

**BEFORE THE
GEORGIA PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF GEORGIA POWER
COMPANY'S TWENTIETH AND TWENTY-FIRST
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 22, 2019

1

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12 **Exhibits:**

13 STF-SDR-1 Resume of Steven D. Roetger

14 STF-WRJ-1 Resume of William R. Jacobs, Jr., Ph.D.

15

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 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 leader for 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 Commissioner 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 from
5 the Georgia Institute of Technology. I am a registered Professional Engineer and a
6 member of the American Nuclear Society. I have more than forty years of
7 experience in the electric power industry including more than twelve years of
8 nuclear power plant construction and start-up experience. I have participated in the
9 construction and start-up of seven nuclear power plants in this country and
10 overseas in management positions including start-up manager and site manager.
11 As a loaned employee to the Institute of Nuclear Power Operations (“INPO”), I
12 participated in the Construction Project Evaluation Program, performed operating
13 plant evaluations and assisted in development of the Outage Management
14 Evaluation Program. Since joining GDS Associates, Inc. in 1986, I have
15 participated in rate case and litigation support activities related to power plant
16 construction, operation and decommissioning. I have evaluated nuclear power
17 plant outages at numerous nuclear plants throughout the United States. I served on
18 the management committee during construction of Plum Point Unit 1, a 650
19 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

1 in providing oversight of the Vogtle 3 and 4 Project since August 2009. My
2 resume is included in Exhibit STF-WRJ-1.

3
4 **Q. WHOM ARE YOU REPRESENTING IN THIS PROCEEDING?**

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

7
8 **Q. MR. ROETGER, WHAT IS YOUR INVOLVEMENT WITH THE VOGTLE**
9 **3 AND 4 PROJECT?**

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

17
18 **Q. DR. JACOBS, WHAT IS YOUR INVOLVEMENT WITH THE VOGTLE 3**
19 **AND 4 PROJECT?**

20 **A.** I am the Commission's Independent Construction Monitor ("CM") for the Project.
21 My duties are to assist the Staff Team in its regulatory oversight of all aspects of
22 the Project and to keep the Commission informed of significant Project issues or
23 changes in the Project forecast Cost and Schedule as they occur. In addition, I

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

7
8 **Q. WHAT IS YOUR ASSIGNMENT IN THIS PROCEEDING?**

9 **A.** Our assignment is to present the results of the Staff's oversight from certification
10 of the Project to the present with emphasis on the time period covered by the
11 Twentieth and Twenty-First Semi-annual VCM Report, July 1, 2018 to June 30,
12 2019. In this testimony, we present our analysis of the current status of the Project
13 and discuss at a high level the status of the most recent forecast Schedule and Cost
14 provided by the Company and identify risks and areas of concern for the Project.
15 Details of the schedule and cost analyses are provided in the testimony of Mr. Don
16 Grace. Finally, we make a recommendation regarding Georgia Power Company's
17 ("Company") request for verification and approval of costs incurred during the
18 period in the amount of \$1.248 billion.

19
20 **Q. PLEASE DESCRIBE THE CONSTRUCTION MONITORING PROGRAM**
21 **THAT THE STAFF TEAM HAS IMPLEMENTED TO MONITOR THE**
22 **CONSTRUCTION OF THE VOGTLE 3 AND 4 PROJECT.**

1 **A.** The Staff Team continues to actively monitor the Project. Monitoring activities
2 include monthly meetings between Staff and Company personnel to discuss
3 Project status and regular trips to the Vogtle Project site to observe the Monthly
4 Project Review (“MPR”) meeting and to witness firsthand construction activities’
5 progress. We review the Company’s Weekly Metrics reports, Monthly Update
6 Reports including addenda, and submit data requests to the Company for
7 additional information. The Team has continued its review of the Company’s
8 process for handling Project invoices from WEC¹ and Bechtel², and other
9 Company contractors. This includes review of the Project cost control procedures
10 and sampling of processed invoices. Other activities conducted by the Staff Vogtle
11 Construction Monitoring Team include:

- 12 • Review of Monthly status reports issued by Bechtel and Westinghouse;
- 13 • Review of the Company’s Semi-Annual VCM Reports;
- 14 • Preparation of discovery requests for additional information as needed
15 following review of the monthly status reports, semi-annual
16 construction monitoring reports or meetings with the Company;
- 17 • Attendance at management briefings by the Vogtle Construction
18 Review Board;
- 19 • Participation in Nuclear Regulatory Commission (“NRC”) public
20 meetings in person and via conference call as appropriate;
- 21 • Review of public correspondence between the Company and the NRC;

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

² Bechtel is the construction contractor.

- Review of correspondence between the Contractor and the Company;
- Review of trade articles and journals related to new nuclear power plant development;
- Witnessing significant construction activities.

In addition, as described in our testimony in the Nineteenth VCM, the Vogtle Project monitoring activities by Staff and the Construction Monitor have been augmented by the addition of the Vogtle Monitoring Group (“VMG”) personnel to the Staff team. VMG activities include a fulltime experienced construction manager stationed at the Vogtle site and detailed schedule and cost analyses as presented in Mr. Grace’s testimony.

II. PROJECT STATUS

Q. PLEASE DESCRIBE THE CURRENT STATUS OF THE PROJECT.

A. Construction continues on the Vogtle Project with SNC’s emphasis being on completion of systems for turnover to the Initial Test Program (“ITP”) Group. Through September 2019, the total Project is reported to be 81.3% complete compared to a plan of 82.3% which are based on a weighted average of the Project components as shown below:

<u>Project Phase</u>	<u>September 2019</u> <u>Plan</u>	<u>September 2019</u> <u>Actual</u>
Engineering	98.7%	98.6%

Procurement	97.5%	97.1%
Construction	74.5%	73.0%
<i>Bechtel</i>	71.5%	69.3%%
<i>Direct Subs</i>	80.2%	79.8%%
I&C/Cyber Security	98.9%	98.7%
Initial Test Program	19.8%	17.4%
Total Project	82.3%	81.3%

Q. HAS THE PROJECT ACCOMPLISHED MAJOR CONSTRUCTION MILESTONES DURING THE 20TH – 21ST VCM PERIOD?

A. Yes, several significant construction milestones have been accomplished during the 20th – 21st VCM period. These milestones include:

- Set Unit 3 Containment Vessel Top Head;
- Commence Unit 3 Initial Energization;
- All Major Modules Delivered to Site;
- Set Unit 4 Reactor Vessel and Pressurizer;
- Complete the Raw Water and Cooling Water Intake Structure.

