**BEFORE THE**
**GEORGIA PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF GEORGIA POWER COMPANY'S TWENTY-EIGHTH 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**

**JUNE 22, 2023**

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## I. INTRODUCTION

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

**A.** My name is Steven D. Roetger. I am the lead analyst for the Georgia Public Service Commission ("Commission") Staff Public Interest Advocacy Team for the Vogtle Construction Monitoring Docket 29849. My business address is 244 Washington Street, S.W., Atlanta, Georgia, 30334. My name is William R. Jacobs, Jr., Ph.D. I am a principal with WRJ Associates, LLC. My business address is 5775 Charleston Bay Drive, Cumming, Georgia, 30041.

**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 Staff team leader for monitoring the Plant Vogtle Unit 3 and 4 Project under Docket 29849. Also, I was a member of the Public Interest Advocacy Staff team for the Plant Vogtle Unit 3 and 4 Certification (Docket 27800), and a Commission Advisory Staff team member for various other proceedings. Prior to joining the Commission, I held various positions in either an accounting or finance capacity for firms in different industries. My resume is included in Exhibit STF-SDR-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 forty 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. In July

2022, I formed WRJ Associates, LLC to continue my role as the Commission's Independent Construction Monitor of the Vogtle 3 and 4 Project and assist the Staff in preparation for the Vogtle prudence evaluation. My resume is included in Exhibit STF-WRJ-1.

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

**A.** We are representing the Commission's Public Interest Advocacy Staff ("Staff") Team in this matter.

**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 Plant Vogtle Unit 3 and 4 Project ("Project") as lead analyst of the Staff Team. I have closely monitored the Project with Dr. Jacobs since certification. Among other oversight, along with Dr. Jacobs, I monitor the Project areas that either have realized schedule delays or show a risk of potentially experiencing delay or increased Project cost. I have testified in the Eighth through the Twenty-Seventh Semi-Annual Vogtle Construction Monitoring ("VCM") proceedings. Recently, I have taken the lead to oversee the prudency review work scope, budget, work product, and coordination between and among Staff and the consultants. Staff meets on a regular basis with the consultants engaged to support Staff's litigation in the prudency hearing to continually assess the progress of this effort.

**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. My duties are to assist the Staff Team in its regulatory oversight of all aspects of the Project and to keep the Commission informed of significant Project issues or changes in the Project forecast Cost and Schedule as they occur. In addition, I keep the Commission informed of significant challenges to the Project that could impact the Project forecast Cost and/or Schedule. I have presented testimony in the Plant Vogtle Unit 3 and 4 Certification (Docket 27800) and the First through the Twenty-Seventh Semi-Annual VCM proceedings describing the construction monitoring activities, the status of the Project and any concerns or significant issues. Also, as Mr. Roetger describes above, I assist in the analysis of prudency issues and management of the prudency effort of Staff and the consultants.

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

A. Our assignment is to present the results of the Staff's oversight from certification of the Project to the present with emphasis on the time period covered by the Twenty-Eighth Semi-Annual VCM Report ("28 VCM"), of July 1, 2022 to December 31, 2022. In this testimony, we present our analysis of the current status of the Project and discuss at a high level the status of the most recent Schedule and Cost forecast provided by the Company and identify risks and areas of concern for the Project.

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

**A.** As described in prior VCM testimonies, the Staff Team continues to actively monitor the Project. Monitoring activities include monthly meetings between Staff and Company personnel to discuss Project status. Since COVID-19 has diminished, the Staff Team has begun regular site visits again with Mr. Roetger, Dr. Jacobs, Mr. Dinos Nicolaou, and Mr. Grace conducting a walkdown of both Units in mid-November. Staff anticipates a follow-up site visit within the next few months. Staff continues to be active in all major site related meetings such as the Monthly Project Review ("MPR") meeting. We review the Company's Weekly Metrics Reports, Monthly Status Reports including addenda, and submit data requests to the Company for additional information. The Team has continued its review of the Company's process for handling Project invoices from WEC[1] and Bechtel[2], and other Company contractors. This includes review of the Project cost control procedures and sampling of processed invoices. Please refer to the Shemetha Q. Jones testimony for further details on the cost review Staff performs. Other examples of activities conducted by the Staff Vogtle Construction Monitoring Team include:

[1] Westinghouse provides the engineering, design, and applicable analyses for the Design Certification Document ("DCD").
[2] Bechtel is the construction contractor.

