached over 500 feet and the foundation of the Annex building was begun during the period. Good progress is also being made on the Unit 4 turbine building utilizing lessons learned from Unit 3.

**Q. WHAT MAJOR COMPONENTS HAVE BEEN RECEIVED AT THE VOGTLE PROJECT SITE DURING THIS PERIOD?**

A. Several large components were received at the Vogtle site during the Eleventh VCM period. These include:

- The Unit 3 integrated head package;
- The Unit 4 Reactor Vessel;
- The Unit 4 Accumulator tanks;

- The Unit 4 reactor coolant surge line piping;
- The Unit 4 turbine generator.

In addition, the Unit 3 Pressurizer was delivered to the site in August 2014.

**Q. PLEASE DESCRIBE THE PROGRESS MADE IN NON-CONSTRUCTION AREAS THAT ARE NECESSARY TO PLACE UNITS 3 AND 4 INTO COMMERCIAL OPERATION.**

A. In addition to the construction progress described above, progress continues to be made in preparation for startup testing and plant operation. These areas include:

- Development of preoperational and startup test procedures;
- Operator training and preparations for licensing of operators by the NRC;
- Development of operating procedures and programs;
- Reduction in the forecast peak of ITAACs by proactively working with the NRC to complete ITAAC as early as possible.

However, issues have recently been identified with Plant Reference Simulator Integrated System Validation (“ISV”) efforts which show a risk of delaying the first NRC Operator Exams scheduled for May 2015. The primary reason for this risk is that the [REDACTED] Should this delay be realized, the next opportunity for NRC operator exams would be in November 2015.

**Q. DOES THIS DELAY IN OPERATOR EXAMS POSE ANY INCREMENTAL THREAT TO THE UNITS' CODS?**

A. No. Staff and the CM believe that this delay will be absorbed by the current critical path construction delays.

**Q. THE COMPANY IN ITS FILING AND PREFILED TESTIMONY DISCUSS AT LENGTH THE EFFORTS OF THE COMPLIANCE MONITORING PROGRAM. WHAT IS THIS PROGRAM AND WHAT IS ITS INTENT?**

A. The Compliance Monitoring Program ("CMP") primarily encompasses the Company's Appendix B qualified Quality Assurance Program and its Corrective Action Program. The intent is to provide reasonable assurance that non-compliant design, systems, structures, and components are not placed or constructed into the Units. The CMP provides SNC the structure that ensures compliance with NRC's laws, regulations, and rules.

**Q. IS IT CORRECT TO STATE THAT THE PRIMARY OBJECTIVE OF THE CMP IS TO PROVIDE A BARRIER TO THE PLACEMENT OR SETTING OF NON-COMPLIANT SYSTEMS, STRUCTURES, AND COMPONENTS?**

A. Yes. It is implemented using compliance audits, vendor inspections, and trending among other processes and procedures.

**Q. WHAT IS STAFF AND THE CM'S OPINION OF THE CMP?**

A. Staff and the CM believe that from its inception in 2013 through the present, the CMP has been a robust and effective program that is meeting expectations of the Company and, more importantly, of the NRC.

**Q. CAN THE CMP AFFECT COMPLIANCE CHANGE AT THE CONSORTIUM OR ANY OF THEIR APPENDIX B SUPPLIERS?**

A. Not directly. The Program can identify non-compliant work, track the corrective actions initiated due to non-compliant work, and as previously stated be a barrier to non-compliant work being incorporated into the Units.

**Q. IS IT CORRECT TO STATE THAT ULTIMATELY THE CONSORTIUM AND ITS APPENDIX B SUPPLIERS ARE OBLIGATED TO PROVIDE FULLY COMPLIANT SERVICES AND WORK?**

A. Yes. Due to the structure of the EPC Agreement the Company states that it cannot interject itself into the means and methods chosen by the Consortium to accomplish the work.

**Q. WHAT IS THE CURRENT QUALITY STATUS OF THE CONSORTIUM'S VENDORS FABRICATING THE SUB-MODULES FOR UNITS THREE AND FOUR?**

A. Newport News Industries ("NNI"), the fabricator of the shield building panels, has to date supplied the project with quality compliant panels. However, it has been known for

some time that NNI potentially cannot fabricate the panels at a rate that meets construction needs. Thus far Staff is unaware of any commercially accepted expansion of NNI's production facilities. Various stop work orders are in effect at the Lake Charles Facility, Oregon Iron Works, and SMCI. IHI and Toshiba fabrication of Unit 4 CA01 sub-modules has been slowed due to Westinghouse design changes.

### **III. SCHEDULE ANALYSIS AND CHALLENGES**

**Q. ON JANUARY 1, 2014, THE BEGINNING OF THE ELEVENTH VCM REPORTING PERIOD, WHAT WAS THE STATUS OF THE INTEGRATED PROJECT SCHEDULE?**

A. The IPS was deficient for two reasons. First, there were significant engineering activities and durations that required linking to procurement and construction activities in the IPS; second, several critical path activity durations in that IPS were recognized by the Company and the Consortium to require significant revision and re-linkage into the schedule.

**Q. WHAT WERE THOSE CRITICAL PATH ACTIVITIES?**

A. Those critical path activities were the fabrication, site delivery, and site assembly of CA01; the fabrication, site delivery, and site assembly of the remaining unfinished 'big six' modules of CA02, CA03, and CA05; the fabrication, site delivery, and site assembly

of the shield building panels; and the early start of the Annex Building to support initial energization.