However, in spite of achieving these construction milestones, construction progress on the Project fell far behind the production needed to achieve what was called the +21-month schedule with a Unit 3 COD of April 14, 2019. In our testimony in the 19th VCM we identified many concerns with the Project's ability to meet the required production while transitioning the Project from the bulk

1 construction mode to system completion and turnover. We concluded that “Staff
2 believes that the +21-month schedule is highly unlikely to be achieved.” As
3 discussed in the next section of this testimony, the challenges to construction
4 production and system turnover necessitated the development of a new baseline
5 schedule in April 2019.

6
7 **Q. DOES SNC USE MILESTONES TO ASSESS PROGRESS ON THE**
8 **PROJECT?**

9 **A.** Yes. At the end of each year SNC develops a series of quarterly milestones that
10 are to be met the following year.

11
12 **Q. DOES STAFF HAVE ANY CONCERNS WITH THE USE OF**
13 **MILESTONES AS A PRIMARY MEANS OF DETERMINING THE**
14 **STATUS OF WORK COMPLETED ON THE PROJECT?**

15 **A.** Yes. Each milestone must be carefully selected so that it is indicative of actual
16 work performed. For example, SNC selected ‘Start of Integrated Flush’ as a Major
17 Milestone to be accomplished in the third quarter of 2019. SNC did meet this
18 Major Milestone. The issue, however, is that the ‘Start’ of any activity could
19 constitute the laying of only several feet of cable or installing one pipe hanger.
20 The critical milestone, in Staff’s opinion, is not the ‘Start’ of an activity but rather
21 the ‘Finish’ of an activity.

Q. CAN INAPPROPRIATE MAJOR MILESTONES MASK THE ACTUAL PROGRESS ON THE PROJECT?

A. Yes. Please see the table below.

Hours Ahead (Behind) Plan vs. Milestones Met

	1st Qtr	2nd Qtr ⁽¹⁾	3rd Qtr	4th Qtr ⁽²⁾
Number of Milestones	4	3	3	5
Met Milestones	4	3	3	3
Cumulative Unit 3 Plan vs. Actual ⁽³⁾	(988,000)	(141,896)	(533,242)	(639,512)
Cumulative Unit 4 Plan vs. Actual	(289,901)	84,610	137,415	116,213
Cumulative BOP ⁽⁴⁾ Plan vs. Actual	(28,331)	12,440	88,536	106,304
Total deficit hours	(1,306,232)	(44,846)	(307,291)	(416,995)
Source	3/31 SC	6/30 SC	9/29 SC	3/31 SC ⁽⁵⁾

⁽¹⁾ April 2019 Baseline; pushed deficit hours to the future; shifted COD from April to May 2021 and 2022.

⁽²⁾ 4th quarter ends 12/31/2019; cumulative hours as of 10/31/2019

⁽³⁾ Plan hours; ahead of Plan positive number; behind Plan negative number

⁽⁴⁾ Balance of Plant

⁽⁵⁾ SC = Scorecard

As shown on this Table, all Major Milestones selected by SNC have been achieved as of the filing of this testimony. However, the backlog of hours to complete the Project since the second quarter have steadily increased during 2019 and, in Staff's opinion, will continue to increase.

Q. WHY DOES THE DEFICIT IN HOURS DECREASE IN THE SECOND QUARTER?

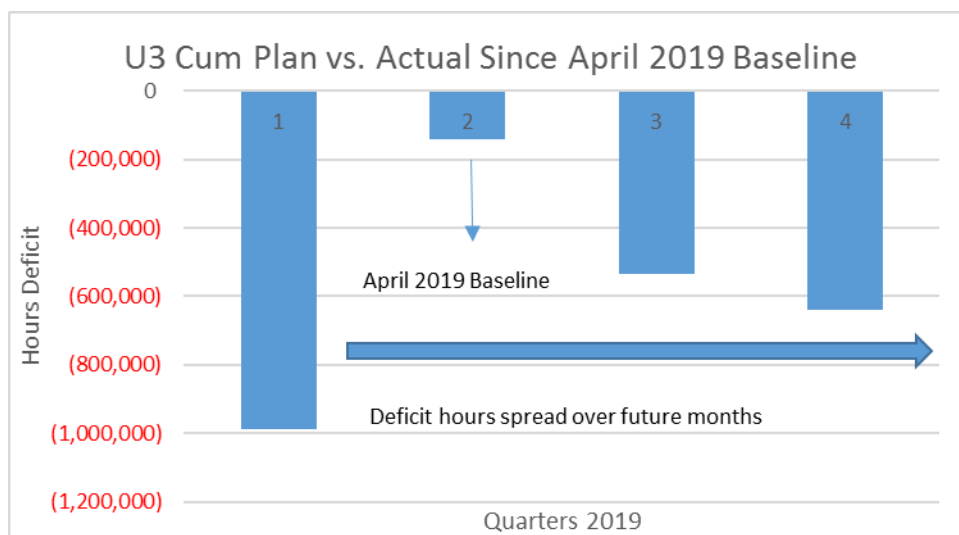
1 **A.** This is due to the April 2019 Baseline. The deficit hours prior to the April 2019
2 Baseline were re-distributed to future months.

3
4 **Q. DOES STAFF BELIEVE THIS DEFICIT IN EARNED HOURS TO BE**
5 **ACCURATE?**

6 **A.** No. As is shown in the Don Grace testimony, the assumed unit rates in the 2019
7 Baseline are, for many commodities, understated. If actual experienced unit rates
8 are substituted for the assumed unit rates, the deficit would be larger. Actual
9 experienced unit rates by commodity are discussed in more detail in the Don Grace
10 testimony.