- Review of Monthly Status Reports issued by Bechtel and Westinghouse;
- Review of the Company's Semi-Annual VCM Reports and testimony;
- 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;
- Monitoring via teleconference the site Plan of the Day and Work-To-Go meetings along with other site meetings;
- Monitoring of Change Control Board meetings and decisions;
- Attendance via teleconference in bi-weekly SNC Management Update calls;
- Attendance in monthly meetings with the Company to review the Project Management Board presentation;
- Participation in Nuclear Regulatory Commission ("NRC") public meetings in person and via conference call as appropriate;
- Review of public correspondence between the Company and the NRC;
- Review of correspondence between the Contractor and the Company;
- Review of trade articles and journals related to new nuclear power plant development.

**Q. WHAT TIME PERIOD BEYOND DECEMBER 31, 2022 DOES YOUR TESTIMONY COVER AND WHY?**

A. Our monitoring includes the January through June, 2023, period beyond the VCM 28 time period. Staff also includes monitoring observations up to the most recent months for which Staff has accurate data in order to keep the Commission apprised of the status of the Project in as close to real time as possible.

## II. UNIT 3 STATUS

**Q. WHAT IS THE STATUS OF UNIT 3 AT THE TIME OF FILING YOUR TESTIMONY?**

**A.** At the time of drafting this testimony, Unit 3 is shut down and in a 10-day planned maintenance outage ("PMO") to perform planned maintenance and correct issues that were identified during the startup testing. Initial criticality was achieved on 3/6/23 and Unit 3 reached 100% power on 5/28/2023. Upon completion of the maintenance outage, the Unit will be returned to 100% power to complete the 100% Load Rejection Test and the Loss of Offsite Power test. Following successful completion of these tests the Unit will be returned to 100% power and declared to be in Commercial Operation which is currently projected to occur on July, 2023[3].

**Q. PLEASE COMPARE THE VCM 27 DATES TO THE VCM 28 DATES FOR THE MAJOR MILESTONES OF INITIAL CRITICALITY AND COD FOR UNIT 3 AS SHOWN IN THE VCM REPORTS.**

**A.** Schedule performance during VCM 28 has continued to slip from the VCM 27 Risk Adjusted Schedule. The Unit 3 COD Risk Adjusted Schedule dates slipped 3 months from VCM 26 to VCM 27 as described in our VCM 27 testimony and have continued to slip during VCM 28 at the same rate as shown in Table 1 below.

[3] https://d18rn0p25nwr6d.cloudfront.net/CIK-0000092122/dd1a2127-b2d9-4ff7-8800-9df2f829bb91.pdf

Table 1 – Comparison of VCM 27 and VCM 28 Unit 3 Milestone Dates

| Unit 3 Milestone | VCM 27 Risk Adjusted Schedule | VCM 28 Risk Adjusted Schedule |
|---|---|---|
| Initial Criticality | 12/18/22 | 3/6/23 (A) |
| COD | 3/31/23 | 6/23 |

**Q. WHAT IS YOUR VIEW REGARDING ADDITIONAL UNIT 3 SCHEDULE DELAYS COMPARED TO YOUR TESTIMONY IN VCM 27?**

**A.** In our VCM 27 testimony we stated that the Risk Adjusted Schedule of 3/31/2023 was a reasonable forecast for Unit 3 COD. However, we identified risks with the untried portions of the Unit that could extend the schedule beyond 3/31/2023. Unit 3 did, in fact, experience issues as described below that delayed COD to the currently forecast month July.

