

Recommendations

1. The Company should be directed to submit a publicly available revised set of Commercial Operation Dates (“CODs”) for Units 3 and 4 that incorporates the construction schedule slippage that has occurred since the January 2016 Integrated Project Schedule (“IPS”) was filed.
2. The Company should be directed to file a mitigation strategy that supports the revised CODs for Units 3 and 4.
3. The Commission should expand the scope of its semi-annual Vogtle Construction Monitoring report to also verify the reasonableness of the Company’ commercial operation dates for both units and the total costs of all financing and capital and construction expenditures to include all amounts to be paid by ratepayers, including all taxes and other costs.
4. The Company should provide the Commission with an update on the financial situation for Toshiba and Westinghouse, and what the potential impacts could be for the completion of Units 3 and 4.
5. Alternatively, the Commission should order the immediate halt of construction for Vogtle Units 3 and 4 and initiate proceedings for the consideration of approval and construction of lower cost alternatives.

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Argument and Citation of Authority

I. The Contractor's Failure to Achieve the Project's Critical Milestones In Accordance With the January 2016 Integrated Project Schedule ("IPS") Further Undermines and Jeopardizes the 2019 and 2020 Completion Dates for the Nuclear Units

The Staff and Independent Monitor's warning of additional construction delays for the Project are sobering and blunt. "We conclude that the Company has not demonstrated to Staff that the current CODs have a reasonable chance of being met. It is our opinion that there exists a very strong likelihood of further delayed CODs for both Units." (Docket 29849, 15th VCM Direct Testimony of Roetger and Jacobs, p. 23; Tr.155) Once again, the PSC Staff and Independent Monitor clearly and directly make the case why the current acknowledged 39 month Project construction delay is unlikely to hold or be reduced because the Contractor failed to meet the Focus Milestone completion dates, other critical milestones were delayed and mitigation efforts were unsuccessful.¹

The Focus Milestone charts found at page 7 of the Roetger and Jacobs pre-filed testimony identify additional delays of up to nine months for Unit 3 and six months for Unit 4. (Tr.139) According to their testimony, "[t]he Focus Milestones were developed by the Contractor and agreed to be the Company in order to establish a set of critical construction activities with forecast completion dates that

¹ See Section IV for excerpts of previous testimony from the PSC Staff and Independent Monitor from the 6th to 15th semi-annual Vogtle Construction Monitoring reporting periods before the Georgia Public Service Commission in Docket 29849.

the Contractor would place extra emphasis on to prove to the Company that schedule adherence would be re-established.” (Tr.141) While it is possible that these construction time variances for the individual milestone activities may change, it is important to note that the focus milestone construction delays are in addition to the existing 39 month Project construction delay. (Tr. 141) If the Focus Milestone delays persist the total Project construction delay could increase from 39 months to 48 months or longer. In addition to the Focus Milestone delays Staff witnesses Roetger and Jacobs also identified several other critical milestone delays that could impact the Project’s schedule. (Tr.141)

A. The Commercial Operation Dates of June 2019 and June 2020 for Units 3 and 4 Respectively Are Impossible to Achieve and the Company Should Submit A Publicly Available Revised Set of Commercial Operation Dates That Incorporate the Construction Schedule Slippage That Has Occurred since the January 2016 Integrated Project Schedule (“IPS”) Was Filed

SACE reiterates its arguments made in the 14th VCM regarding the need to submit a revised set of Commercial Operation Dates (“CODs”) that is realistic and takes into account the construction schedule slippage that has occurred since January 2016. The CODs of June 2019 for Unit 3 and June 2020 for Unit 4 cannot be achieved due to excessive construction delays that have not been eliminated by mitigation. According to the Staff’s pre-filed testimony the lack of mitigation creates an “acute risk of future delays to the Project.” (Tr. 144) They then go on to

discuss how the addition of approximately 1,300 new craft personnel has not increased production because of the “lower productivity of the craft workforce.”

(p. 12)

The PSC Staff’s assessment of the Project’s construction production is almost a verbatim repetition of its previous testimony in the 14th VCM.² The PSC Staff’s 15th VCM pre-filed testimony stated, “[t]he Contractor will have to complete construction at much higher monthly rates than were achieved in 2016 in order to meet current CODs. For the Project to meet the current forecast CODs, the amount of construction work required to be completed each month increases in each subsequent month through September of 2017 to **a rate over three times the amount that has ever been achieved to date on this Project.**” (Emphasis supplied)(Tr. 146) In response to questions regarding the amount of actual construction completed the PSC Staff witnesses confirmed that the current annual construction completion rate was 9.2% for the Project, and it was unlikely that this completion rate could be tripled to achieve a 27% construction completion rate over the next 12 months. (Tr. 256) No reasonable person actually believes that the Project’s annual construction rate will increase from 9% to 27% and such a ridiculous assumption should not be tolerated or supported by the Commission.