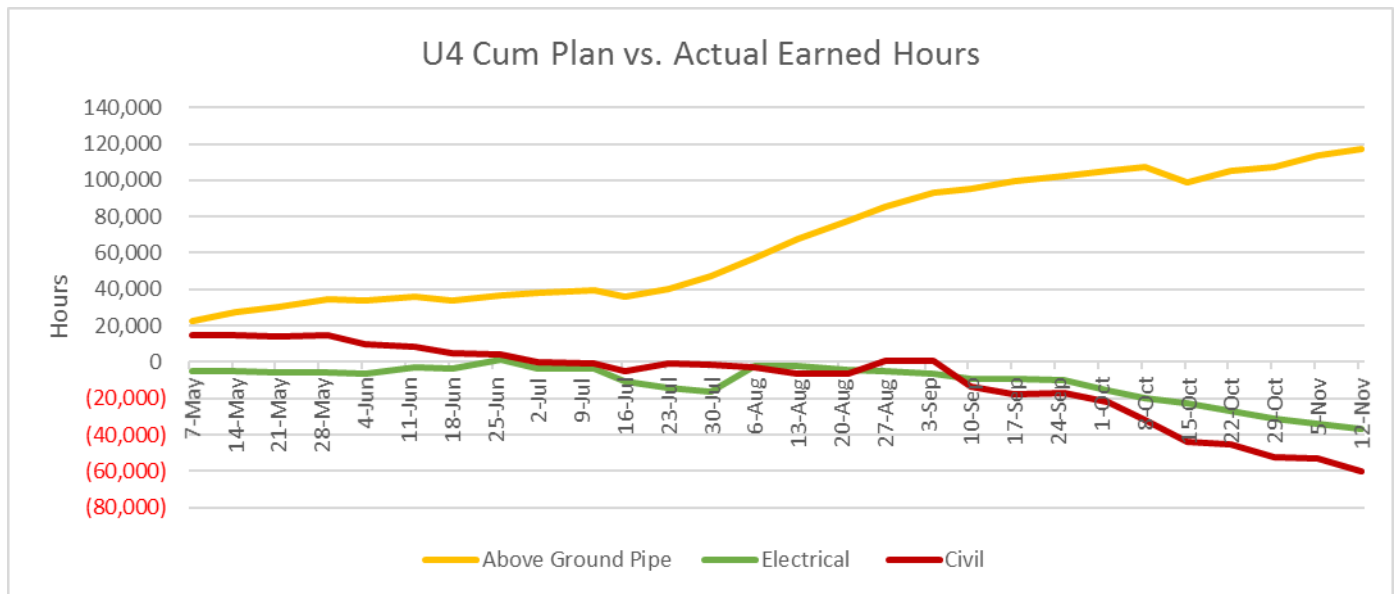
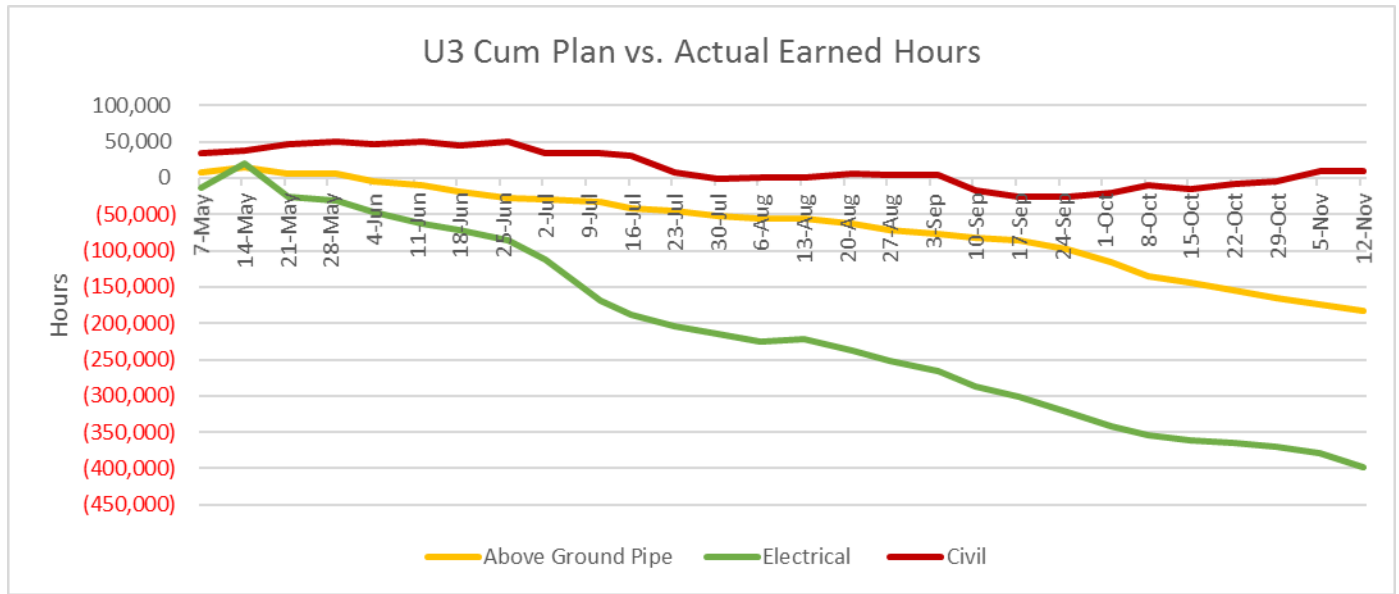
11
12 **Q. HOW LARGE HAS THE DEFICIT FOR UNIT 3 ELECTRICAL**
13 **COMMODITIES GROWN SINCE THE APRIL 2019 BASELINE TO**
14 **DATE?**

15 **A.** Please see the graph below. As shown, the current deficit is approximately
16 640,000 hours.