**Q. GIVEN THE SCHEDULE DEFICIENCIES ARTICULATED ABOVE, DO YOU CONSIDER THE IPS AT THAT TIME UNRELIABLE FOR PROJECT USE?**

A. For intermediate and long-term planning yes. Because each of the activities requiring refinement and detail were on the Consortium and Company's identified parallel critical paths, downstream activities could not be analyzed for impact to the units CODs.

**Q. DID THE CONSORTIUM PRODUCE AN IPS BETWEEN FEBRUARY 2014 AND THE TIME IT ISSUED THE LOCKED DOWN SCHEDULE IN LATE APRIL 2014?**

A. No. The Consortium did not update the IPS for three months during the Eleventh VCM period.

**Q. IN LATE APRIL THE CONSORTIUM ISSUED WHAT IT REFERRED TO AS THEIR LOCKED DOWN SCHEDULE, CORRECT?**

A. Yes. A Level 2 schedule for Unit 3 only was provided to Staff around the end of May 2014.

**Q. WHAT DID THIS LOCKED DOWN SCHEDULE SHOW?**

A. It showed activity durations up to December 31, 2015 with the exception of transmission inter-connect activities which were shown through the first quarter of 2016.

**Q. WHEN DID THE CONSORTIUM STATE THAT THE POST 2015 ACTIVITY DURATION DATES OF BOTH UNITS WOULD BE PROVIDED?**

A. The Consortium stated that balance of activities would be available within 3-5 months of the issuance of the Locked Down Schedule, or the end of October 2014.

**Q. HAS THE CONSORTIUM DEVELOPED THE BALANCE OF THE LOCKED DOWN SCHEDULE?**

A. As discussed above, Staff and the CM understand that according to the Company the Consortium has developed a full IPS through CODs of the Units. However, the Company and Consortium are reported to be in commercial negotiations to allow the Company to review and assess this schedule.

**Q. PLEASE SUMMARIZE THE HISTORY OF THE IPS VERSIONS THAT HAVE BEEN PROVIDED BY THE CONSORTIUM SINCE DECEMBER 2012.**

A. From December 2012 through April 2013 the Consortium only provided six month look-ahead schedules to the Company. Staff and the CM received a Level 2 IPS in June 2013 with a data date as of May 24, 2013. However, by September of 2013 it was recognized by both the Company and the Consortium that a significant amount of detail as described above was omitted from this iteration of the IPS which limited its



usefulness. Subsequently, as described above, the Consortium terminated issuance of any IPS from February 2014 until the issuance of the Locked Down Schedule in May of 2014.

**Q. IS IT ACCURATE TO STATE THE PROJECT HAS BEEN WITHOUT AN EFFECTIVE IPS THROUGH COD OF THE UNITS FROM DECEMBER 2012 THROUGH TODAY?**

A. Yes.

**Q. IS A FULLY INTEGRATED PROJECT SCHEDULE IMPORTANT FOR THIS PROJECT?**

A. Yes. Given that this project is the first nuclear construction in nearly 30 years, that this project uses many first of a kind construction techniques, that the licensing process 10 CFR Part 52 has never been used, and that the passive safety system design is also first of a kind, it is imperative that the Company obtains a complete IPS.

**Q. DOES STAFF AND THE CM BELIEVE IT TO BE REASONABLE AND PRUDENT TO MANAGE THIS COMPLEX BUILD WITHOUT AN EFFECTIVE IPS FOR 24 MONTHS?**

A. No. In fact it runs counter to any prudent project management, nuclear or otherwise, the Engineering, Procurement, and Construction Agreement requirements, and the nuclear

industry's own self-funded INPO Principles for Excellence in Nuclear Project Construction.

**Q. IS THE CONSORTIUM REQUIRED UNDER THE EPC AGREEMENT TO PROVIDE THE COMPANY WITH A FULLY INTEGRATED PROJECT SCHEDULE?**

A. Yes. The EPC, Article 3 Scope Of Work, section 3.4(a) states:

Project Schedule. The Project Schedule is attached to this Agreement as Exhibit E-1. The Project Schedule (and any revisions thereto) incorporates a Primavera (level III integrated CPM) schedule, linked to Intergraph Design Review 3D modeling package to enable 4D (3D v. time) visualization. The Project Schedule (and any revisions thereto) will include a construction plan and schedule report.

Additionally, attachment to Project letter agreement SVP/SV00166 dated May 21, 2009

section 4.1 Project Schedule states:

XX  
XX  
XX.

XX  
XX  
XXXXXXXXXXXXXXXXXXXXXXXXXXXX [emphasis added].

The attachment continues:

XX  
XX  
XX  
XX  
[emphasis added]. XXX  
XX  
XX.

