

**BEFORE THE
GEORGIA PUBLIC SERVICE COMMISSION**

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

JANUARY 3, 2023

Table of Contents

I.	INTRODUCTION	1
II.	UNIT 3 STATUS	9
III.	UNIT 4 STATUS	14
IV.	PROJECT COST AND SCHEDULE UPDATE	18

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.

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

3 **A.** I received a Bachelor of Mechanical Engineering in 1968, a Master of Science in
4 Nuclear Engineering in 1969 and a Ph.D. in Nuclear Engineering in 1971, all
5 from the Georgia Institute of Technology. I am a registered Professional
6 Engineer and a member of the American Nuclear Society. I have more than forty
7 years of experience in the electric power industry including more than twelve
8 years of nuclear power plant construction and start-up experience. I have
9 participated in the construction and start-up of seven nuclear power plants in this
10 country and overseas in management positions including start-up manager and
11 site manager. As a loaned employee to the Institute of Nuclear Power Operations
12 ("INPO"), I participated in the Construction Project Evaluation Program,
13 performed operating plant evaluations and assisted in development of the Outage
14 Management Evaluation Program. Since joining GDS Associates, Inc. in 1986, I
15 have participated in rate case and litigation support activities related to power
16 plant construction, operation and decommissioning. I have evaluated nuclear
17 power plant outages at numerous nuclear plants throughout the United States. I
18 served on the management committee during construction of Plum Point Unit 1, a
19 650 Megawatts Electric ("MWe") coal fired power plant. As a member of the
20 management committee, I assisted in providing oversight of the Engineering,
21 Procurement and Construction ("EPC") contractor for this Project. I have assisted
22 the Georgia Public Service Commission as the Independent Construction Monitor
23 in providing oversight of the Vogtle 3 and 4 Project since August 2009. In July

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

5
6 **Q. WHOM ARE YOU REPRESENTING IN THIS PROCEEDING?**

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

9
10 **Q. MR. ROETGER, WHAT IS YOUR INVOLVEMENT WITH THE**
11 **VOGTLE 3 AND 4 PROJECT?**

12 **A.** Since Docket No. 27800, I have been directly involved in the oversight of the
13 Plant Vogtle Unit 3 and 4 Project ("Project") as lead analyst of the Staff Team. I
14 have closely monitored the Project with Dr. Jacobs since certification. Among
15 other oversight, along with Dr. Jacobs, I monitor the Project areas that either have
16 realized schedule delays or show a risk of potentially experiencing delay or
17 increased Project cost. I have testified in the Eighth through the Twenty-Sixth
18 Semi-Annual Vogtle Construction Monitoring ("VCM") proceedings.

19
20 **Q. DR. JACOBS, WHAT IS YOUR INVOLVEMENT WITH THE VOGTLE 3**
21 **AND 4 PROJECT?**

22 **A.** I am the Commission's Independent Construction Monitor ("CM") for the
23 Project. My duties are to assist the Staff Team in its regulatory oversight of all

1 aspects of the Project and to keep the Commission informed of significant Project
2 issues or changes in the Project forecast Cost and Schedule as they occur. In
3 addition, I keep the Commission informed of significant challenges to the Project
4 that could impact the Project forecast Cost and/or Schedule. I have presented
5 testimony in the Plant Vogtle Unit 3 and 4 Certification (Docket 27800) and the
6 First through the Twenty-Sixth Semi-Annual VCM proceedings describing the
7 construction monitoring activities, the status of the Project and any concerns or
8 significant issues.

9
10 **Q. WHAT IS YOUR ASSIGNMENT IN THIS PROCEEDING?**

11 **A.** Our assignment is to present the results of the Staff's oversight from certification
12 of the Project to the present with emphasis on the time period covered by the
13 Twenty-Seventh Semi-Annual VCM Report ("27 VCM"), of January 1, 2022 to
14 June 30, 2022. In this testimony, we present our analysis of the current status of
15 the Project and discuss at a high level the status of the most recent Schedule and
16 Cost forecast provided by the Company and identify risks and areas of concern
17 for the Project.

18
19 **Q. WHY DID MR. DON N. GRACE NOT FILE TESTIMONY IN THIS VCM**
20 **PROCEEDING?**

21 **A.** VMG, including Mr. Grace, is currently focusing on preparing for the prudence
22 evaluation. VMG did assist in providing Staff's current estimate of Total Project

1 Cost and the Commercial Operation Dates (“COD”) for Units 3 and 4 for this
2 testimony.

3
4 **Q. HAS STAFF FURTHER AUGMENTED ITS TEAM TO PREPARE FOR**
5 **THE PRUDENCE EVALUATION?**

6 A. Yes. Staff has retained the services of J. S. Held LLC. J. S. Held specializes in,
7 among other matters, performing construction management and oversight of all
8 major types of construction including nuclear. Their expertise in performing an
9 ‘independent review’ of Southern Nuclear Company’s (“SNC”) management of
10 the Project since inception of construction will provide Staff with valuable
11 information and opinions for the prudency evaluation. Additionally, J.S. Held has
12 the ability to work with and manage large volumes of data. This ability to ‘data
13 mine’ can often lead to the identification of trends that would otherwise have been
14 missed. This is a critical ability given the complexity and longevity of the
15 Project.