² “The Contractor will have to complete construction at much higher monthly rates than were achieved in 2015 and the first five months of 2016 in order to meet current CODs. In order for the Project to meet the CODs the amount of construction work required to be completed each month increases in each subsequent month through September of 2017 to a rate three times the amount that has ever been achieved to date on this Project.” Docket 29849, 14th VCM Direct Testimony of Roetger and Jacobs, p. 13, 14th VCM Tr. 150.

Basing the Vogtle construction schedule on fantasy and unsupported speculation reduces everyone's confidence in the Contractor and the Owners. Rather than perpetuating farcical and unrealistic plans that eventually will be abandoned, the Company should develop a reasonable construction schedule that incorporates achievable CODs.

B. No Mitigation Schedule Has Been Submitted That Would Support the Current Commercial Operation Dates of June 2019 for Unit 3 and June 2020 for Unit 4

The current CODs should be abandoned immediately without a viable mitigation schedule. A mitigation schedule that artificially pins or constrains dates is not viable. A mitigation schedule that is vague is not viable. And a mitigation schedule that dramatically and unnaturally accelerates production schedules in a short time period - which has never happened yet on this project after more than seven years of construction - is not viable.

While the PSC Staff acknowledges that, “[t]he Contractor has developed a Construction Performance Improvement Plan, . . .” (Tr.148) they proceed to severely criticize the IPS Schedule P6 Level III for its fidelity and accuracy. (Tr. 149-152) In response to the question, “[i]s this the first VCM in which Staff has raised fidelity and accuracy issues with the Project’s IPS?” the Staff replied, “[n]o. Staff raised serious concerns in the Eighth VCM proceeding and in subsequent

proceedings. Staff has also raised this issue repeatedly with senior Company Project management.” (Tr. 150) The Staff raised concerns about the use of hard constraints or pinning applied to critical path activities, the fidelity of the schedule based on the results of an Acumen Fuse analysis and the management of the Project with Excel spreadsheets. (Tr. 150-151)

As a result of raising these concerns with Georgia Power Company a Defense Contract Management Agency (“DCMA”) 14-point assessment on the Vogtle Level III IPS was conducted. (Tr. 151) The DCMA is an “industry standard for determining the integrity, fidelity, and reasonableness of complex schedules to meet their completion dates as forecast.” (Tr. 151) The Vogtle Level III IPS scored a 44 for the February review and a 51 for the September review. The best score is 100. (Tr. 152) The PSC Staff witnesses testified that a score in the 80s is a “reasonable quality number” and a 30-point differential was considered a significant challenge for the contractor. (Tr. 264) The Vogtle Level III IPS’s exceptionally low DCMA score clearly demonstrates that any current mitigation efforts have been unsuccessful and only radical efforts can bring the DCMA score up to an acceptable level. In response to the question, “[w]hat does a DCMA score of fifty-one represent?” Messrs. Roetger and Jacobs stated, “[w]e conclude that the Vogtle Level III IPS does not accurately present the status of the Project and the results indicate that the Level III IPS lacks sufficient schedule integrity and

fidelity, and therefore may not represent a reasonable forecast of the CODs.” (Tr. 152)

1. The PSC Staff’s Current Evaluation of the Vogtle Mitigation Efforts Demonstrate No Improvement from Their Assessment of Mitigation Efforts in the 14th VCM Review

The PSC Staff’s prior testimony in the 14th VCM also reflects their very negative opinion regarding the success of past mitigation efforts and the likelihood that future mitigation might work. (Docket 29849, 14th VCM Direct Testimony of Roetger and Jacobs, pp. 19, 24 and 30; Tr. 156, 161 and 167) They stated, “[s]ince the beginning of construction on the Project to the present, **mitigation has been ineffective in eliminating delays and only recently slightly effective in reducing existing delays.** The Contractor’s assumption that future mitigation will have a positive impact on the IPS is not supported by its performance to date.” (Tr. 156) (Emphasis supplied) Westinghouse’s reaffirmation of the June 2019 and June 2020 for Units 3 and 4 respectively is a meaningless gesture unless they can provide a realistic and achievable mitigation schedule that supports these dates. So far they have not.

This is an exceptionally complex and challenging project, but that does not excuse Westinghouse or the Georgia Power Company from providing a reasonable mitigation schedule that supports the current CODs. Not producing a reasonable

mitigation schedule is counterproductive and intentionally deceptive. Knowingly affirming or supporting a mitigation schedule that is counterproductive and intentionally deceptive is fraudulent and clearly an imprudent act.