**Q. HOW HAVE THE CUMULATIVE BACKLOG OR SURPLUS OF
PLANNED HOURS BY COMMODITY AND UNIT 3 AND UNIT 4 FAIRED
SINCE THE APRIL 2019 BASELINE?**

A. The first graph below represents Unit 3 and the second graph represents Unit 4.
For Unit 3 Above Ground Piping and Electrical have fallen behind the April 2019
Baseline almost since its issuance. For Unit 4, Electrical and Civil, since August,
have shown a negative trend.



III. THE APRIL 2019 REBASELINE

Q. WHY WAS A NEW SCHEDULE BASELINE NEEDED IN APRIL 2019?

A. As Staff has continually stated since the Sixth VCM and as affirmed in INPO Principle for Excellence in Nuclear Construction No. 4, *schedules must be realistic*

1 *and understood.* A realistic schedule drives many critical elements of project
2 management including construction priorities, procurement needs and staffing
3 requirements. In addition, comparison of the Project status to a realistic schedule
4 allows project management to identify problem areas and develop possible
5 mitigation strategies. Without a realistic, achievable schedule, project
6 management is typically in a poor position to support all the disciplines needed for
7 a project. Project management often finds itself fighting fires because long range
8 planning is not effective to identify upcoming problems with sufficient time and
9 resources to take proper corrective actions. By the end of 2018, it was clear that
10 the Project Schedule was not realistic or achievable and thus was not a viable
11 management tool. Staff believes another consequence of not having such a
12 schedule was that it was difficult for stakeholders to determine the true completion
13 status of work and the work that remains.

14
15 **Q. PLEASE DESCRIBE THE RESULTS OF THE APRIL 2019 SCHEDULE**
16 **REBASELINE³.**

17 **A.** The work done on the April 2019 Baseline resulted in some improvements when
18 compared to the June 2018 baseline. These improvements are discussed in Staff's
19 July 30, 2019 report on the April 2019 Vogtle Unit 3 and 4 Re-baseline of Forecast
20 Cost and Schedule and include:

³ Staff will refer the prior re-baselined Integrated Project Schedule ("IPS") and Estimate at Completion ("EAC") as the June 2018 Baseline and the April 2019 Baseline.

- Integration of sub-contractor work;
- Additional detail in construction and ITP schedule logic;
- Additional resource loading;
- Reduction in the number of hard constraints;
- Verification of to-go commodity quantities.

However, the primary result of the April 2019 Baseline was a relatively small change in the forecast CODs from April 14, 2021 to May 23, 2021 for Unit 3 and from April 25, 2022 to May 23, 2022 for Unit 4.

Q. IN ITS JULY 30, 2019 REPORT, STAFF IDENTIFIED SEVERAL CONCERNS WITH THE APRIL 2019 BASELINE. HAVE THESE CONCERNS BEEN REALIZED IN THE PERIOD SINCE YOUR JULY 30TH REPORT?

A. Yes, they have. Only four months after issuance of the April 2019 Baseline, it is no longer relevant to the Project. The actual status of construction is many hours behind the April 2019 Baseline and system turnovers to ITP are several months delayed. In Staff's opinion, the April 2019 Baseline is no longer a relevant benchmark for SNC and Bechtel to manage, or status. the Project. Many System turnovers are 90 days or more later than shown in the April 2019 Baseline. In other words, in the four months since the April 2019 Baseline was established, these system turnovers have slipped 90 days.

1 **Q. DOES STAFF EXPECT THIS TREND OF UNDER-EARNING CRAFT**
2 **HOURS AND DELAYS WITH SYSTEM TURNOVERS TO CONTINUE?**

3 **A.** Yes. Without significant improvements in production, productivity and planning
4 i.e. a realistic schedule forecast, Staff believes this trend will continue.
5

6 **Q. HOW DID SNC MEET THE ‘START INTEGRATED FLUSH’**
7 **MILESTONE ACTIVITY?**

8 **A.** The Project managed to achieve the “Start Integrated Flush (“IF”)” milestone by
9 using the Partial Release for Test (“PRT”) process, which allows some testing to
10 be done on piping and components that are not turned over to ITP as scheduled, by
11 performing a flush on a small length of pipe. Use of the PRT process and the
12 negative impacts is described later in this testimony.
13

14 **Q. WHY IS ACTUAL CONSTRUCTION PROGRESS SIGNIFICANTLY**
15 **BEHIND THE APRIL 2019 BASELINE ONLY FIVE MONTHS AFTER**
16 **THE BASELINE WAS ISSUED?**

17 **A.** In our opinion, the primary reason that construction progress is far behind the
18 April 2019 Baseline is that the schedule assumptions including unit rates were,
19 from the outset, unrealistic and unachievable. As a result, in order to meet the
20 April 2019 Baseline, the unit rates used to develop the April 2019 Baseline were
21 not achievable and were not based on experienced actual unit rates that have been
22 achieved on the Project to date.
23

1 **Q. PLEASE EXPLAIN THE TERM UNIT RATE AND WHY IT IS**
2 **RELEVANT TO THIS DISCUSSION.**

3 **A.** A unit rate is the estimate of the number of hours required to complete installation
4 of a unit of commodity such as feet of pipe or cable. For the April 2019 Baseline,
5 the unit rates were based, with a few minor exceptions, on the unit rates
6 established by Fluor and Westinghouse in 2017 and incorporated in the Bechtel
7 contract which, as shown in Mr. Grace's testimony, are much lower than the actual
8 experienced unit rates achieved on the Project. The use of unrealistically low unit
9 rates results in fewer man-hours and implies shorter activity durations than are
10 realistic or achievable. This usually leads to delays in system turnovers because
11 completion of construction is later than planned.

12
13 **Q. DOES STAFF ANTICIPATE ANOTHER RE-BASELINE IN THE NEAR**
14 **FUTURE?**

15 **A.** Yes, Staff anticipates that a new forecast of Schedule and Cost will be issued in
16 early 2020.

17
18 **Q. WHAT IS STAFF'S EXPECTATION FOR THE SCHEDULE RE-**
19 **FORECAST?**

20 **A.** Staff expects that the upcoming reforecast may again be overly aggressive and
21 result in small, incremental delays to the forecast CODs of both units. Staff's
22 concern is that the forthcoming re-baseline will again be unrealistic and therefore
23 become irrelevant within a short period of time after issuance. It may logically lay

1 out the activities to complete Unit 3 and 4 but the explicit production and
2 productivity assumptions may again be overly aggressive.