16
17 **Q. PLEASE EXPLAIN THE TERM ‘INDEPENDENT REVIEW’ IN THE**
18 **RESPONSE ABOVE.**

19 A. At Staff’s request, J. S. Held will be performing their own independent evaluation
20 with regards to SNC’s management of the Project, which is independent of any
21 analyses performed by the Staff Team to date. Staff believes that this independent
22 review will strengthen any Staff recommendations regarding costs of the Project

1 to be recovered from ratepayers. J. S. Held will provide substantive analytical
2 conclusions, ‘best practices’ applications conclusions, and experience.
3

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

7 **A.** As described in prior VCM testimonies, the Staff Team continues to actively
8 monitor the Project. Monitoring activities include monthly meetings between
9 Staff and Company personnel to discuss Project status. Since COVID-19 has
10 diminished, the Staff Team has begun regular site visits again with Mr. Roetger,
11 Dr. Jacobs, Dinos Nicolaou, and Mr. Grace conducting a walkdown of both Units
12 in mid-November. Staff continues to be active in all major site related meetings
13 such as the Monthly Project Review (“MPR”) meeting. We review the
14 Company’s Weekly Metrics Reports, Monthly Status Reports including addenda,
15 and submit data requests to the Company for additional information. The Team
16 has continued its review of the Company’s process for handling Project invoices
17 from WEC¹ and Bechtel², and other Company contractors. This includes review
18 of the Project cost control procedures and sampling of processed invoices. Please
19 refer to the Shemetha Q. Jones testimony for further details on the cost review

¹ Westinghouse provides the engineering, design, and applicable analyses for the Design Certification Document (“DCD”).

² Bechtel is the construction contractor.

1 Staff performs. Other examples of activities conducted by the Staff Vogtle

2 Construction Monitoring Team include:

- 3 • Review of Monthly Status Reports issued by Bechtel and
- 4 Westinghouse;
- 5 • Review of the Company's Semi-Annual VCM Reports and testimony;
- 6 • Preparation of discovery requests for additional information as needed
- 7 following review of the monthly status reports, semi-annual
- 8 construction monitoring reports or meetings with the Company;
- 9 • Monitoring via teleconference the site Plan of the Day and Work-To-
- 10 Go meetings along with other site meetings;
- 11 • Monitoring of Change Control Board meetings and decisions;
- 12 • Attendance via teleconference in bi-weekly SNC Management Update
- 13 calls;
- 14 • Attendance in monthly meetings with the Company to review the
- 15 Project Management Board presentation;
- 16 • Participation in Nuclear Regulatory Commission ("NRC") public
- 17 meetings in person and via conference call as appropriate;
- 18 • Review of public correspondence between the Company and the NRC;
- 19 • Review of correspondence between the Contractor and the Company;
- 20 • Review of trade articles and journals related to new nuclear power plant
- 21 development.

22

23 **Q. WHAT TIME PERIOD BEYOND JUNE 30, 2022 DOES YOUR**

24 **TESTIMONY COVER AND WHY?**

25 **A.** The results of our monitoring includes the July through December, 2022 beyond

26 the VCM 27 time period. Staff also includes monitoring observations up to the

27 most recent months for which Staff has accurate data in order to keep the

1 Commission apprised of the status of the Project in as close to real time as
2 possible.

3
4 **Q. HAS STAFF'S STANDARD FOR EVALUATING THE PERFORMANCE**
5 **OF SNC AND GEORGIA POWER COMPANY CHANGED AS A RESULT**
6 **OF COVID-19?**

7 **A.** No. Under all circumstances, Staff uses the reasonableness and prudence
8 standards as dictated by statute.

9
10 **Q. HAS STAFF LOOKED AT THE COSTS AND SCHEDULE IMPACTS OF**
11 **COVID-19?**

12 **A.** Now that COVID-19 has been present on the Project, Staff is able to factor into its
13 analyses and conclusions assumptions regarding the impacts of the virus.
14 However, it is important to note, that COVID-19 has not been a material driver of
15 costs and delays for approximately the last 36 months and Staff does not
16 anticipate it to become a material cost and schedule driver for the balance of the
17 construction and startup of Unit 4.

18
19 **Q. DOES STAFF BELIEVE THAT THE WESTINGHOUSE BANKRUPTCY**
20 **STILL DRIVES MATERIAL COST INCREASES AND SCHEDULE**
21 **DELAYS?**

22 **A.** No. For VCM 17 the Company submitted an estimated Total Project Cost of \$7.3
23 billion for its share of the Project. This estimate included the costs of the

1 Westinghouse bankruptcy and schedule delay. The amounts written off by the
2 Company since the 17th VCM totaling \$2.5 billion³, in Staff's opinion, were not
3 the result of the bankruptcy but rather other factors for which SNC had control to
4 mitigate.