**Q. PLEASE DESCRIBE THE ISSUES THAT DELAYED INITIAL CRITICALITY FROM 12/18/22 TO 3/6/23.**

A. Following Fuel Load on 10/13/2022, initial criticality slipped nearly three months from the VCM 27 RAS date of 12/18/22 to 3/6/23. Key activities requiring completion prior to initial criticality included:

- Completion of required work packages;
- Transition of systems to operations;
- Completion of area turnovers;
- Completion of Containment coatings;
- Achieving required Containment cleanliness;

- Completion of required component tests;
- Completion of required pre-operational tests;
- Repairs to the Automatic Depressurization System ("ADS") Stage 4 piping support;
- Meeting Technical Specification requirements.

This delay from Fuel Load to Initial Criticality is another example of SNC pushing work forward to meet a milestone, Fuel Load in this case, that would normally have been completed prior to the milestone.

**Q. PLEASE DESCRIBE THE ISSUES EXPERIENCED DURING THE UNIT 3 STARTUP FOLLOWING INITIAL CRITICALITY.**

A. Following Initial Criticality, Unit 3 experienced several unplanned reactor and turbine trips as briefly described below.

1. **3/15/23** - Turbine trip / Reactor trip - During attempted initial synchronization Automatic Voltage Regulator ("AVR") current transformer (CT) relay wiring issues, reverse polarity, resulted in a Turbine trip. Following the Turbine trip a Reactor trip occurred due to failure of a Fast Bus Transfer due to the design not being implemented;
2. **3/22/23** – Turbine trip - Generator Circuit Breaker current transformer wiring issues, reverse polarity;
3. **3/28/23** - Turbine trip [redacted];
4. **3/30/23** - Turbine trip - [redacted];
5. **4/10/23** – Turbine trip / Reactor trip - Turbine control valve setting was too low causing insufficient steam flow to turbine;
6. **5/2/23** – Turbine trip / Reactor trip - at Mode 1, 75%; Condenser shipping flanges not removed during initial installation resulting in Turbine trip; High differential pressure on main feedwater startup suction strainers leading to manual Reactor trip.
7. **6/10/23** – Turbine trip – [redacted]

[redacted].
Following the planned maintenance outage the 100% Load Rejection Trip test and the Loss of Offsite Power test will be conducted.

**Q. HOW WOULD YOU SUMMARIZE UNIT 3 PERFORMANCE DURING THE STARTUP TEST SEQUENCE?**

A. Unit 3 startup has been characterized by a significant number of turbine and reactor trips due to wiring errors, designs not installed, turbine control valve issues and failure to remove shipping flanges. This large number of avoidable plant trips represents less than expected performance during startup testing.

## III. UNIT 4 STATUS

**Q. WHAT IS THE STATUS OF UNIT 4 AT THE TIME OF FILING YOUR TESTIMONY?**

**A.** Vogtle Unit 4 completed the major milestone Hot Functional Test ("HFT") on 5/1/2023 with a duration of 42 days, a significant improvement over the HFT performance of Unit 3. The Unit 4 RAS Commercial Operation Date is 12/31/2023- unchanged from the RAS COD presented in VCM 27. However, at the 5/25/23 Monthly Project Review meeting, SNC indicated that the Unit 4 COD could slip an additional 3 months to 3/31/24.

**Q. WHAT IS YOUR ASSESSMENT OF THE COMPANY'S CURRENT UNIT 4 RISK ADJUSTED SCHEDULE COD OF DECEMBER 2023?**

**A.** In our opinion it is unlikely that Unit 4 will achieve commercial operation by the end of this year. We believe that a reasonable estimate for Unit 4 Commercial Operation is the first quarter of 2024.

**Q. WHAT MUST SNC ACCOMPLISH ON UNIT 4 TO ACHIEVE COMMERCIAL OPERATION?**

A. SNC must complete a significant number of parallel activity work streams to achieve Commercial Operation on Unit 4. First, Unit 4 must load fuel. Many activities must be completed to achieve Fuel Load including:

- Submittal of all completed ITAAC to the NRC;
- Receipt of the 103(g) Fuel Load authorization from the NRC;
- Complete turnover of required Fuel Load systems to Operations;
- Complete required room and area turnovers;
- Complete required pre-operational tests;
- Complete required component tests;
- Complete required Containment coatings.