3
4 **Q. CAN BECHTEL BE FINANCIALLY AT RISK FOR THE DELAY OF**
5 **COMMERCIAL OPERATION OF THE UNITS?**

6 **A.** No. Bechtel and for the most part, all of the sub-contractors working on the site,
7 will be made whole because of the Time and Materials nature of these contracts.
8 The Company agreed with the characterization that Bechtel gets paid for every
9 hour worked. (Transcript, Abramovitz, p. 58). Bechtel does have an “At Risk” fee
10 in their contract. However, Bechtel has the opportunity to submit construction
11 trends to protect that fee.

12 13 **IV. CONSTRUCTION STATUS**

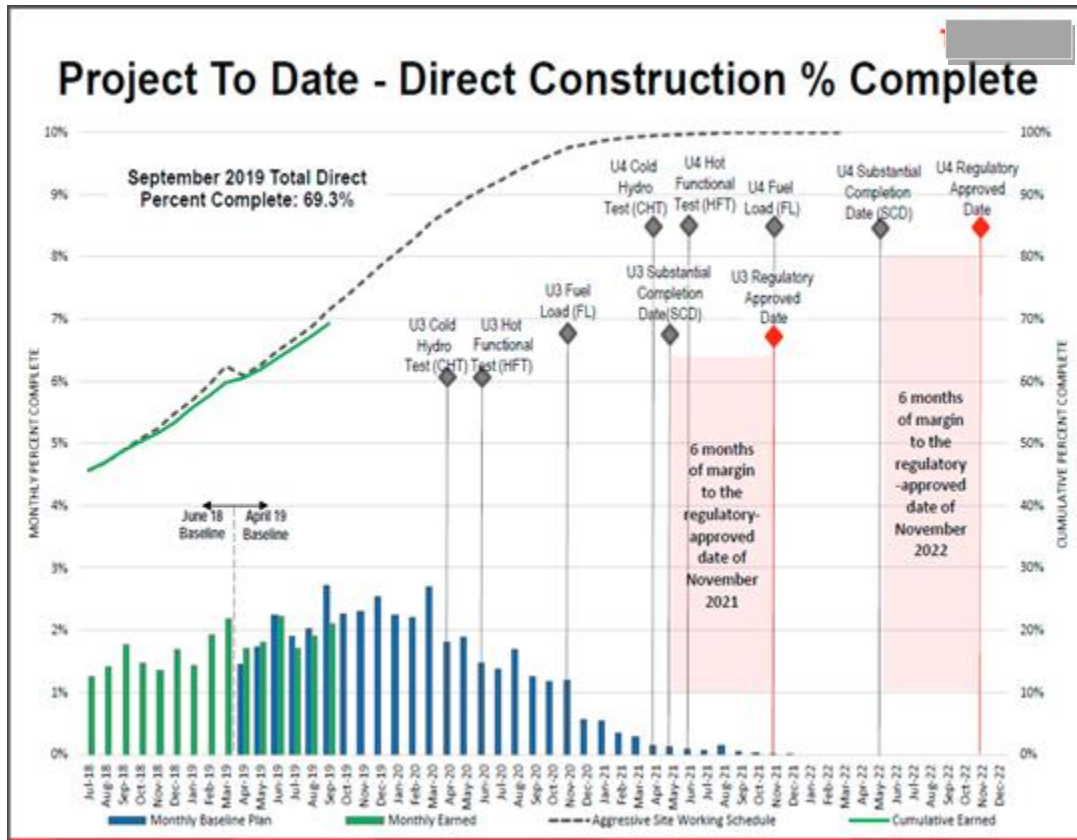
14 **Q. PLEASE PROVIDE THIS COMMISSION AN UPDATE ON THE**
15 **CONSTRUCTION STATUS OF THE VOGTLE PROJECT.**

16 **A.** Unfortunately, it is difficult to provide such an update because there is no relevant
17 baseline schedule against which to compare the current status of the Project. As of
18 September 2019, SNC states that construction was 73.0% complete. However,
19 without a realistic Schedule we cannot confirm the percent complete. Staff can
20 state that because it is significantly behind the schedule established in the April
21 2019 Baseline and because many more hours than planned are being required to

1 complete construction activities, the percent may not accurately represent the
2 balance of work needed to attain the May CODs.

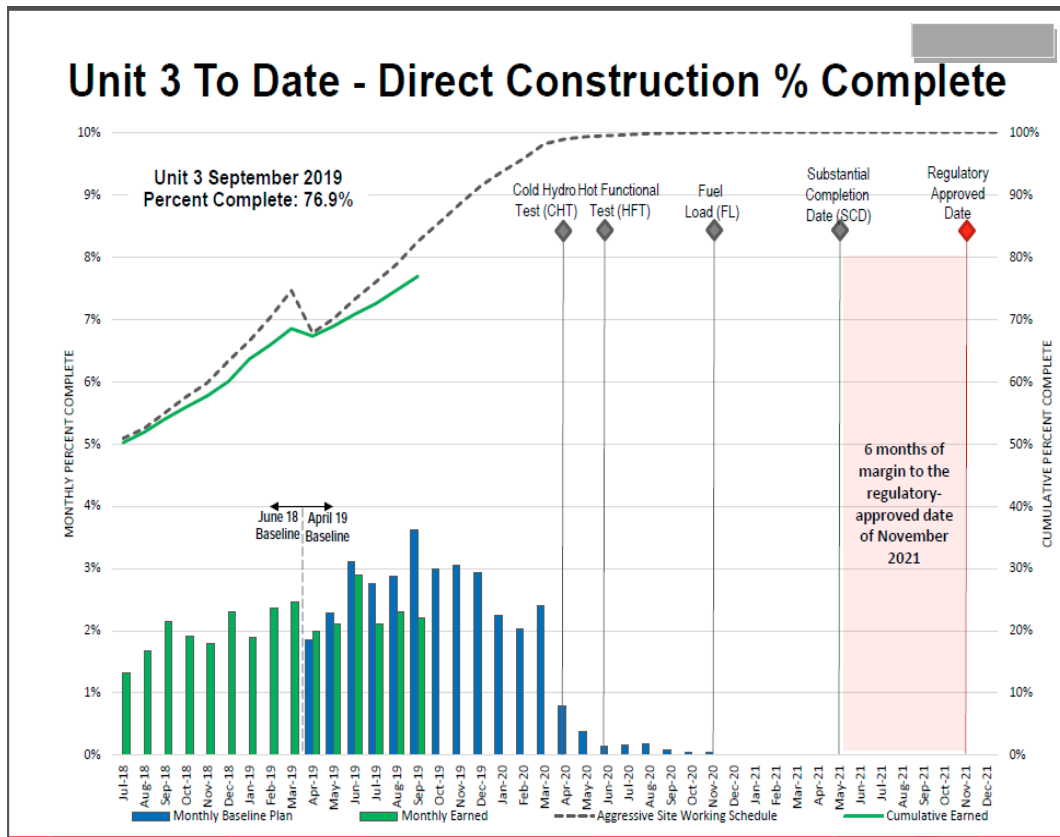
3
4 **Q. BASED ON STAFF'S KNOWLEDGE CAN STAFF PREDICT WITH ANY**
5 **CERTAINTY WHEN THE CODS WILL BE ACHIEVED?**