5
6 **II. UNIT 3 STATUS**

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

9 **A.** At the time of drafting this testimony, Unit 3 is in Mode 3 (see table below for
10 description of Modes) and conducting startup testing. The next major milestone
11 is Initial Criticality which is scheduled for [REDACTED] in the Risk Adjusted
12 Schedule ("RAS"). The current RAS forecasts Unit 3 initial synchronization to
13 the grid on [REDACTED], achieving 100% power on [REDACTED] and Commercial
14 Operation on 3/31/2023. The major activities from this point forward include
15 completion of the startup test program from Initial Criticality to 100% power and
16 achieving Commercial Operation. The startup test program is described in more
17 detail later in this testimony. During startup testing, the secondary plant will be
18 exposed to normal operating temperatures and pressures for the first time. Staff
19 anticipates there could be numerous issues discovered during this time that may
20 result in delays.

³ Reference Table 1.1 VCM 27.

1 **Q. PLEASE EXPLAIN THE ROLE OF THE TECHNICAL**
2 **SPECIFICATIONS IN GOVERNING OPERATION OF THE UNIT AND**
3 **ALSO EXPLAIN THE MODES OF PLANT OPERATION PRESCRIBED**
4 **BY THE TECHNICAL SPECIFICATIONS.**

5 **A.** Technical specifications are part of the plant's license and provide the rules by
6 which the plant must be operated. They also specify which equipment must be
7 operable for each Mode of plant operation and also specify what actions must be
8 taken within specific time limits if key equipment becomes inoperable. Plant
9 Modes of operation are described in the Technical Specifications as follows:

MODE	TITLE	REACTIVITY CONDITION (Keff)	% RATED THERMAL POWER (a)	AVERAGE REACTOR COOLANT TEMPERATURE (DEGREES F)
1	Power Operation	≥ 0.99	≥ 5	NA
2	Startup	≥ 0.99	≤ 5	NA
3	Hot Standby	< 0.99	NA	> 420
4	Safe Shutdown (b)	< 0.99	NA	$420 \geq T_{avg} > 200$
5	Cold Shutdown (b)	< 0.99	NA	≤ 200
6	Refueling (c)	NA	NA	NA
(a)	Excluding Decay Heat.			
(b)	All reactor vessel head closure bolts fully tensioned.			
(c)	One or more reactor vessel head closure bolts less than fully tensioned.			

1 Keff is a measure of the criticality of the reactor core with $K_{eff} < 0.99$ being sub-
2 critical, and with $K_{eff} \geq 0.99$ the core is considered to be critical. Criticality
3 means that a self-sustaining nuclear reaction is occurring.

4
5 **Q. PLEASE BRIEFLY DESCRIBE THE UNIT 3 PLANNED STARTUP**
6 **TESTING SEQUENCE FROM THE CURRENT STATUS THROUGH**
7 **COD.**

8 **A.** The startup testing program begins with Initial Criticality, the first time the
9 reactor core is brought to a condition with a self-sustaining nuclear reaction and
10 proceeds in a series of increasing power levels until testing at 100% power is
11 completed. Following Initial Criticality, a series of tests are conducted at very
12 low power to verify that the reactor physics characteristics of the core are as
13 designed. After the low power testing is complete, the power level of the Unit is
14 increased to 25% and the Unit is synchronized to the electric grid for the first
15 time. The Unit is held at 25% power while the testing of the Unit's secondary
16 systems are conducted. Upon completion of the 25% power testing, the Unit is
17 tested at increasing power levels of 50%, 75%, 90% and finally 100% power.
18 Testing at these power levels includes verification that the Unit performs as
19 designed to various events that can occur during normal operation including load
20 swings, loss of offsite power, load rejections and plant trips from 100% power.
21 Following completion of these tests the plant will shut down and conduct a
22 maintenance outage to perform planned maintenance and correct any issues that
23 were identified during the startup testing. Upon completion of the maintenance

1 outage, the Unit will be declared to be in commercial operation. The RAS
2 duration of startup testing from Initial Criticality to commercial operation is
3 planned to be ■ days with commercial operation planned for 3/31/2023.
4

5 **Q. PLEASE COMPARE THE VCM 26 DATES TO THE VCM 27 DATES**
6 **FOR THE MAJOR MILESTONES OF FUEL LOAD AND COD FOR UNIT**
7 **3 AS SHOWN IN THE VCM REPORTS.**

8 **A.** Schedule performance during VCM 27 has improved compared to the
9 performance during VCM 26⁴. While forecast Unit 3 fuel load and COD Risk
10 Adjusted Schedule dates slipped six to eight months from VCM 25 to VCM 26 as
11 described in our VCM 26 testimony, during VCM 27 fuel load and COD dates
12 have remained within the range forecast in the VCM 26 Risk Adjusted Schedule
13 as shown in Table 1 below.