**Q. DOES THE ABOVE EXCERPT SHOW THAT THE CONSORTIUM AND THE COMPANY IDENTIFIED VERY EARLY INTO THE PROJECT THE IMPORTANCE OF A FULLY INTEGRATED PROJECT SCHEDULE?**

A. The Staff and the CM believe it does.

**Q. HOW DOES INPO ARTICULATE THE IMPORTANCE OF AN IPS?**

A. INPO considers schedules to be of such significance to best industry practices that it articulates the need for such as one of their fundamental nuclear construction principles as follows:

**INPO Principle No. 4 – Schedules are Realistic and Understood.**

Effective project controls and detailed planning are key factors in the success of any large construction project. Unrealistic, uncoordinated, or obsolete schedules or insufficient resources can have a negative effect on construction quality and personnel safety, **especially when appropriate actions are taken to accelerate construction or to reduce cost [emphasis added].**

The Company is clearly in violation of this INPO principle. Of particular note is the emphasized portion above because the Project is currently 21 months delayed and has incurred additional incremental delays.

**Q. CAN THE COMPANY CURRENTLY PERFORM THE APPROPRIATE SCHEDULE ANALYSES TO ASSESS THE REASONABLENESS OF THE CURRENT FORECAST COD DATES?**

A. No, in response to four data requests issued by Staff the Company responded, in part, as follows:

Data Request	Company Response
STF-65-6	The Company cannot assess the potential critical path impact of this scenario because the Contractor has not yet provided current schedule information after 2015.
STF-65-9(a)	Without a full integrated project schedule ("IPS") through the in-service dates from the Contractor, the Company cannot assess the impact of a delay in setting CA01 to the scheduled in-service date of Unit 3.
STF-65-24	The Company agrees that Shield Building installation remains a long-term critical path activity. However, the Company does not have detailed schedule information for Shield Building panel installation beyond 2015 and cannot assess projected production rates for Shield Building fabrication or installation for any activities beyond 2015.
STF-68-6	Without a full integrated project schedule ("IPS") through the in-service dates from the Contractor, the Company cannot fully assess the impact of negative schedule variances in critical path activities or quantify the positive impact certain mitigation strategies will have when applied to critical path activities. The Company acknowledges that the Contractor's schedule performance has been disappointing since the issuance of the May 2014 IPS, and this performance has placed additional pressure on achieving the scheduled in-service dates.

**Q. DURING CERTIFICATION DOCKET 27800 DID COMPANY WITNESS DAY TESTIFY TO THE COMPANY'S ACTIONS WITH REGARD TO THE PROJECT IPS?**

A. Yes. Witness Day testified "I think it's very imperative on the company and Georgia Power will utilize Southern Nuclear as well as my engineering and construction organization to ensure that we have people on site day to day, week to week, month to month, that are watching the processes, **watching the schedules, getting advanced**

schedules for us to look and see if they're appropriate and we're going to hold the consortium accountable for those schedules (emphasis added) and methods and processes..." (Tr. P1681-1682)

**Q. IN STAFF AND THE CM'S PRE-FILED TESTIMONY IN THE NINTH/TENTH VCM DID YOU INCLUDE A TABLE THAT SHOWED THE STATUS OF SOME NUCLEAR ISLAND CRITICAL PATH ACTIVITIES AS OF THAT FILING?**

A. Yes. For convenience and comparison purposes we have included below that same table.

<b>Unit 3 Nuclear Island Path to Elevation 100'/103'</b>				
<b>I D</b>	<b>Milestone Activity</b>	<b>Level 2 Schedule Dated 5/24/2013*</b>	<b>May 30, 2014 Weekly Metrics</b>	<b>Days Delayed</b>
A	[REDACTED]	8/6/2013	12/4/2013(A)	120
B	[REDACTED]	9/4/2013	3/8/2014(A)	185
C	[REDACTED]	12/3/2013	7/21/2014	230
D	** [REDACTED]	2/24/2014	12/3/2014	282
E	** [REDACTED]	2/25/2014	1/8/2015	317

\*\*5/24/2013 IPS shows these activities combined with an end date @ elevations 100'/103'; (A) = Actual date set; \*IPS in the 8<sup>th</sup> VCM.

**Q. DID STAFF AND THE CM UPDATE THIS TABLE FOR THOSE MILESTONE ACTIVITIES WHICH WERE NOT COMPLETE AS OF THE NINTH/TENTH VCM FILING DATE PLUS INCLUDE ADDITIONAL FORECAST MILESTONES?**

A. Yes. The table below shows the milestone activities C, D, and E from the above table which are shown below as A, B, and C, and additional significant critical path activities updated as of date of this testimony.

<b>Unit 3 Nuclear Island Path to Elevation 100'/ 107'</b>	

---

ID	Milestone Activity	Level 2 Schedule Dated 5/24/2013*	IPS Dated 9/29/14	Days Delayed
A	[REDACTED]	12/03/13	10/20/14 (A)	321
B	** [REDACTED]	02/24/14	01/07/15	317
C	** [REDACTED]	02/25/14	04/09/15	408
D	[REDACTED]	02/25/14	04/02/15	401
E	[REDACTED]	02/25/14	04/02/15	401
F	[REDACTED]	02/12/14	02/16/15	369
G	[REDACTED]	04/09/14	07/09/15	456
H	[REDACTED]	11/14/14	10/28/15	348

\*IPS in the 8<sup>th</sup> VCM; \*\*5/24/2013 IPS shows these activities combined with an end date @ elevations 100'/103'; (A)= Actual date set; O/S=Outside; I/S=Inside

**Q. SINCE THE PREVIOUS VCM, HAVE THE FORECAST MILESTONE ACTIVITY DURATIONS FOR A, B, AND C EXPANDED IN DURATION?**

A. Yes. The delay for milestone activity A has increased 91 days; for milestone activity B 35 days; and for milestone activity C 91 days.