II. The Commission Should Expand Its Scope of Review Beyond Verifying Expenditures Over the Last Six Months

For the past fifteen Vogtle construction monitoring reviews the Commission has only addressed one issue: “Whether the Commission should verify and approve or disapprove the expenditures as made pursuant to the Certificate issued by the Commission.” Georgia Power admits that the Vogtle Project is 39-months behind schedule and the budget for its share of the Project has increased from \$6.113 billion to \$7.878 billion. (Docket 29849, Fifteenth Semi-annual Vogtle Construction Monitoring Report, Table 1.1, p. 6) If this were the third or fourth Vogtle construction monitoring review there might be an argument that there is no need to expand the scope of the Commission’s review and verification, but after fifteen Vogtle construction monitoring reviews there is no good argument for not expanding the Commission’s review to include critical issues that have come up in every single Vogtle semi-annual review, such as: the reasonableness of the Company’s commercial operation dates for both units; the total costs of all financing and capital and construction expenditures to include all

amounts to be paid by ratepayers and the total construction costs including any amount found to be prudent.

Ignoring any issue, other than just the expenditures for the past six months, at this point in the monitoring process is unjustified and counterproductive. The Company should not be allowed to pretend that June 2019 for Unit 3 and June 2020 for Unit 4 are plausible commercial operation dates without an effective mitigation strategy in place. According to the PSC Staff and the Independent Monitor there is no effective mitigation strategy. (Tr. 240-241) Additionally, the Commission should also know what ratepayers would have to pay for the Project, now and over the next 60 years. That is just a fair and commonsense requirement. Incomplete financial assessments artificially distort the Project's real revenue requirement for ratepayers. Additionally, total construction costs, including any amounts found to be prudent, should be verified and disclosed for every semi-annual review to ensure ratepayers have an accurate picture of their financial liability.

The Commission's Order Adopting Stipulations in Dockets 40161 and 40162 directed the Company to file annual status reports "regarding the investigation and development of the Combined Operating License ("COL") for the site in Stewart County." (Final Order, p. 12) Having current and accurate total construction costs for Units 3 and 4 is vital information necessary for the

Commission's proper review of the annual reports for the development of the Commercial Operating License for the Stewart County site.

At this advanced stage of the Vogtle Project with all of the information that has been presented regarding the important issues affecting construction it is fully justified and logical to expand the scope of the Commission's review beyond merely verifying expenditures for the VCM period. Not to do so is indefensible and reflects a total abdication of the Commission's duty and responsibility to provide adequate oversight of the Project.

A. The Company Should Provide the Commission With An Update On the Financial Status of Toshiba and Westinghouse And Affirm That No Additional Cost Increases Will Be Passed Along to Ratepayers

The recent volume of press coverage concerning Toshiba and Westinghouse's precarious financial position has been growing for the past couple of months. From utility industry newsletters to The Wall Street Journal³ the business and utility industry media have been writing about the financial challenges facing both companies, and Toshiba's decision to get out of the nuclear

³ E&E News, "Westinghouse scraps deal as parent company struggles," January 24, 2017; Reuters, "Toshiba to sell part of chip business, puts overseas nuclear ops under review," January 27, 2017; The Japan Times, "Toshiba to withdraw from nuclear plant construction, chairman to quit," February 1, 2017; The Atlanta Journal-Constitution, "Toshiba losing big on Plant Vogtle expansion," February 1, 2017; The Wall Street Journal, "Toshiba Shrinks Nuclear Ambitions," February 1, 2017; Atlanta Business Chronicle, "Toshiba to stop building nuclear reactors," February 1, 2017; World Nuclear Report, "Toshiba-Westinghouse: The End of New-build for the Largest Historic Nuclear Builder," February 2, 2017; E&E News, "Toshiba nuclear write-off spooks Southeast power companies," February 3, 2017

construction business and stop building any more new nuclear units. Regardless what the new EPC agreement contains regarding financial protection for Southern Company and its shareholders, Georgia Power Company should be directed to provide the Commission with a detailed analysis of the financial posture of both Toshiba and Westinghouse and an explanation how ratepayers are insulated from any cost overruns in the future arising from billions of dollars in losses suffered by the companies. Georgia Power's past declarations regarding ratepayer protections and liquidated damages provisions did nothing to protect ratepayers. The company waived or forfeited over \$250 million in liquidated damages they had repeatedly assured the Commission would be paid to mitigate any cost overruns. Any unsupported blanket assurances from the Company that ratepayers are protected from any additional costs associated with either Toshiba or Westinghouse's losses on the Vogtle Project are worth as much as the promises the Company made about ratepayers being protected from Project cost increases due to the liquidated damages clause contained in the former EPC: nothing.