14 Table 1 – Comparison of VCM 26 and VCM 27 Unit 3 Milestone Dates

Unit 3 Milestone	VCM 26 Risk Adjusted Schedule	VCM 27 Risk Adjusted Schedule
Fuel Load	8/2022 to 10/2022	10/13/22 (A)
COD	12/2022 to 3/2023	3/31/23

15
16 **Q. WHAT IS YOUR VIEW REGARDING ADDITIONAL UNIT 3**
17 **SCHEDULE DELAYS COMPARED TO YOUR TESTIMONY IN VCM 26?**

⁴ Meaning that the rate of slippage decreased during the 27 VCM period and beyond.

1 **A.** In our VCM 26 testimony we stated that a more probable forecast for Unit 3 COD
2 was between December 2022 and February 2023. The current Risk Adjusted
3 Schedule for Unit 3 COD is now forecasted for 3/31/2023. We believe this is a
4 reasonable forecast for Unit 3 COD although as discussed further below, the
5 mostly untried secondary plant does present risks that could extend the schedule
6 beyond the 3/31/2023 COD.

7
8 **Q. WHAT IS THE CURRENT CRITICAL PATH TO COD FOR UNIT 3 AT**
9 **THE TIME OF WRITING THIS TESTIMONY?**

10 **A.** The critical path needed to achieve COD is primarily completion of the activities
11 needed to achieve Mode 1 and then completion of the startup testing sequence
12 described above. Actions required to achieve and complete Mode 1 testing based
13 on the information presented during the Monthly Project Review meeting on
14 December 14, 2022 include:

- 15 • Completion of requirements to achieve Mode 2;
 - 16 ○ Complete 557 degree F Plateau Testing;
 - 17 ○ Complete Rod Control Testing;
 - 18 ○ Complete Pressurizer spray and flow verification testing;
 - 19 ○ Complete RCS flow coastdown to 300 degrees F;
- 20 • Complete required secondary plant startup activities including condenser
- 21 vacuum and feedwater cleanup;
- 22 • Achieve Initial Criticality;
- 23 • Complete the low power core physics testing;
- 24 • Complete the requirements for entry into Mode 1;
- 25 • Complete transition of systems to Operations as required during startup;
- 26 • Complete the startup testing at plateaus from 25% to 100% power.

1

2 **Q. WHAT IS YOUR OPINION OF THE CURRENT UNIT 3 RISK**

3 **ADJUSTED SCHEDULE WHICH FORECASTS COD ON 3/31/2023?**

4 **A.** Staff continues to believe that the Company should be able to achieve Unit 3
5 COD by March 2023 as shown in the current RAS. However, the RAS margin to
6 the Site Working Plan (“SWP”) has decreased from 3.5 months in VCM 26 to
7 approximately 4 weeks from the current SWP COD of 2/27/2023 to the RAS
8 COD of 3/31/2023. Staff continues to believe that the March 2023 COD is not
9 without risk. As we have discussed in prior testimony, Staff’s areas of concern
10 include the fact that many of the systems and components have yet to be tested on
11 the secondary plant, the steam and generating side of the plant, which is a design
12 that has yet to be operated at power. While the primary (nuclear) side of the plant
13 is essentially identical to the four units in China that are operating well, the
14 secondary plant is a unique design that has never been subject to the pressure and
15 temperature conditions experienced when the plant is in operation at full power.
16 There is a strong likelihood that equipment and design issues will be identified
17 during the initial operation of this equipment.

18

19 **III. UNIT 4 STATUS**

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

22 **A.** Vogtle Unit 4 completed the major milestone Cold Hydro Test (“CHT”) on
23 12/5/2022 with the next major milestone being Hot Functional Test (“HFT”) in

1 which the primary side of the plant is brought to normal operating temperature
2 (“NOT”) and normal operating pressure (“NOP”) using the energy input from the
3 Reactor Coolant Pumps to heat the Reactor Coolant System. The critical path to
4 HFT is completion of penetrations seals and completion of required component
5 and preoperational testing. Data presented at the Monthly Project Review
6 meeting on December 14, 2022 indicates that current electrical production
7 supports the RAS HFT start date of 3/12/2023. The Unit 4 RAS Commercial
8 Operation Date is 12/31/2023. This COD is at the end of the range of CODs
9 presented in VCM 26 of third quarter or fourth quarter 2023.