**Q. ARE THE FORECAST DATES SHOWN ABOVE AT FURTHER RISK OF DELAY?**

A. Yes. For example, the forecast set date for module CA01 is [REDACTED]. However, as can be seen from the graph below (as of October 12, 2014) the Consortium is significantly below the May 2014 Locked Down Schedule forecast seam weld curve to meet the set date. Also, additional weld was identified but not included in the IPS which is why the total forecast weld below of [REDACTED] feet is greater than the target [REDACTED] weld feet. This requires the number of feet weld per day to be sustained at a rate that has never been achieved to date by the Consortium.

**REDACTED**

**Q. IS THIS EXPANSION INDICATIVE OF OTHER NUCLEAR ISLAND ACTIVITY MILESTONE DURATIONS?**

A. Yes. As you can see from the table above, milestone activities D-H are exhibiting the same level of delay.

**Q. WHAT DOES THIS EVIDENCE SHOW ABOUT THE AMOUNT OF COMPRESSION THAT NEEDS TO BE PERFORMED SUCCESSFULLY IN ORDER TO MAINTAIN THE CURRENT FORECAST CODS?**

A. It shows that the amount of schedule compression required to maintain the current forecast CODs of late 2017 and late 2018 as of the end of the Eleventh VCM is greater than what was required as of the end of the Ninth/Tenth VCM. Two primary factors have contributed to the exacerbation of the need for increased compression. First, the

Consortium is taking longer to complete critical path activities, rather than compressing them. Second, the movement of time (i.e. six months have passed) with less than forecast progress on the critical path.

**Q. TO DATE, HAS THE CONSORTIUM COMPRESSED ANY NUCLEAR ISLAND RELATED ACTIVITY DURATIONS?**

A. No. In fact the duration of NI related activities have continued to expand.

**Q. HAS STAFF ESTIMATED HOW MUCH COMPRESSION OF FUTURE ACTIVITIES WILL BE NECESSARY TO MAINTAIN THE REVISED COD FOR UNIT 3?**

A. Yes. Staff used the completed milestone of setting structural module CA05 as the current status of the Unit 3 project schedule. In the May 24, 2013 IPS, there were 1,495 days between the scheduled set date of CA05 to the Unit 3 COD. Using the actual set date of CA05, Staff calculated that there are only 1,174 days remaining to the Unit 3 current forecast COD. Therefore, Staff estimates that future activities required to complete Unit 3 will need to be compressed by approximately 321 days.

**Q. DOES THIS INCREASE IN REQUIRED COMPRESSION COME WITH INCREASED RISK THAT THE CURRENT FORECAST CODS CANNOT BE MET?**



A. Yes. As Staff and the CM noted in the Ninth/Tenth VCM pre-filed testimony, adding additional labor and/or shifts to an activity will not reduce the duration for that activity if the required design and material available to support the work is unavailable. In addition, a larger workforce does not always equate to a linear increase in production. Or put another way, a doubling of the labor does not necessarily mean output will double. Opening more work fronts by adding new vendors exposes the Project to risks that the new vendors might not have the robust quality and work processes required for nuclear construction work.

**Q. HOW HAS THE CONSORTIUM PERFORMED RELATIVE TO THE MAY 2014 LOCKED DOWN SCHEDULE?**

A. As stated above, not well. For most activities the Consortium has missed critical milestone dates and some forecasts milestone completion dates continue to slip. The table below shows critical path milestones from the May 2014 Locked Down Schedule relative their current forecast dates. While two activities appear to be on schedule to meet their forecast, the majority have slipped. Please note the milestone activity IDs do not correspond to those shown in the tables above.

<b>Unit 3 Nuclear Island Path to Elevation 100 ft.</b>				
<b>ID</b>	<b>Milestone Activity</b>	<b>Level 2 May 2014 Target Schedule</b>	<b>IPS Dated 9/29/14</b>	<b>+ Delay / ( ) Compress</b>
A		11/10/14	01/22/15	73

---

B		07/09/14	09/26/14 (A)	79
C		07/21/14	10/03/14 (A)	74
D		08/27/14	10/20/14 (A)	54
E	**	01/19/15	01/07/15	(12)
F	**	03/23/15	04/09/15	17
G		02/10/15	04/02/15	51
H		03/23/15	04/02/15	10
I		03/04/15	02/16/15	(16)
J		06/29/15	07/09/15	10
K		10/19/15	10/28/15	9

\*IPS in the 8<sup>th</sup> VCM; \*\*5/24/2013 IPS shows these activities combined with an end date @ elevations 100'/103'; (A) = Actual date set; O/S=Outside; I/S=Inside

**Q. HAS THE COMPANY ACKNOWLEDGED ADDITIONAL SCHEDULE PRESSURES SINCE THE NINTH/TENTH VCM?**

A. Yes.

**Q. WHAT IS STAFF AND THE CM'S OPINION WITH REGARD TO THE ACHIEVABILITY OF THE CURRENT FORECAST COD DATES?**

A. The Staff and the CM believe that the CODs will be further delayed. At this time, given the Consortium performance to date of significant delays in completing NI activities, the lack of an IPS and the required compression activities that the Consortium intends to deploy, it is impossible to determine a reasonable forecast range as to when the Units could be commercially available. To be clear, Staff and the CM believe the Units will be delayed beyond current forecast CODs of December 2017 and 2018; however, we make no opinion regarding when the Units could be commercially available.