III. The Construction of Any New Nuclear Units Is Clearly Uneconomic

According to Staff expert witness Hayet, the cost of building a combined-cycle natural gas turbine is approximately \$700 a kilowatt (Tr. 318) and the total cost of building and financing a 1,000 megawatt ("MW") combined-cycle natural gas generation plant is approximately \$1 billion. (Tr. 324) According to the PSC Staff testimony "the remaining cost to complete the [Vogtle] Project is \$3.057 billion," (Tr. 299) and there is absolutely no guarantee that the remaining cost to complete the Project will be fixed at \$3.057 billion. Based on the Project's history the \$3.057 billion figure is at best a temporary estimate that will change in the next VCM proceeding, and the real amount necessary to complete the Project is likely to be much higher than \$3.057 billion. For example, whether the actual cost to complete the Vogtle Project is \$3.057 billion or \$4 billion or \$5 billion, the construction of a 1,000 MW combined-cycle gas unit based on PSC Staff testimony can be done cheaper and faster than completing Units 3 and 4. (Tr. 319)

The Company has been allowed to completely ignore the current certified cost of the Project of \$6.113 billion and constantly update and increase its cost estimates based on lengthening construction delays so that fair and realistic cost comparisons to other alternatives are impossible. The Commission can take the appropriate steps to protect ratepayers from billions of dollars in additional construction and financing costs to complete Vogtle Units 3 and 4 by ordering an

immediate stop to construction and authorizing proceedings to consider the approval for the construction of lower cost alternatives. For instance, the Commission could evaluate the costs of a comparably sized combined-cycle gas generation unit and expand the Renewable Energy Development Initiative (“REDI”) program by a comparable amount in order to ensure that the gas plant is only dispatchable when solar and wind resources are not available. The only other alternative the Commission has to provide some level of financial protection to ratepayers is to reaffirm the original certified cost of the Project or set the certified cost at \$7.862 billion and not increase it any more.

IV. The Staff and Independent Monitor’s Opinions Regarding the Project Over Time

The Staff and Independent Monitor’s pre-filed direct testimony in the Vogtle Construction Monitoring reviews have a disturbing consistency to anyone who cares about the Vogtle Project and its impact on ratepayers. Their assessments and warnings have been ignored almost from the first Vogtle Construction Monitoring review until today. Below are selected excerpts from the various VCM direct testimonies filed by Steven D. Roetger and Dr. William R. Jacobs, Jr. that

highlight their persistent concerns and warnings regarding the Vogtle Project, which have all been proven accurate.⁴

15th VCM August 2016 – February 2017: Direct Testimony of Steven D. Roetger and William R. Jacobs, Jr.

“The Contractor, however, has failed to achieve the Project’s critical milestones in accordance with the January 2016 Integrated Project Schedule (“IPS”) which re-confirmed the June 2019 and June 2020 Commercial Operation Dates (“CODs”). A significant reason for not meeting the Project’s critical milestones was the *actual* construction completion during the Fifteenth VCM period was far below the *forecast* construction completion. This trend of not meeting construction forecast production continued through the post Fifteenth VCM period of July, 2016, to October, 2016, and since August production actually declined.” [p. 7]

“The risk of additional Project capital and financing costs due to additional schedule delays beyond the current forecasted delayed CODs remains a significant risk to increase Project cost as described in our previous VCM proceedings. As discussed above, the Project continued to incur substantial schedule delays, in particular on Unit 3, during the Fifteenth VCM period. In addition, the Project has incurred additional schedule delays during the July 2016 to October 2016 time period.” [p. 11]

“Since January the Project has increased its labor force by approximately 1,300 personnel. However, the addition of these craft personnel has not increased production. This is due to lower productivity of the craft workforce.” [p. 12]

“The Contractor will have to complete construction at much higher monthly rates than were achieved in 2016 in order to meet current CODs. For the Project to meet the current forecast CODs, the amount of construction work required to be completed each month increases in each subsequent month through September 2017 to a rate over three times the amount that has ever been achieved to date on this Project.” [p. 14]

⁴ Find testimonies with the VCM docket number 29849 at <http://www.psc.state.ga.us/factsv2/Docket.aspx?docketNumber=29849>.

“As of June 30, 2016 the forecast construction completion was 34.4% and the actual construction completion was 33.4% for a delta of -1%. As of September 30, 2016 the forecast earned was 39.3% and the actual earned was 35.9% for a delta of -3.4%. This increasing delta is consistent with the Construction Project Status chart shown above. The Contractor completed less work than planned in the most recent months and has fallen further behind schedule.” [p. 14]

“Q. Is this the first VCM in which Staff has raised fidelity and accuracy issues with the Project’s IPS?

A. No. Staff raised serious concerns in the Eighth VCM proceeding and in subsequent proceedings. Staff has also raised this issue repeatedly with senior Company Project management.” [p. 18]

“Q. What does a DCMA [Defense Contract Management Agency] score of fifty-one represent?