10
11 **Q. WHAT IS YOUR ASSESSMENT OF THE COMPANY’S CURRENT UNIT**
12 **4 RISK ADJUSTED SCHEDULE COD OF DECEMBER 2023?**

13 **A.** As we stated in our testimony in VCM 26, SNC should be able to achieve the
14 Unit 4 Risk Adjusted COD of 12/31/2023 if SNC successfully implements the
15 Lessons Learned from Unit 3 and follows best construction practices. The
16 following best construction practices, which were identified by Staff in previous
17 testimonies as necessary to achieve the 12/31/2023 COD, have not changed:

- 18 • Manage the Project using schedules that, while aggressive, are reasonable
19 and achievable;
- 20 • Emphasis on first time quality;
- 21 • Ensure that all required codes and standards such as IEEE 384 are correctly
22 adhered to in order to avoid costly rework and schedule delays;
- 23 • Implementing a “sign-as-you-go” procedure to avoid the large backlog of
24 incomplete IRs and work packages experienced on Unit 3;
- 25 • Stay in the bulk construction mode in electrical construction until a high
26 percentage of electrical installation is complete;

- Minimize use of the Partial Release for Test (“PRT”) process;
- Do not push work forward past a scheduled milestone to accomplish a given milestone at the expense of future milestones.

Q. HAS SNC IMPLEMENTED THESE BEST CONSTRUCTION PRACTICES ON UNIT 4?

A. With some exceptions, yes, SNC has generally implemented these best construction practices. Schedule adherence is better on Unit 4 and milestone dates have not been slipping month per month as on Unit 3. However, the Quality Assurance Aggregate Trend Reports over the past 12 months continue to identify a significant number of adverse quality trends. Also, there seems to be a reduced tendency on the part of Senior Management to push work forward to achieve a milestone. Staff will continue to monitor completion of work activities as more significant milestones are approached.

Q. PLEASE BRIEFLY DESCRIBE THE RISKS THAT COULD FURTHER DELAY UNIT 4 COD BEYOND DECEMBER 2023.

A. While we believe the Company should be able to achieve Unit 4 COD by December 2023, there are many risks or management decisions that could delay Unit 4 COD if they materialize. The following is Staff’s current assessment of the risks that were identified in our VCM 26 testimony:

- Continued delays to Unit 3 which would delay the transfer of craft and field non-manual personnel from Unit 3 to Unit 4 as planned – *delays in Unit 3*

1 *have resulted in delay of resources to Unit 4. These delays may push Unit 4*
2 *COD to the end of the range into the fourth quarter 2023;*⁵

- 3 • The Company does not effectively implement Unit 3 lessons learned –
4 *Although many of the “Unit 3 lessons learned”, which Staff believes are*
5 *actually good construction practices, they appear to have been generally*
6 *implemented on Unit 4;*
- 7 • The Company is unable to improve electrical productivity as necessary to
8 meet the December 2023 COD RAS – *electrical production currently is*
9 *reported to support the RAS COD;*
- 10 • The Company abandons bulk installation too early to meet near term
11 milestones – *the Company has revised the construction / testing sequence to*
12 *stay in bulk electrical construction to achieve a more efficient schedule;*
- 13 • The Company continues to utilize unachievable schedules – *this risk has not*
14 *changed. The Company continues to utilize unachievable schedules resulting*
15 *in the many negative impacts of this approach that we have previously*
16 *discussed;*
- 17 • The Company fails to address potential attrition of experienced craft – *the*
18 *Company recognizes the risk of not retaining experienced craft and is*
19 *considering additional incentives to reduce attrition. However, attrition of*
20 *experienced craft remains a risk;*

⁵ Italicized words discuss this VCM’s update.

- 1 • Quality lapses continue to persist – *as stated above, lapses of quality continue*
2 *to be identified although not as significant as issues identified on Unit 3;*
- 3 • Late or emergent procurement items with long-lead times are identified – *this*
4 *has not been a problem to date. However, we note that there is no trailing*
5 *unit to be used as a source of parts as needed to address emergent issues.*
6 *Failure of a key component with a long lead time could result in a significant*
7 *delay;*
- 8 • Engineering cannot improve the speed of resolution of Engineering Service
9 Requests (ESR) for Unit 4 – *timely resolution of ESRs appears to have*
10 *improved during VCM 27.*

11

12 **Q. CAN THE FAILURE OF COMPONENTS ON UNITS 3 AND 4 BE**
13 **PROBLEMATIC POST DECLARATION OF COMMERCIAL**
14 **OPERATIONS?**

15 **A.** Yes. Many of the components and pieces and parts contained in the AP1000
16 design are unique to that design. As a result of only Vogtle's two AP1000's being
17 operational in the world, outside of China, many of the manufacturers and
18 fabricators of the components and pieces and parts no longer produce those items.
19 This makes many of the more critical parts in the Units long-lead time
20 procurements compared with the existing United States commercial nuclear fleet.