**Q. IN THE COMPANY’S ELEVENTH VCM FILING AND IN THE PRE-FILED TESTIMONY OF THEIR WITNESSES THE TERM “COMMERCIAL OPERATION DATE” IS NO LONGER USED CONSISTENT WITH PRIOR VCMS. WHAT DOES STAFF AND THE CM BELIEVE TO BE THE CHARACTERISTICS OF A PLANT PLACED IN-SERVICE?**

A. It is Staff and the CM’s opinion that any generation plant, including Vogtle Units 3 and 4, which has reached commercial operation and is placed in service have the following attributes:

1. The plant must have the capability to be readily dispatched at its full net Mw capacity;
2. The plant must be able to maintain its output at its full net Mw capacity for a length of time that is expected of a similar type plant.

#### **IV. RECOMMENDATIONS**

**Q. WHAT IS YOUR RECOMMENDATION REGARDING VERIFICATION AND APPROVAL OF EXPENDITURES DURING THE ELEVENTH VCM PERIOD?**

A. We recommend that the expenditures of \$198 million incurred during the Eleventh VCM be verified and approved. As Staff has previously explained, “verification and approval” of costs means a determination that such costs have actually been spent on the Project and does not preclude a subsequent disallowance by the Commission.

**Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

A. Yes it does.

## EXHIBIT STF-SR/WRJ-1

### Resume of Steven D. Roetger

**Steven D. Roetger**  
244 Washington Street, S.W.  
Atlanta, GA 30334

## **Professional Experience**

### **Georgia Public Service Commission Atlanta, Georgia 2008-Present**

Analyst Primary responsibilities include monitoring the Vogtle expansion of Units 3 and 4, attending site visits on a regular basis, participate with the Commission and Company interface, and assist in the preparation of testimony.

### **BCD Travel Atlanta, Georgia 2007-2008**

Finance Manager Primary responsibilities were to manage financial analysts, generate and review variance analyses, analyze departmental financials, and facilitate the coordination between our group and various internal departments.

- Key achievements
  - Elevated team's performance to improve consistency, accuracy, and timeliness of service
  - Identified client missed revenue opportunities and communicated to Operations for recapture and/or inclusion with future invoicing
- Key Requirements
  - Train, motivate, and develop 3 financial analysts to achieve an outstanding level of service and performance
  - Direct workflow to maintain efficiency and productivity without compromising standards
  - Analyze departmental financials to maximize profitability by reviewing contracts, perform variance analyzes, and ensure complete transaction billing
  - Review complex contracts and interpret for finance reconciliation and billing procedures
  - Prepare client budgets and forecasts

### **Marine Bank of Florida Marathon, Florida 2003-2005**

Accounting Operations Manager/Bank Officer Primary responsibilities were to manage the Bank's Accounting Department and, as directed by the COO, Deposit Operations' functions.

- Key achievements
  - Identified high-risk, time sensitive accounts for dedicated review to significantly reduce financial risk to the Bank
  - In partnership with the CFO reduced audit management exceptions from 13 to zero year over year
  - Launched new wire department procedures to decrease response time, increase capacity, and improve customer service without increasing staff
  - In partnership with the COO implemented the Bank's new ACH operations to enhance existing customer relations, attract new business, and respond in a

timely manner to ACH adjustments/returns

- Key Requirements
  - Comprehensive GIL management including reconciliations, adjusting entries, and monthly/annual close
  - Manage and review the activities of 3 accounting and 2 deposit operations personnel responsible for accounts payable, wires, ACH operations, VISA checkcard operations, branch settlements, electronic funds transfers, and check clearing.
  - Establish and refine departmental policies and procedures to improve accuracy and timeliness of reporting, facilitate employee transition, and meet audit requirements
  - Oversee Federal Reserve, FHLB, and IBB correspondent accounts
  - Support the CFO to meet external audit requirements
  - Oversee the Bank's daily cash position to minimize overnight net interest expense
  - Support branch operations by assisting branch managers maintain acceptable internal controls, provide training on Bank reporting procedures, and process exceptions

### **B. Terfloth & Co. (USA) Inc. Atlanta, Georgia 1998-2000**

Accounting Manager Primary responsibilities were to manage the Branch's Accounting Department with an emphasis on controlling expenses and manage the yearly audit process.

- Key achievements
  - Re-established accurate and timely monthly reporting to the Corporate Office
  - Developed a cash flow forecasting model to assess the Branch's financing needs and negotiated under the President's supervision a working capital credit line to meet those needs
- Key requirements
  - Comprehensive G/L management including reconciliations, adjusting entries, and monthly/annual close
  - Manage the annual audit process
  - Accounts payable and account receivable
  - Payroll and annual bonus calculations

### **Bridgetown Grill Restaurants Inc. Atlanta, Georgia 1996-1997**

Interim Controller Primary responsibilities were to re-establish a reliable Accounting process and once established facilitate the transition to a new Controller.

- Key achievements
  - Established internal controls to better manage purchases, inventories, and reduce cash variances
  - Developed Accounting procedures for Unit Managers and trained the management staff on those procedures

- o Assisted the Owner in evaluating an outside purchase offer
- Key requirements
  - o Comprehensive G/L management including reconciliations, adjusting entries, and monthly close procedures
  - o Coordinate the annual audit process
  - o Manage accounts payable and payroll processing
  - o Manage credit card transaction procedures to reduce charge backs

### **Turner Broadcasting System Inc. Atlanta, Georgia 1991-1996**

Staff Accountant Primary responsibility was to support the Managers with accurate and timely completion of assigned tasks.