A. The score means that the integrity and fidelity of the Vogtle Level III IPS is suspect. As stated above, Company scheduling personnel and Westinghouse management have concurred with this assessment. We conclude that the Vogtle Level III IPS does not accurately present the status of the Project and the results indicate that the Level III IPS lacks sufficient schedule integrity and fidelity, and therefore may not represent a reasonable forecast of the CODs.” [p. 20]

“The current Project schedule remains extremely challenging.” [p. 22]

“The Contractor’s performance will need a dramatic improvement to complete construction of Unit 3 in the next 19 months. It is becoming unrealistic to expect this level of improved performance in the relatively short time period remaining on the current schedule.” [p. 22]

“Our opinion has not changed from the opinion expressed in the 14th VCM except perhaps that we are less optimistic and view the schedule as more challenging than we did six months ago/ due to lack of construction progress made since our prior testimony. We conclude that the Company has not demonstrated to Staff that the current CODs have a reasonable chance of being met. It is our opinion that there exists a very strong likelihood of further delayed CODs for both Units.” [pp. 22-23]

14th VCM February – August 2016: Direct Testimony of Steven D. Roetger and William R. Jacobs, Jr.

“The Contractor, however, has failed to achieve the critical project milestones in accordance with the January 2015 Integrated Project Schedule (“IPS”) which established the June 2019 and June 2020 Commercial Operation Dates (“CODs”). Furthermore, since January 2016, milestones have continued to slip. The production level assumed in the January 2015 IPS for the 14th VCM period was not achieved. Also, the forecasted production for the months January 2016 through May 2016 have not been achieved.” [p. 7]

“As of the end of the 14th VCM period, December 31, 2015, many Unit 3 critical path milestones and some Unit 4 milestones continue to show significant negative variance in comparison to the dates established by the Contractor in the January 2015 IPS which supports the COD dates of June 2019 and June 2020. Key Unit 3 critical path activity variances from the January 2015 IPS to the January 2016 IPS include 302 day slippage to reaching Elevation 100’ (south) on the east side of the Shield Building and 172 day slippage of installing Course 7 Shield Building panels at Elevation 149’6”.” [p. 8]

“Some Unit 4 critical milestones show significant negative variance in comparison to the dates established by the Contractor in the January 2015 IPS which supports the COD date of June 2020. Key Unit 4 critical milestones variances from the January 2015 IPS to the January 2016 IPS include installing CA20 in the nuclear island which is forecast 228 days delayed; installing CA01 which is forecast 152 days delayed; and installing CA03 which is forecast 337 days delayed.” [p. 8]

“The risk of additional Project capital and financing costs due to additional schedule delays beyond the current forecasted delayed CODs remains a significant risk to increase Project cost as described in our testimony in the 13th VCM proceeding. As discussed above, the Project continue to incur substantial schedule delays during the 14th VCM period. In addition, the Project has incurred additional schedule delays during the January 2016 to May 2016 period.” [p. 11]

“For the six-month period July 2015 through December 2015, Construction percent complete increased 4.0 percent and the total plant percent complete increased 2.2 percent. For the 14th VCM period, the Contractor achieved a Construction percent complete average of .67% per month compare to the 5 month period/ ending June 30, 2015 (the 13th VCM period for which this data was available to Staff) achieved a Construction percent complete average of .54%.” [pp. 12-13]

“The Contractor will have to complete construction at much higher monthly rates than were achieved in 2015 and the first five months of 2016 in order to meet current CODs. In order for the Project to meet the CODs the amount of construction work required to be completed each month increases in each subsequent month through September 2017 to a rate three times the amount that has ever been achieved to date on this Project.” [p. 13]

“The Contractor has used several techniques to maintain the Project CODs shown in the Integrated Project Schedules while critical path milestones continue to slip. One technique is to ‘pin’ or constrain key project milestones so that these milestones and associated downstream activities do not move out further in the schedule and do not reflect or take into account the longer duration of the proceeding activities.” [p. 18]

“Since the beginning of construction on the Project to the present, mitigation has been ineffective in eliminating delays and only recently slightly effective in reducing existing delays. The Contractor’s assumption that future mitigation will have a positive impact on the IPS is not supported by its performance to date.” [p. 19]

“The start of Course 7 Shield Building panels is 172 days delayed when comparing the January 2015 IPS to the January 2016 IPS.” [p. 20]

“As seen from the continued delays discussed above, the mitigation strategies employed to date have generally been ineffective in maintaining the Project schedule. A primary mitigation technique discussed by the Company is to utilize increased craft personnel and additional shifts to increase production. This approach has not been effective in maintaining critical milestones because the Contractor has been unable to increase the staffing levels of skilled craft workers to the level needed.” [p. 24]

“Q. Is there a particular series of activities that give Staff reason for concern?
A. Yes, the Inside Containment equipment installation appears extremely optimistic.” [pp. 25-26]

“Lastly, inside containment work will require multiple craft (rebar, concrete, electricity, welders, HVAC, pipe fitters, etc), quality assurance, field engineering, and other oversight workers to have access to the same extremely congested space

and will need to accomplish their scopes of work under strict scheduling requirements.” [p. 27]

“Other significant schedule challenges include:

- Construction completion per month must increase by a factor of three to over 3 percent per month. To date the Contractor has not exceeded one percent per month.” [p. 30]

“Q. Please summarize your evaluation of the Project schedule.