21

22 **IV. PROJECT COST AND SCHEDULE UPDATE**

23

1 **Q. DOES STAFF STILL BELIEVE THAT SNC SHOULD BE ABLE TO**
2 **FINISH THE PROJECT WITHIN ITS RISK ADJUSTED SCHEDULE**
3 **AND COST?**

4 **A.** Yes. However, the risks to schedule and cost remain similar to that expressed by
5 Staff in VCM 26. [P16 L4 of this testimony]
6

7 **Q. HAS STAFF REVIEWED THE PROGRESS SINCE VCM 26 TO THE**
8 **MOST RECENT INFORMATION AVAILABLE AND DEVELOPED**
9 **ADDITIONAL POSSIBLE DELAY AND COST SCENARIOS FOR EACH**
10 **UNIT?**

11 **A.** Yes. With regards to the forecast commercial operations of the Units the second
12 quarter of 2023 is a reasonable possibility for Unit 3 and the first quarter of 2024
13 is a reasonable possibility for Unit 4.
14

15 **Q. WHAT IS STAFF'S BASIS FOR THE EXTENDED SCHEDULES OF THE**
16 **SECOND QUARTER 2023 AND THE SECOND QUARTER 2024 FOR**
17 **UNITS 3 AND 4, RESPECTIVELY?**

18 **A.** The U.S. commercial nuclear fleet's historical duration between Fuel Load and
19 COD has been approximately 6 months whereas the current forecasts for Unit 3 is
20 5 months⁶ and for Unit 4 is 5 months⁷; trending of activities to complete each
21 Unit suggests longer durations for those activities; and experienced slippage of

⁶ 27 VCM Report page 7

⁷ 27 VCM Report page 8

the schedule for each Unit through the latest data points which will in all
likelihood continue.

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

A. Please refer to the Table below:

Total Project Cost Estimate At Completion			
	ASSUMED CODs	ASSUMED To Go CPI	TPC EAC
U-3	March 2023	4.5	\$ 20.7 B
U-4	Dec 2023		
PIA/VMG TPC EAC			
U-3	April 2023	> 4.5	≥ \$ 21.0 B
U-4	April 2024		

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

1
2
3
4
5
6
7
8
9

EXHIBIT STF-SDR-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.

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 hearings.

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, 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

Resume of Steven D. Roetger

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, 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

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

Resume of Steven D. Roetger

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 rolling 12 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.

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

2
3 2022 – Present WRJ Associates, LLC

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

8
9 1986-2022 GDS Associates, Inc.

10
11 As Executive Consultant, Dr. Jacobs assists clients in evaluation of management and technical
12 issues related to power plant construction, operation and design. He has evaluated and
13 testified on combustion turbine projects in certification hearings and has assisted the Georgia
14 PSC in monitoring the construction of the combustion turbine projects. Dr. Jacobs has
15 evaluated nuclear plant operations and provided testimony in the areas of nuclear plant
16 operation, construction prudence and decommissioning in nine states. He has provided
17 litigation support in complex law suits concerning the construction of nuclear power facilities.
18 Dr. Jacobs is the Georgia PSC's Independent Construction Monitor for the Plant Vogtle 3 and 4
19 nuclear project.

20
21 1985-1986 Institute of Nuclear Power Operations (INPO)

22
23 Dr. Jacobs performed evaluations of operating nuclear power plants and nuclear power plant
24 construction projects. He developed INPO Performance Objectives and Criteria for the INPO
25 Outage Management Department. Dr. Jacobs performed Outage Management Evaluations at
26 the following nuclear power plants:

- 27
28 • Connecticut Yankee - Connecticut Yankee Atomic Power Co.
29 • Callaway Unit I - Union Electric Co.
30 • Surry Unit I - Virginia Power Co.
31 • Ft. Calhoun - Omaha Public Power District
32 • Beaver Valley Unit 1 - Duquesne Light Co.

33
34 During these outage evaluations, he provided recommendations to senior utility management
35 on techniques to improve outage performance and outage management effectiveness.

36
37 1979-1985 Westinghouse Electric Corporation

38
39 As site manager at Philippine Nuclear Power Plant Unit No. 1, a 655 MWe PWR located in
40 Bataan, Philippines, Dr. Jacobs was responsible for all site activities during completion phase of
41 the project. He had overall management responsibility for startup, site engineering, and plant

1 completion departments. He managed workforce of approximately 50 expatriates and 1700
2 subcontractor personnel. Dr. Jacobs provided day-to-day direction of all site activities to ensure
3 establishment of correct work priorities, prompt resolution of technical problems and on
4 schedule plant completion.

5
6 Prior to being site manager, Dr. Jacobs was startup manager responsible for all startup activities
7 including test procedure preparation, test performance and review and acceptance of test
8 results. He established the system turnover program, resulting in a timely turnover of systems
9 for startup testing.

10
11 As startup manager at the KRSKO Nuclear Power Plant, a 632 MWE PWR near Krsko, Yugoslavia,
12 Dr. Jacobs' duties included development and review of startup test procedures, planning and
13 coordination of all startup test activities, evaluation of test results and customer assistance with
14 regulatory questions. He had overall responsibility for all startup testing from Hot Functional
15 Testing through full power operation.