Following Fuel Load, SNC must achieve Initial Criticality and complete the startup test program prior to Commercial Operation. The duration for Unit 3 from Fuel Load to Commercial Operations will be approximately 8.5 months based on Unit 3 COD in early July 2023. While we expect that implementation of lessons learned from Unit 3 will reduce this duration, as discussed in our VCM 27 testimony, a typical duration from Fuel Load to Commercial Operation is six months.

## IV. PROJECT COST UPDATE

**Q. WHAT IS STAFF'S ESTIMATE OF TOTAL PROJECT COST ON A 100% OWNERSHIP BASIS GIVEN THE FORECAST CODS?**

A. Please refer to the Table below:

| COD and TPC Estimates at Completion | | |
|---|---|---|
| **Company Risk Adjusted Schedule CODs and TPC (per May 30, 2023, VPMB)** | | |
| COD | Risk Adjusted Schedules | TPC |
| U-3 | 30-Jun-23 | $ 20.953 B |
| U-4 | 31-Mar-24 | |
| **Range of PIA/ VMG Estimated CODs and TPC** | | |
| COD | Probable Range | TPC |
| U-3 | July-Aug 2023 | $ 21.25 B - $21.55 B (Mid-point of $ 21.4 B) |
| U-4 | April - June 2024 | |

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

**A.** Yes.

# EXHIBIT STF-SDR-1

# Resume Of
# Steven D. Roetger

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.

Key achievements

Manage the Vogtle Construction monitoring process including engineering, procurement, and construction; economic analysis of the value of the Project; and financial accounting review for the Project's costs.

Write and review direct pre-filed testimony of the status of the Project for a semi-annual hearing.

**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 work flow 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, Florida2003-2005

**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 G/L 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 check card 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

Oversaw Federal Reserve, FHLB, and IBB correspondent accounts

Supported the CFO to meet external audit requirements

Oversaw 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 accounts receivable

Payroll and annual bonus calculations

## **Bridgetown Grill Restaurants Inc.** Atlanta, Georgia1996-1997

**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

Assisted the Owner in evaluating an outside purchase offer

Key requirements

Comprehensive G/L management including reconciliations, adjusting entries, and monthly close procedures

Coordinate the annual audit process

Manage accounts payable and payroll processing
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

Partnered with Management to streamline the procedure for The Statement of Cash Flows
Corrected the EPS calculation
Streamlined governmental reporting and incorporated detailed procedures for each report
Provided a Companywide vacation and sick time accrual analysis

Key requirements

Worked, as part of a team, on the Consolidated Financial Statements of TBS, Inc.
Develop various footnotes to the Financial Statements
Provide analysis of accounts for actual to budget and actual to rolling12 month forecast variances
Provide analysis of, and recommendations for, lease capitalizations
Coordinate with 72 Operating Unit Controllers for the content and timely receipt of Unit financial data
Prepare debt covenant calculations for 4 issues and provide forecasts with sensitivity analysis
Prepare all U.S. Department of Commerce and U.S. Treasury Department statistical reports

## Software

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

## Education

BBA Georgia State University in Finance with an equivalent in Accounting
Completed 70 percent of course work toward an MBA in Finance from Georgia State University

# EXHIBIT STF- WRJ-1

# 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 forty 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 assisted 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 has provided testimony on power plant operations and decommissioning in several jurisdictions. Dr. Jacobs represented a 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.

2022 – Present WRJ Associates, LLC

As principal and founder of WRJ Associates, LLC, Dr. Jacobs assists the Georgia Public Service Commission in monitoring the construction and startup activities of the Vogtle 3 and 4 project. He assists the GPSC Staff in preparation for the Vogtle 3 and 4 prudence evaluation that is anticipated following fuel load of Vogtle Unit 4.

1986-2022 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.