A. The current Project schedule is extremely challenging. The Contractor must successfully implement as yet unproven mitigation strategies to recover current delays and also complete critical construction sequences in significantly less time than originally planned due to compression of the Project schedule. Until now the Contractor has taken significantly longer than planned to complete scheduled activities.” [p. 32]

“Q. Based on the available information, what do you conclude regarding the achievability of the forecast commercial operation dates?

A. We conclude that the Company has not demonstrated to Staff that the current CODs have a reasonable chance of being met. It is our opinion that there exists a strong likelihood of further delayed operation dates for both Units.” [p. 33]

“Q. Does inside containment equipment installation and testing present unique risks that can ultimately delay the production of electricity from Unit 3?

A. It is our opinion that due to the factors stated above, the schedule for inside containment work will be severely challenged.” [p. 33]

13th VCM August 2015 – February 2016: Direct Testimony of Steven D. Roetger and William R. Jacobs, Jr.

“...the Contractor has failed to achieve the necessary schedule progress in critical path areas during the 13th VCM period required to support the CODs of June 2019 for Unit 3 and June 2020 for Unit 4.” [p. 7]

“The Company explained that the Contractor is developing ‘mitigation strategies’ to recover the slippage of the pinned activities. As of the end of October 2015, it is

the Staff's understanding that the Contractor is still developing these mitigation strategies." [p. 9]

"The risk of additional Project capital and financing costs due to additional schedule delays beyond the current forecasted delayed CODs remains a significant risk to increase Project cost." [p. 15]

"A total of eleven activity dates are pinned; nine on Unit 3 and two on Unit 4." [p. 24]

"As discussed above, the Contractor has had limited, if any, success in mitigating schedule delays. While mitigation may be effective in maintaining the current delays or reducing them to some degree, based on past performance we believe that it is unlikely that the Contractor will be able to develop and implement mitigation strategies that will prevent the current existing delays from impacting the current completion dates for Units 3 and 4 of June 2019 and 2020, respectively." [p. 30]

"Q. Does this remind you of the prior situation concerning the IPS during the 11th and 12th VCM?

A. Yes it does. . . . We believe we are in a similar situation today in which the Contractor is relying on unknown and untried mitigations [sp] strategies to maintain the Project schedule." [p. 30]

"Q. Do you have any other concerns related to the Project schedule?

A. Yes, we are concerned with the overall lack of schedule adherence experienced on the Project. From delivery of critical sub-modules to placement of concrete in the Nuclear Island, many activities continue to slip week after week. This is demonstrated by the number of milestones that have not been achieved as planned." [p. 32]

"Rework has been a significant source of Project delay for many years." [p. 33]

12th VCM February – August 2015: Direct Testimony of Steven D. Roetger and William R. Jacobs, Jr.

"The Project is under budget because the Consortium has not completed the milestones necessary to receive milestone payments as projected." [p. 7]

“Q. What future risks could result in additional cost to the Project?

A. The risks identified in our testimony in the 9th/10th and 11th VCMs still exist, and include additional schedule delays beyond the current forecasted delayed CODs; . . .” [p. 9]

“... the Consortium has failed to achieve the necessary schedule progress in critical path areas during the 12th VCM period and in prior VCM periods required to / support the CODs of fourth quarter 2017 for Unit 3 and fourth quarter 2018 for Unit 4 which were the CODs during the period of this review.” [pp. 9-10]

“... the Consortium has completed only a small percent of Construction in the three year period since the NRC issued the Combined Operating License (“COL”) for the Project.” [p. 10]

“With the exception of a few regulations such [sp]Fitness-For-Duty and Cyber-Security, the Company knew its obligations under NRC laws, regulations, an applicable codes when it proposed its cost and schedule for building Units 3 and 4 at certification.” [p. 16]

“Q. What quality of care does Staff expect from the Company and its Contractors?