16 1973 - 1979 NUS Corporation

17
18 As Startup and Operations and Maintenance Advisor to Korea Electric Company during startup
19 and commercial operation of Ko-Ri Unit 1, a 595 MWE PWR near Pusan, South Korea, Dr. Jacobs
20 advised KECO on all phases of startup testing and plant operations and maintenance through
21 the first year of commercial operation. He assisted in establishment of administrative
22 procedures for plant operation.

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

27
28 As Startup engineer at Kewaunee Nuclear Power Plant and Beaver Valley, Unit 1, Dr. Jacobs
29 developed and performed preoperational tests and surveillance test procedures.

30
31 1971 - 1973 Southern Nuclear Engineering, Inc.

32
33 Dr. Jacobs performed engineering studies including analysis of the emergency
34 core cooling system for an early PWR, analysis of pressure drop through a
35 redesigned reactor core support structure and developed a computer model to
36 determine tritium build up throughout the operating life of a large PWR.

37
38 **SIGNIFICANT CONSULTING ASSIGNMENTS:**

39
40 Georgia Public Service Commission – Selected as the Independent Construction Monitor to
41 assist the GPSC staff in monitoring all aspects of the design, licensing and construction of Plant
42 Vogtle Units 3 and 4, two AP1000 nuclear power plants.

1
2 Georgia Public Service Commission – Assisted the Georgia Public Service Commission Staff and
3 provided testimony related to the evaluation of Georgia Power Company’s request for
4 certification to construct two AP1000 nuclear power plants at the Plant Vogtle site.

5
6 South Carolina Office of Regulatory Staff – Assisted the South Carolina Office of Regulatory Staff
7 in evaluation of South Carolina Electric and Gas’ request for certification of two AP1000 nuclear
8 power plants at the V.C. Summer site.

9
10 Florida Office of Public Counsel – Assists the Florida Office of Public Counsel in monitoring the
11 development of four new nuclear power plants and extended power uprates on five nuclear
12 units in Florida including providing testimony on the prudence of expenditures.

13
14 East Texas Electric Cooperative – Represented ETEC on the management committee of the
15 Plum Point Unit 1 a 650 Mw coal-fired plant under construction in Osceola, Arkansas and
16 represents ETEC on the management committee of the Harrison County Power Project, a 525
17 Mw combined cycle power plant located near Marshall, Texas.

18
19 Arizona Corporation Commission – Evaluated operation of the Palo Verde Nuclear Generating
20 Station during the year 2005. Included evaluation of 11 outages and providing written and oral
21 testimony before the Arizona Corporation Commission.

22
23 Citizens Utility Board of Wisconsin – Evaluated Spring 2005 outage at the Kewaunee Nuclear
24 Power Plant and provided direct and surrebuttal testimony before the Wisconsin Public Service
25 Commission.

26
27 Georgia Public Service Commission - Assisted the Georgia PSC staff in evaluation of Integrated
28 Resource Plans presented by two investor owned utilities. Review included analysis of
29 purchase power agreements, analysis of supply-side resource mix and review of a proposed
30 green power program.

31
32 State of Hawaii, Department of Business, Economic Development and Tourism – Assisted the
33 State of Hawaii in development and analysis of a Renewable Portfolio Standard to increase the
34 amount of renewable energy resources developed to meet growing electricity demand.
35 Presented the results of this work in testimony before the State of Hawaii, House of
36 Representatives.

37
38 Georgia Public Service Commission - Assisted the Georgia PSC staff in providing oversight to the
39 bid evaluation process concerning an electric utility’s evaluation of responses to a Request for
40 Proposals for supply-side resources. Projects evaluated include simple cycle combustion
41 turbine projects, combined cycle combustion turbine projects and co-generation projects.

1 Millstone 3 Nuclear Plant Non-operating Owners – Evaluated the lengthy outage at Millstone 3
2 and provided analysis of outage schedule and cost on behalf of the non-operating owners of
3 Millstone 3. Direct testimony provided an analysis of additional post-outage O&M costs that
4 would result due to the outage. Rebuttal testimony dealt with analysis of the outage schedule.
5

6 H.C. Price Company – Evaluated project management of the Healy Clean Coal Project on behalf
7 of the General Contractor, H.C. Price Company. The Healy Clean Coal Project is a 50 megawatt
8 coal burning power plant funded in part by the DOE to demonstrate advanced clean coal
9 technologies. This project involved analysis of the project schedule and evaluation of the
10 impact of the owner's project management performance on costs incurred by our client.
11

12 Steel Dynamics, Inc. – Evaluated a lengthy outage at the D.C. Cook nuclear plant and presented
13 testimony to the Indiana Utility Regulatory Commission in a fuel factor adjustment case Docket
14 No. 38702-FAC40-S1.
15