- Key achievements
  - o Partnered with Management to streamline the procedure for The Statement of Cash Flows
  - o Corrected the BPS calculation (the error proved to be insignificant for the time period)
  - o Streamlined governmental reporting and incorporated detailed procedures for each report
  - o Provided a Companywide vacation and sick time accrual analysis
- Key requirements
  - o Worked, as part of a team, on the Consolidated Financial Statements of TBS, Inc.
  - o Develop various footnotes to the Financial Statements
  - o Provide analysis of accounts for actual to budget and actual to rolling 12 month forecast variances
  - o Provide analysis of, and recommendations for, lease capitalizations
  - o Coordinate with 72 Operating Unit Controllers for the content and timely receipt of Unit financial data
  - o Prepare debt covenant calculations for 4 issues and provide forecasts with sensitivity analysis
  - o Prepare all U.S. Department of Commerce and U.S. Treasury Department statistical reports

### **Software**

*PeopleSoft/n Vision reporting, Kirchman/Bankway and IPS Sendero banking software, MSA accounting software, Excel, Outtask, and Word*

### **Education**

MBA Georgia State University in Finance (70% complete)

BBA Georgia State University in Finance with an equivalent in Accounting

## EXHIBIT STF-SR/WRJ-2

### Resume of William R. Jacobs, Ph.D.





**EDUCATION:** Ph.D., Nuclear Engineering, Georgia Tech 1971  
MS, Nuclear Engineering, Georgia Tech 1969  
BS, Mechanical Engineering, Georgia Tech 1968

**ENGINEERING REGISTRATION:** Registered Professional Engineer

**PROFESSIONAL MEMBERSHIP:** American Nuclear Society

**EXPERIENCE:**

Dr. Jacobs has over thirty-five years of experience in a wide range of activities in the electric power generation industry. He has extensive experience in the construction, startup and operation of nuclear power plants. While at the Institute of Nuclear Power Operation (INPO), Dr. Jacobs assisted in development of INPO's outage management evaluation group. He has provided expert testimony related to nuclear plant operation and outages in Texas, Louisiana, South Carolina, Florida, Wisconsin, Indiana, Georgia and Arizona. He currently provides nuclear plant operational monitoring services for GDS clients. Dr. Jacobs was a witness in nuclear plant certification hearings in Georgia for the Plant Vogtle 3 and 4 project on behalf of the Georgia Public Service Commission and in South Carolina for the V.C. Summer 2 and 3 projects on behalf of the South Carolina Office of Regulatory Staff. His areas of expertise include evaluation of reactor technology, EPC contracting, risk management and mitigation, project cost and schedule. He is assisting the Florida Office of Public Counsel in monitoring the development of four new nuclear units in the State of Florida, Levy County Units 1 and 2 and Turkey Point Units 6 and 7. He also evaluated extended power uprates on five nuclear units for the Florida Office of Public Counsel. He has been selected by the Georgia Public Service Commission as the Independent Construction Monitor for Georgia Power Company's new AP1000 nuclear power plants, Plant Vogtle Units 3 and 4. He has assisted the Georgia Public Service Commission staff in development of energy policy issues related to supply-side resources and in evaluation of applications for certification of power generation projects and assists the staff in monitoring the construction of these projects. He has also assisted in providing regulatory oversight related to an electric utility's evaluation of responses to an RFP for a supply-side resource and subsequent negotiations with short-listed bidders. He has provided technical litigation support and expert testimony support in several complex law suits involving power generation facilities. He monitors power plant operations for GDS clients and has provided testimony on power plant operations and decommissioning in several jurisdictions. Dr. Jacobs represents a GDS client on the management committee of a large coal-fired power plant currently under construction. Dr. Jacobs has provided testimony before the Georgia Public Service Commission, the Public Utility Commission of Texas, the North Carolina Utilities Commission, the South Carolina Public Service Commission, the Iowa State Utilities Board, the Louisiana Public Service Commission, the Florida Public Service Commission, the Indiana Regulatory Commission, the Wisconsin Public Service Commission, the Arizona Corporation Commission and the FERC.

A list of Dr. Jacobs' testimony is available upon request.

1986-Present GDS Associates, Inc.

As Executive Consultant, Dr. Jacobs assists clients in evaluation of management and technical issues related to power plant construction, operation and design. He has evaluated and testified on combustion turbine projects in certification hearings and has assisted the Georgia PSC in monitoring the construction of the combustion turbine projects. Dr. Jacobs has evaluated nuclear plant operations and provided testimony in the areas of nuclear plant operation, construction prudence and decommissioning in nine states. He has provided litigation support in complex law suits concerning the construction of nuclear power facilities. Dr. Jacobs is the Georgia PSC's Independent Construction Monitor for the Plant Vogtle 3 and 4 nuclear project.