6 **A.** This question could be answered if the schedule was realistic. But without an IPS
7 based on realistic and achievable unit rates, an estimate of Project completion is
8 simply an educated guess. When asked if the Company used actual rates that
9 might have projected a more realistic duration on unit rate, Company Witness
10 Abramovitz responded by stating that, "...we did not change the unit rates from
11 2018. (Transcript, Abramovitz p. 57). The status of direct construction on the
12 Project, which is primarily the nuclear island, the power block and some Balance
13 of Plant for Units 3 and 4, is shown in the figure below.



This figure shows that the overall Project is falling behind the April 2019 baseline.

As shown below the situation is worse when looking at Unit 3 in isolation.



As shown above, the divergence of the green line from the dotted line represents direct construction falling behind the April 2019 Baseline.

Q. WHAT IS THE PRIMARY DRIVER FOR THE CONSTRUCTION SCHEDULE?

A. The primary driver of the construction schedule is to meet the required system turnovers to ITP.

Q. HOW HAS THIS FOCUS ON SYSTEM TURNOVERS IMPACTED THE PROJECT?

1 **A.** The construction focus on system turnovers has negatively impacted the Project's
2 ability to meet the required earned hours to support the Project Schedule. Work
3 related to system completion is tedious and typically results in fewer earned hours.
4 The most efficient approach to earning hours is in bulk construction where, for
5 example, all the electrical cables needed in a given *area* are pulled at the same time
6 rather than pulling just a few cables needed for a specific system turnover. SNC
7 has stated that its primary approach is to support system completion and turnover
8 to support the ITP Schedule. Since adoption of that approach, the Project has not
9 achieved the required earned hours each month.

10
11 **Q. HOW DOES SNC PROPOSE TO RECOVER THE CURRENT DELAYS**
12 **COMPARED TO THE APRIL 2019 BASELINE?**

13 **A.** Many Project documents state that schedule mitigation activities are being
14 implemented or schedule mitigation activities are being evaluated to recover the
15 current delays. We have heard this terminology many times throughout the course
16 of the Vogtle Project and our observation and experience has been that the Project
17 has implemented many mitigation strategies and improvement plans with little to
18 no significant impact on recovery of delays on the Project. At best, these plans
19 tend to prevent further delays in construction or system turnovers, but have not
20 been able to recover existing schedule delays.

21
22 **Q. SNC HAS STATED THAT IT WILL UTILIZE "MANAGEMENT TIME"**
23 **TO MAINTAIN THE CURRENT SCHEDULE. WHAT IS**

**“MANAGEMENT TIME” AND WHAT IS YOUR OPINION OF ITS USE
TO MAINTAIN THE CURRENT SCHEDULE?**

A. SNC has identified some periods in the current schedule in which they believe that less time will be required during that period to complete the scheduled activities than what is shown in the schedule. This is more typically called “schedule float” but it is called “management time” on the Vogtle Project. SNC believes that [REDACTED] of management time is available in the Unit 3 Schedule between Open Vessel Testing (“OVT”) and COD. Our first observation is that the management time identified by the Company is based on everything going perfectly in the remaining construction and commissioning testing activities. SNC’s position seems to be that while to date the Project has incurred delays at every point, in the future, construction and testing activities will be completed within the time allotted in the Schedule. As a former startup manager at two nuclear plants, I (Dr. Jacobs) assure you that everything will not go perfectly. Problems will be found with equipment and systems that will require time to correct and re-test.

**Q. HAS ITP ENCOUNTERED PROBLEMS TO DATE DURING THE EARLY
TESTING ACTIVITIES?**

A. Yes, ITP has encountered numerous problems during the early phase of flush and hydro and component testing. These problems include:

- Numerous leaks in the fire protection system during initial hydro testing;
- High vibrations on the spent fuel system pumps during initial component testing;

- 1 • Current imbalance issue on the Normal Residual Heat Removal pump motor
- 2 during initial testing;
- 3 • Numerous issues with system valves;
- 4 • Control circuits for 6.9kV/480V transformer not installed;
- 5 • Numerous issues with circuit breakers.

6

7 **Q. IN YOUR EXPERIENCE, HAS THE PROJECT ENCOUNTERED AN**

8 **ABNORMAL AMOUNT OF PROBLEMS DURING INITIAL TESTING?**

9 **A.** No, the level of problems encountered has not been abnormal to date. One of the

10 major objectives of the Test Program is to find problems and correct them. We

11 mention these examples of problems found during testing to emphasize the point

12 that it is not realistic to assume that testing will be completed within the scheduled

13 durations and that schedule float or management time will be available during the

14 testing windows. In addition, the late turnover of systems to ITP will result in

15 compression of the time available to complete many preoperational tests. As these

16 preoperational tests stack up, the capability of ITP to complete them during the

17 Scheduled durations will be challenged.

18

19 **Q. AS THE PROJECT HAS ENTERED THE EARLY TESTING PHASE,**

20 **PLEASE BRIEFLY DESCRIBE THE TESTING REQUIRED TO START**

21 **UP A NUCLEAR POWER PLANT.**

22 **A.** The equipment that makes up a nuclear power plant is divided into many systems.