16 Florida Office of Public Counsel - Evaluated lengthy outage at Crystal River Unit 3 Nuclear Plant.
17 Submitted expert testimony to the Florida Public Service Commission in Docket No. 970261-EI.
18

19 United States Trade and Development Agency - Assisted the government of the Republic of
20 Mauritius in development of a Request for Proposal for a 30 MW power plant to be built on a
21 Build, Own, Operate (BOO) basis and assisted in evaluation of Bids.
22

23 Louisiana Public Service Commission Staff - Evaluated management and operation of the River
24 Bend Nuclear Plant. Submitted expert testimony before the LPSC in Docket No. U-19904.
25

26 U.S. Department of Justice - Provided expert testimony concerning the in-service date of the
27 Harris Nuclear Plant on behalf of the Department of Justice U.S. District Court.
28

29 City of Houston - Conducted evaluation of a lengthy NRC required shutdown of the South Texas
30 Project Nuclear Generating Station.
31

32 Georgia Public Service Commission Staff - Evaluated and provided testimony on Georgia Power
33 Company's application for certification of the Intercession City Combustion Turbine Project -
34 Docket No. 4895-U.
35

36 Seminole Electric Cooperative, Inc. - Evaluated and provided testimony on nuclear
37 decommissioning and fossil plant dismantlement costs - FERC Docket Nos. ER93-465-000, et al.
38

39 Georgia Public Service Commission Staff - Evaluated and prepared testimony on application for
40 certification of the Robins Combustion Turbine Project by Georgia Power Company - Docket No.
41 4311-U.
42

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

4
5 Georgia Public Service Commission Staff - Evaluated and prepared testimony on application for
6 certification of the McIntosh Combustion Turbine Project by Georgia Power Company and
7 Savannah Electric Power Company - Docket No. 4133-U and 4136-U.

8
9 New Jersey Rate Counsel - Review of Public Service Electric & Gas Company nuclear and fossil
10 capital additions in PSE&G general rate case.

11
12 Corn Belt Electric Cooperative/Central Iowa Power Electric Cooperative - Directs an operational
13 monitoring program of the Duane Arnold Energy Center (565 Mwe BWR) on behalf of the non-
14 operating owners.

15
16 Cities of Calvert and Kosse - Evaluated and submitted testimony of outages of the River Bend
17 Nuclear Station - PUCT Docket No. 10894.

18
19 Iowa Office of Consumer Advocate - Evaluated and submitted testimony on the estimated
20 decommissioning costs for the Cooper Nuclear Station - IUB Docket No. RPU-92-2.

21
22 Georgia Public Service Commission/Hicks, Maloof & Campbell - Prepared testimony related to
23 Vogtle and Hatch plant decommissioning costs in 1991 Georgia Power rate case - Docket No.
24 4007-U.

25
26 City of El Paso - Testified before the Public Utility Commission of Texas regarding Palo Verde
27 Unit 3 construction prudence - Docket No. 9945.

28
29 City of Houston - Testified before Texas Public Utility Commission regarding South Texas Project
30 nuclear plant outages - Docket No. 9850.

31
32 NUCOR Steel Company - Evaluated and submitted testimony on outages of Carolina Power and
33 Light nuclear power facilities - SCPSC Docket No. 90-4-E.

34
35 Georgia Public Service Commission/Hicks, Maloof & Campbell - Assisted Georgia Public Service
36 Commission staff and attorneys in many aspects of Georgia Power Company's 1989 rate case
37 including nuclear operation and maintenance costs, nuclear performance incentive plan for
38 Georgia and provided expert testimony on construction prudence of Vogtle Unit 2 and
39 decommissioning costs of Vogtle and Hatch nuclear units - Docket No. 3840-U.

40
41 Swidler & Berlin/Niagara Mohawk - Provided technical litigation support to Swidler & Berlin in
42 law suit concerning construction mismanagement of the Nine Mile 2 Nuclear Plant.

1
2 Long Island Lighting Company/Shea & Gould - Assisted in preparation of expert testimony on
3 nuclear plant construction.

4
5 North Carolina Electric Membership Corporation - Prepared testimony concerning prudence of
6 construction of Carolina Power & Light Company's Shearon Harris Station - NCUC Docket No. E-
7 2, Sub537.

8
9 City of Austin, Texas - Prepared estimates of the final cost and schedule of the South Texas
10 Project in support of litigation.

11
12 Tex-La Electric Cooperative/Brazos Electric Cooperative - Participated in performance of a
13 construction and operational monitoring program for minority owners of Comanche Peak
14 Nuclear Station.

15
16 Tex-La Electric Cooperative/Brazos Electric Cooperative/Texas Municipal Power Authority

17 (Attorneys - Burchette & Associates, Spiegel & McDiarmid, and Fulbright & Jaworski) -

18 Assisted GDS personnel as consulting experts and litigation managers in all aspects of
19 the lawsuit brought by Texas Utilities against the minority owners of Comanche Peak
20 Nuclear Station.