A. . . . the standard of care expected from a reasonable person is higher when the risks to ratepayers are commensurately higher.” [p. 16]

“We believe that little to no margin or float, is embedded in the January 2015 IPS. Consequently, Staff and the CM believe that there exists significant schedule delay risk in the current IPS.” [p. 20]

“However, the Company has stated that the January 2015 IPS is achievable (Transcript 6/2/15 p. 120 line 3) and that they will hold the Consortium accountable to the June 2019 and June 2020 COD dates. (Transcript 6/2/15 p. 81 line 24; p. 82 line 7) [p. 21]

The variance on the Shield Building Roof between the January 2014 IPS and the January 2015 IPS is +684 days. [p. 23]

The additional schedule slippage for the Shield Building Roof since the issuance of the January 2015 IPS is an additional variance of +71 days. [p. 25]

“Finally, additional schedule risks include the ability of the Consortium to install smaller piping inside containment, install electrical cable, cable tray and conduit and install instrumentation and associated wiring in the time allotted on the IPS.” [p. 29]

“Another potential source of schedule delay is the requirement to complete and obtain NRC approval of 874 ITAAC prior to fuel load.” [p. 30]

11th VCM August 2014 – February 2015: Direct Testimony of Steven D. Roetger and William R. Jacobs, Jr.

“The Consortium’s September 2014 Integrated Project Schedule (“IPS”) terminates at December 31, 2015. Therefore, a complete IPS through the Commercial Operation Date (“COD”) of each unit has not been provided to Staff. Of particular concern to the Staff is that in the present VCM, the Company has not reaffirmed the forecast CODs provided in the Ninth/Tenth VCM of late 2017 for Unit 3 and late 2018 for Unit 4 or provided revised CODs for the Project . . .” [p. 7]

“Beyond 2015, it is our understanding the Consortium has recognized that significant mitigation efforts will be required to maintain the current CODs.” [p. 8]

“Q. To date has the Staff been provided with a complete IPS that includes the mitigation activities needed to maintain the latest forecast CODs?

A. No, . . .” [p. 9]

“More plainly, the Project is under budget because the Consortium has not completed the milestones necessary to receive the milestone payments as anticipated in the Company’s current budget.” [p. 10]

“The costs resulting from additional schedule delay include increased capital cost, financing cost, and the replacement fuel cost.” [p. 12]

“The NI [Nuclear Island] encompasses the vast majority of the risks associated with nuclear design, procurement, and construction.” [p. 16]

“Various Stop work orders are in effect at the Lake Charles Facility, Oregon Iron Works, and SMCI. IHI and Toshiba fabrication of Unit 4 CA01 sub-modules has been slowed due to Westinghouse design changes.” [p. 20]

“Given the schedule deficiencies articulated above, do you consider the IPS at that time unreliable for Project use? For intermediate and long-term planning yes.” [p. 21]

“Q. Is a fully integrated project schedule important for this Project?

A. Yes. Given that this project is the first nuclear construction in nearly 30 years, that this project uses many first of a kind construction techniques, that the licensing process 10 CFR Part 52 has never been used, and that the passive safety system design is also first of a kind, it is imperative that the Company obtains a complete IPS.” [p. 23]

“Q. Does Staff and the CM [Construction Monitor] believe it to be reasonable and prudent to manage this complex build without an effective IPS for 24 months?

A. No. In fact it runs counter to any prudent project management, nuclear or otherwise, the Engineering, Procurement, and Construction Agreement requirements, and the nuclear industry’s own self-funded INPO Principles for Excellence in Nuclear Project Construction.” [p. 24]

“Q. During certification Docket 27800 did Company witness Day testify to the Company’s actions with regard to the Project IPS?

A. Yes. Witness Day testified ‘I think it’s very imperative on the company and Georgia Power will utilize Southern Nuclear as well as my engineering and construction organization to ensure that we have people on site day to day, week to week, month to month, that are watching the processes, **watching the schedules, getting advanced schedules for us to look and see if they’re appropriate and we’re going to hold the consortium accountable for those schedules (emphasis added)** and methods and processes . . .’ (Tr. P1681-1682)” [pp. 26-27]

“To date, has the Consortium compressed any nuclear island related activity durations? No. In fact the duration of NI related activities have continued to expand.” [p. 30]

“Q. What is Staff and the CM’s opinion with regard to the achievability of the current forecast COD dates?

A. The Staff and the CM believe that the CODs will be further delayed.” [p. 32]

“To be clear, Staff and the CM believe the Units will be delayed beyond current forecast CODs of December 2017 and 2018; however, we make no opinion regarding when the Units could be commercially available.” [p. 33]

9th and 10th VCM February – August 2014: Direct Testimony of Steven D. Roetger and William R. Jacobs, Jr.