1985-1986 Institute of Nuclear Power Operations (INPO)

Dr. Jacobs performed evaluations of operating nuclear power plants and nuclear power plant construction projects. He developed INPO Performance Objectives and Criteria for the INPO Outage Management Department. Dr. Jacobs performed Outage Management Evaluations at the following nuclear power plants:

- Connecticut Yankee - Connecticut Yankee Atomic Power Co.
- Callaway Unit I - Union Electric Co.
- Surry Unit I - Virginia Power Co.
- Ft. Calhoun - Omaha Public Power District
- Beaver Valley Unit 1 - Duquesne Light Co.

During these outage evaluations, he provided recommendations to senior utility management on techniques to improve outage performance and outage management effectiveness.

1979-1985 Westinghouse Electric Corporation

As site manager at Philippine Nuclear Power Plant Unit No. 1, a 655 MWe PWR located in Bataan, Philippines, Dr. Jacobs was responsible for all site activities during completion phase of the project. He had overall management responsibility for startup, site engineering, and plant completion departments. He managed workforce of approximately 50 expatriates and 1700 subcontractor personnel. Dr. Jacobs provided day-to-day direction of all site activities to ensure establishment of correct work priorities, prompt resolution of technical problems and on schedule plant completion.

Prior to being site manager, Dr. Jacobs was startup manager responsible for all startup activities including test procedure preparation, test performance and review and acceptance of test results. He established the system turnover program, resulting in a timely turnover of systems for startup testing.

As startup manager at the KRSKO Nuclear Power Plant, a 632 MWE PWR near Krsko, Yugoslavia, Dr. Jacobs' duties included development and review of startup test procedures, planning and coordination of all startup test activities, evaluation of test results and customer assistance with regulatory questions. He had overall responsibility for all startup testing from Hot Functional Testing through full power operation.

1973 - 1979 NUS Corporation

As Startup and Operations and Maintenance Advisor to Korea Electric Company during startup and commercial operation of Ko-Ri Unit 1, a 595 MWE PWR near Pusan, South Korea, Dr. Jacobs advised KECO on all phases of startup testing and plant operations and maintenance through the first year of commercial operation. He assisted in establishment of administrative procedures for plant operation.

As Shift Test Director at Crystal River Unit 3, an 825 MWE PWR, Dr. Jacobs directed and performed many systems and integrated plant tests during startup of Crystal River Unit 3. He acted as data analysis engineer and shift test director during core loading, low power physics testing and power escalation program.

As Startup engineer at Kewaunee Nuclear Power Plant and Beaver Valley, Unit 1, Dr. Jacobs developed and performed preoperational tests and surveillance test procedures.

1971 - 1973 Southern Nuclear Engineering, Inc.

Dr. Jacobs performed engineering studies including analysis of the emergency core cooling system for an early PWR, analysis of pressure drop through a redesigned reactor core support structure and developed a computer model to determine tritium build up throughout the operating life of a large PWR.

#### **SIGNIFICANT CONSULTING ASSIGNMENTS:**

Georgia Public Service Commission – Selected as the Independent Construction Monitor to assist the GPSC staff in monitoring all aspects of the design, licensing and construction of Plant Vogtle Units 3 and 4, two AP1000 nuclear power plants.

Georgia Public Service Commission – Assisted the Georgia Public Service Commission Staff and provided testimony related to the evaluation of Georgia Power Company's request for certification to construct two AP1000 nuclear power plants at the Plant Vogtle site.

South Carolina Office of Regulatory Staff – Assisted the South Carolina Office of Regulatory Staff in evaluation of South Carolina Electric and Gas’ request for certification of two AP1000 nuclear power plants at the V.C. Summer site.

Florida Office of Public Counsel – Assists the Florida Office of Public Counsel in monitoring the development of four new nuclear power plants and extended power uprates on five nuclear units in Florida including providing testimony on the prudence of expenditures.

East Texas Electric Cooperative – Represented ETEC on the management committee of the Plum Point Unit 1 a 650 Mw coal-fired plant under construction in Osceola, Arkansas and represents ETEC on the management committee of the Harrison County Power Project, a 525 Mw combined cycle power plant located near Marshall, Texas.

Arizona Corporation Commission – Evaluated operation of the Palo Verde Nuclear Generating Station during the year 2005. Included evaluation of 11 outages and providing written and oral testimony before the Arizona Corporation Commission.

Citizens Utility Board of Wisconsin – Evaluated Spring 2005 outage at the Kewaunee Nuclear Power Plant and provided direct and surrebuttal testimony before the Wisconsin Public Service Commission.

Georgia Public Service Commission - Assisted the Georgia PSC staff in evaluation of Integrated Resource Plans presented by two investor owned utilities. Review included analysis of purchase power agreements, analysis of supply-side resource mix and review of a proposed green power program.

State of Hawaii, Department of Business, Economic Development and Tourism – Assisted the State of Hawaii in development and analysis of a Renewable Portfolio Standard to increase the amount of renewable energy resources developed to meet growing electricity demand. Presented the results of this work in testimony before the State of Hawaii, House of Representatives.

Georgia Public Service Commission - Assisted the Georgia PSC staff in providing oversight to the bid evaluation process concerning an electric utility’s evaluation of responses to a Request for Proposals for supply-side resources. Projects evaluated include simple cycle combustion turbine projects, combined cycle combustion turbine projects and co-generation projects.

Millstone 3 Nuclear Plant Non-operating Owners – Evaluated the lengthy outage at Millstone 3 and provided analysis of outage schedule and cost on behalf of the non-operating owners of Millstone 3. Direct testimony provided an analysis of additional post-outage O&M costs that would result due to the outage. Rebuttal testimony dealt with analysis of the outage schedule.