23 The Vogtle Units are each broken down into approximately 104 systems. Some

1 systems contain only electrical equipment while other systems consist of piping,
2 valves, pumps and other mechanical equipment along with the electrical equipment
3 required to operate these components. Testing typically begins with cleaning
4 piping systems, called flushing and testing the piping systems to ensure they are
5 capable of withstanding the designed pressures, called hydrostatic testing or
6 hydros. Then individual components such as pumps and valves are tested to
7 ensure they are operating within design parameters.

8 As systems are completed and turned over from construction, Pre-operational
9 Testing can begin. Pre-operational Tests confirm the functionality of the full
10 system and verify the system operates per design. Completion of Pre-operational
11 Testing leads to a significant test called Hot Functional Testing ("HFT"). During
12 HFT, the Reactor Coolant System is operated at normal operating temperature and
13 pressure and a large portion of the plant is tested in an integrated fashion to verify
14 that plant systems and the integrated plant operates per design prior to fuel load.
15 The final steps in the Startup Program are loading the nuclear fuel and then testing
16 the plant at increasing power levels leading to 100% power and finally
17 Commercial Operation.

18
19 **Q. WITH THE TURNOVER OF SYSTEMS APPROXIMATELY THREE**
20 **MONTHS BEHIND SCHEDULE, HOW HAS SNC CONTINUED WITH ITP**
21 **ACTIVITIES AND MET MAJOR MILESTONES SUCH AS START**
22 **INTEGRATED FLUSH?**

1 **A.** The Project uses a process called Partial Release for Test (“PRT”). The PRT
2 process allows jurisdictional control of a portion of a system to be transferred to
3 ITP to conduct testing activities prior to final turnover of that system. Once the
4 testing activities are complete, ITP returns jurisdictional control to Construction to
5 complete the system. This process allows ITP to conduct flushing, hydro and
6 component testing activities prior to turnover of a complete or partial system.

7
8 **Q. IS THE PRT PROCESS A REASONABLE APPROACH TO CONDUCT ITP**
9 **ACTIVITIES?**

10 **A.** It is reasonable to use the PRT process to conduct some testing activities prior to
11 turnover. The question is a matter of to what degree it should be used. On the
12 Vogtle Project, a large portion of the testing activities to date have been conducted
13 using the PRT process rather than on systems that have been turned over to ITP as
14 originally contemplated. SNC has stated that they are using the PRT process to
15 mitigate the impact of the late system turnovers. For example, the Project met the
16 major milestone of ‘Start Integrated Flush’ by using the PRT process to turnover a
17 small portion of piping for flushing and have used the process to continue with
18 Integrated Flushing activities. Use of the PRT allows some testing to be done
19 sooner than could otherwise be accomplished due to the late system turnovers from
20 Construction. However, meeting major milestones using this process can give a
21 false impression of the status of the Project. In addition, extensive use of the PRT
22 process greatly complicates and impedes Construction due to the change in
23 jurisdictional control to ITP and then back to Construction. Construction is often

1 left waiting to get back into a system to complete it while ITP completes its testing
2 activities. It would be much more efficient to fully complete a system and then
3 turn the system over to ITP for testing rather than changing jurisdictional control
4 multiple times between construction and ITP by using the PRT process.

5
6 **Q. IN ADDITION TO THE NEGATIVE IMPACT ON CONSTRUCTION**
7 **EFFICIENCY AND PRODUCTION, WHAT OTHER CONCERNS DO YOU**
8 **HAVE ABOUT THE EXCESSIVE USE OF THE PRT PROCESS?**

9 **A.** Conducting testing in locations in which construction is also underway requires
10 close coordination and control of equipment to ensure that construction and/or
11 operating personnel are not in danger. Two recent examples from the Project
12 highlight this concern:

- 13 • On 11/8/2019 night shift ITP was conducting a test on the Chemical and
14 Volume System. A valve was not in the required closed position and water
15 entered the room where electricians were working. Two electricians were
16 injured while trying to exit the room.
- 17 • On 11/7/2019 while restoring the PXS system after conducting a flush, argon
18 gas was vented from Core Makeup Tank A into a room where construction
19 personnel were working. An air quality alarm went off and the room was
20 evacuated.

21 The more the PRT process is used and construction personnel are working in close
22 proximity to testing activities, the more likely these types of events are to occur.

V. IMPACTS OF OVERLY AGGRESSIVE SCHEDULE

Q. DOES STAFF BELIEVE THERE ARE RISKS ASSOCIATED WITH THE USE OF AN OVERLY AGGRESSIVE SCHEDULE?

A. Yes. First, Staff does agree with SNC that the Schedule should be challenging to ensure that all parties involved in the completion of the Project are pushed to perform to their utmost efficiency. However, Staff is of the opinion that the Target CODs of May 2021 and 2022 are not reasonable. The primary reason for this belief is discussed in the Grace Testimony regarding unattainable assumed unit rates in the April 2019 Baseline.

Q. WHAT IS THE PRIMARY RISK THAT STAFF SEES WITH AN OVERLY AGGRESSIVE SCHEDULE?

A. Lack of accountability for completion of activities. The April 2019 Baseline is one of the critical metrics by which SNC can hold Bechtel and all other sub-contractors accountable for work production. Staff believes that it is essential for activity durations to be reasonable and achievable. With the absence of these two qualities for activity durations, completion dates begin to shift to the right (they are delayed) without much questioning from line management.

Q. HAS STAFF WITNESSED THIS LACK OF QUESTIONING REGARDING SHIFTS TO THE RIGHT OF ACTIVITY COMPLETION DATES?

1 **A.** Yes. Staff has been present in many meetings where an activity date is declared
2 unachievable by the responsible manager. Most often the team is told that the
3 completion date can be met X number of days in the future without any challenge
4 from leadership in the room. This practice is then often repeated until a reasonable
5 date is finally declared.

6
7 **Q. WOULD IT BE REASONABLE TO HOLD A MANAGER RESPONSIBLE**
8 **FOR COMPLETING AN ACTIVITY WHEN THE DURATION OF THAT**
9 **ACTIVITY IS UNREASONABLY SHORT?**

10 **A.** No, it would not.

11
12 **Q. ARE THERE OTHER POTENTIAL NEGATIVE IMPACTS THAT CAN**
13 **DEVELOP AS A RESULT OF AN OVERLY AGGRESSIVE SCHEDULE?**

14 **A.** Yes. For the most part they are self-explanatory and are listed below:

- 15 • Low staff morale;
- 16 • Staff attrition;
- 17 • High absenteeism;
- 18 • The need for accelerated procurement;
- 19 • Construction and Engineering's inability to close work packages;
- 20 • Future bow wave of work that must be completed in an ever shrinking time-
- 21 frame.

22
23 **Q. WHAT IS THE CONSEQUENCE OF THE LAST BULLETED ITEM**
24 **ABOVE?**

25 **A.** Essentially it takes the overly-aggressive Schedule and inserts even more work into
26 what time remains.

Q. WHEN MUST ESSENTIALLY ALL CONSTRUCTION BE COMPLETE FOR UNIT THREE?

A. With very few exceptions construction must be complete just prior to fuel load. In order for nuclear fuel to be on site at Unit 3, Unit 3 and the majority of Balance of Plant structures must be incorporated into the Station's (Unit 1, Unit 2, and Unit 3) security perimeter. At that time, it would be very difficult to plan for efficient egress of craft workers into Unit 3. Fuel load is scheduled for November of 2020 which equates to about one year to finish all construction.

VII. REGULATORY ISSUES

Q. HAS THE DEFINITION OF COMMERCIAL OPERATION BEEN DEFINED IN A STIPULATION BETWEEN THE COMPANY AND STAFF?

A. Yes. From the stipulation adopted by the Commission dated October 20th, 2016 between Staff and the Company line items twelve and thirteen state Commercial Operation (per unit) has been defined as follows:

The Projects, consisting of Units 3 and 4, will be placed into retail rate base on December 31, 2020 or upon reaching commercial operation whichever is later.

Commercial Operation of a Unit as used in this Stipulation will be defined as the Unit being fully dispatchable on demand at the stated Net Electrical Output of 1,102MWe of the Unit. For ratemaking purposes, the Units will not be included in base rates

1 until December 31, 2020 or when the Units reach Commercial
2 Operation, whichever is later.
3

4 **Q. DOES THIS DEFINITION CONTEMPLATE ANY FINANCIAL**
5 **ACCOUNTING CRITERIA FOR DECLARING COMMERCIAL**
6 **OPERATION?**

7 **A.** No. If it did contemplate financial accounting criteria the Stipulation
8 would have expressly stated so. It is Staff's opinion that for each of the
9 Units to be placed into base rates each Unit, mutually exclusive of the
10 other, must perform as stated in the Stipulation. Furthermore, because
11 these Units are nuclear generation, the dispatch is to be assumed twenty-
12 four hours a day, seven days a week, until a scheduled outage is required.
13 As the newly completed AP1000 Sanmen 2 has demonstrated, simply
14 because a Unit starts producing power does not mean that the Unit will
15 function as intended. It is important that the Units have demonstrated that
16 they work as intended before ratepayers are asked to pay for them.

17
18 **Q. ARE THERE OTHER CRITERIA UNDER WHICH PROJECT**
19 **COSTS ARE GOVERNED BY STIPULATIONS?**

20 **A.** Yes. From the same Stipulation line items four and five state the burden
21 of proof for disallowance of costs are borne as follows:

22 4. Capital costs incurred up to \$5.68 billion will be
23 presumed to be reasonable and prudent. The burden of
24 proof shall be on the party challenging those costs.
25

1 5. The Company will have the burden to show that Capital
2 costs above the revised forecast of \$5.68 billion are
3 reasonable and prudent.
4

5 **Q DOES LINE ITEM 4 FROM THE STIPULATION ABOVE**
6 **FOREGO THE OPPORTUNITY OF A PARTY FROM**
7 **CHALLENGING CAPITAL COSTS UP TO \$5.68 BILLION?**

8 **A.** No. Item one of the Stipulation deemed capital costs incurred by the
9 Company through the end of the Fourteenth VCM prudent, with the
10 exception that if any system, structure, or component embedded in that
11 capital cost through the Fourteenth VCM does not perform per the design
12 “...The Commission expressly reserves its right to review and disallow
13 any cost and or schedule impacts of such deficiency.” Cost between
14 those incurred through the Fourteenth VCM of approximately \$3.5 billion
15 were therefore deemed prudent. Costs incurred after the 14th VCM up to
16 the \$5.68 billion are challengeable, with the burden of proof on the party
17 challenging the cost. For costs above \$5.68, the burden to show prudence
18 is the Company’s responsibility.
19

20 **Q WITH THE CURRENT COMPANY CAPITAL COST FORECAST**
21 **TO COMPLETE BOTH UNITS AT \$7.3 BILLION, WHAT**
22 **AMOUNT MUST THE COMPANY SHOW TO BE PRUDENTLY**
23 **INCURRED?**

A. It is the difference between the \$7.3 billion current capital forecast and the \$5.68 billion which is \$1.62 billion. If costs exceed \$7.3 billion, the Company would also have the burden of proof on those additional costs.

VIII. RECOMMENDATIONS

Q. WHAT IS STAFF'S RECOMMENDATION WITH REGARD TO THE AMOUNT REQUESTED BY THE COMPANY TO BE VERIFIED AND APPROVED?

A. We recommend that the expenditures of \$1.248 billion incurred during the Twentieth and Twenty-First VCM periods 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-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 analyses, 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

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 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.