H.C. Price Company – Evaluated project management of the Healy Clean Coal Project on behalf of the General Contractor, H.C. Price Company. The Healy Clean Coal Project is a 50 megawatt coal burning power plant funded in part by the DOE to demonstrate advanced clean coal

technologies. This project involved analysis of the project schedule and evaluation of the impact of the owner's project management performance on costs incurred by our client.

Steel Dynamics, Inc. – Evaluated a lengthy outage at the D.C. Cook nuclear plant and presented testimony to the Indiana Utility Regulatory Commission in a fuel factor adjustment case Docket No. 38702-FAC40-S1.

Florida Office of Public Counsel - Evaluated lengthy outage at Crystal River Unit 3 Nuclear Plant. Submitted expert testimony to the Florida Public Service Commission in Docket No. 970261-EI.

United States Trade and Development Agency - Assisted the government of the Republic of Mauritius in development of a Request for Proposal for a 30 MW power plant to be built on a Build, Own, Operate (BOO) basis and assisted in evaluation of Bids.

Louisiana Public Service Commission Staff - Evaluated management and operation of the River Bend Nuclear Plant. Submitted expert testimony before the LPSC in Docket No. U-19904.

U.S. Department of Justice - Provided expert testimony concerning the in-service date of the Harris Nuclear Plant on behalf of the Department of Justice U.S. District Court.

City of Houston - Conducted evaluation of a lengthy NRC required shutdown of the South Texas Project Nuclear Generating Station.

Georgia Public Service Commission Staff - Evaluated and provided testimony on Georgia Power Company's application for certification of the Intercession City Combustion Turbine Project - Docket No. 4895-U.

Seminole Electric Cooperative, Inc. - Evaluated and provided testimony on nuclear decommissioning and fossil plant dismantlement costs - FERC Docket Nos. ER93-465-000, et al.

Georgia Public Service Commission Staff - Evaluated and prepared testimony on application for certification of the Robins Combustion Turbine Project by Georgia Power Company - Docket No. 4311-U.

North Carolina Electric Membership Corporation - Conducted a detailed evaluation of Duke Power Company's plans and cost estimate for replacement of the Catawba Unit 1 Steam Generators.

Georgia Public Service Commission Staff - Evaluated and prepared testimony on application for certification of the McIntosh Combustion Turbine Project by Georgia Power Company and Savannah Electric Power Company - Docket No. 4133-U and 4136-U.

New Jersey Rate Counsel - Review of Public Service Electric & Gas Company nuclear and fossil capital additions in PSE&G general rate case.

Corn Belt Electric Cooperative/Central Iowa Power Electric Cooperative - Directs an operational monitoring program of the Duane Arnold Energy Center (565 Mwe BWR) on behalf of the non-operating owners.

Cities of Calvert and Kosse - Evaluated and submitted testimony of outages of the River Bend Nuclear Station - PUCT Docket No. 10894.

Iowa Office of Consumer Advocate - Evaluated and submitted testimony on the estimated decommissioning costs for the Cooper Nuclear Station - IUB Docket No. RPU-92-2.

Georgia Public Service Commission/Hicks, Maloof & Campbell - Prepared testimony related to Vogtle and Hatch plant decommissioning costs in 1991 Georgia Power rate case - Docket No. 4007-U.

City of El Paso - Testified before the Public Utility Commission of Texas regarding Palo Verde Unit 3 construction prudence - Docket No. 9945.

City of Houston - Testified before Texas Public Utility Commission regarding South Texas Project nuclear plant outages - Docket No. 9850.

NUCOR Steel Company - Evaluated and submitted testimony on outages of Carolina Power and Light nuclear power facilities - SCPSC Docket No. 90-4-E.

Georgia Public Service Commission/Hicks, Maloof & Campbell - Assisted Georgia Public Service Commission staff and attorneys in many aspects of Georgia Power Company's 1989 rate case including nuclear operation and maintenance costs, nuclear performance incentive plan for Georgia and provided expert testimony on construction prudence of Vogtle Unit 2 and decommissioning costs of Vogtle and Hatch nuclear units - Docket No. 3840-U.

Swidler & Berlin/Niagara Mohawk - Provided technical litigation support to Swidler & Berlin in law suit concerning construction mismanagement of the Nine Mile 2 Nuclear Plant.

Long Island Lighting Company/Shea & Gould - Assisted in preparation of expert testimony on nuclear plant construction.

North Carolina Electric Membership Corporation - Prepared testimony concerning prudence of construction of Carolina Power & Light Company's Shearon Harris Station - NCUC Docket No. E-2, Sub537.

City of Austin, Texas - Prepared estimates of the final cost and schedule of the South Texas Project in support of litigation.

Tex-La Electric Cooperative/Brazos Electric Cooperative - Participated in performance of a construction and operational monitoring program for minority owners of Comanche Peak Nuclear Station.

Tex-La Electric Cooperative/Brazos Electric Cooperative/Texas Municipal Power Authority (Attorneys - Burchette & Associates, Spiegel & McDiarmid, and Fulbright & Jaworski) - Assisted GDS personnel as consulting experts and litigation managers in all aspects of the lawsuit brought by Texas Utilities against the minority owners of Comanche Peak Nuclear Station.