“...the Company states that the forecasted Commercial Operation Dates (“COD”) for Unit 3 and Unit 4 of December 2017 and December 2018 are unchanged from the 8th VCM report and remain 21 months beyond the CODs at certification.” [p. 7]

“More plainly, the Project is under budget because the Consortium has not completed the milestones necessary to receive milestone payments as anticipated in the Company’s current budget.” [p. 8]

“Q. Was Staff provided a full IPS through the COD dates of the units by the company at the beginning of 2013?

A. No. From December 2012 through April 2013 neither the Staff nor the CM received an IPS from the Company.” [p. 12]

“The Consortium committed to providing the complete Engineering Completion Schedule to the Company by March 31, 2014. However, this effort is taking longer than expected.” [p. 14]

“The Company stated that when the activities described above were incorporated into the IPS it was apparent that significant schedule mitigation was necessary to hold the COD dates and that the Consortium was developing mitigation plans prior to making a full schedule available.” [p. 15]

“Q. What are the Staff’s and the CM’s primary concerns with the April 2014 IPS?

A. First, it was not issued as complete. At this time Staff and the CM have no indication as to the extent of mitigation needed after 2015 to maintain the CODs of late 2017 and late 2018. Second, the schedule portion that was submitted already contains mitigation of some of those activities up to December 2015. With mitigation strategies unknown and untested it is difficult for the Staff and the CM to assess the reasonableness of the CODs.” [p. 17]

“However, as experience has shown, it is far from certain that mitigation will be successful or even partially successful.” [p. 21]

“Therefore, to assume that the duration for site erection of the Shield Building can be significantly compressed appears to be unsupportable and speculative given the Consortium’s history of delays in fabrication and assembly of sub-modules to full modules, and the Shield Building’s first of a kind design.” [p. 24]

“Q. What is the schedule risk posed by the digital instrumentation and control (“I&C”) design of the AP1000?

A. No nuclear plant operating in the United States today uses a fully digital control system. Design of the AP1000 digital control system is also a First of a Kind activity.” [p. 24]

“Activities related to the nuclear island have taken longer than initially planned, not shorter.” [p. 26]

“Q. With regard to opening up work fronts which entity is responsible for the final quality of that work?

A. As the licensee, Southern Nuclear Company (“SNC”) is ultimately responsible for all work quality that is safety related and placed in the Units regardless of who performs that work or who is responsible under the EPC Agreement.” [p. 27]

8th VCM February – October 2013: Direct Testimony of Steven D. Roetger and William R. Jacobs, Jr.

“Please describe the design issues with the NI rebar that resulted in an approximate ten month delay in FNC in more detail. The delay in FNC was the result of several design deficiencies in the Certified for Construction (“CFC”) drawings for installation of NI rebar. These deficiencies included a failure of a specific CFC drawing to adhere to the approved Licensing Basis, code violations, and the application of an incorrect code to support the Licensing Basis.” [p. 6]

“Q. Who does the NRC hold responsible for ensuring that the design complies with the licensing basis?

A. Southern Nuclear Operating Corporation (“SNC”), as the COL Licensee for the Project, acts as agent for the Co-owners and as such, bears

ultimate responsibility for meeting the requirements of the Atomic Energy Act of 1954 and NRC regulations.” [pp. 7-8]

“The primary cause for the installation of this deficient rebar was poor vendor oversight, in the form of source inspections and poor receipt inspections by the Consortium. It also indicates that SNC did not provide sufficient oversight of these critical Consortium requirements.” [p. 9]

“Q. What is the current schedule for the Project?

A. The Company’s current Project schedule indicates the Commercial Operation Date (“COD”) for Unit 3 will occur in the fourth quarter of 2017 and Unit 4 COD will occur one year later in the fourth quarter of 2018.” [pp. 10-11]

“To date, the Consortium has not demonstrated the ability to fabricate high quality CA20 sub-modules at its Lake Charles, Louisiana facility that meet the design requirements at a rate necessary to support the Project schedule.” [p. 12]

“More plainly, the Project is under budget because the Consortium has not completed the milestones necessary to receive milestone payments as anticipated in the EPC Agreement.” [p. 13]

“Q. Are there other risks that could result in additional cost increases in the future?

A. . . . These cost drivers include additional capital costs due to schedule delay, additional financing costs due to schedule delay, costs resulting from a settlement of the ongoing litigation with the Consortium and cost resulting from current and future change notices received from the Consortium.” [p. 14]

“While the current schedule properly includes known delays that have been incurred to date, there are additional risks that could delay the CODs beyond those shown in this schedule. These risks include:

- The ability of the Consortium to fabricate and assemble the critical structural modules including CA20 and CA01;
- The ability of the Consortium to fabricate the required panels and construct the Shield Building;
- The ability of the Consortium to complete and test the Plant Reference Simulator as needed to support operator licensing;

- The ability of the Consortium to design, install and test the digital instrument and control system utilized by the AP1000 design;
- The ability of the Company and Consortium to complete and submit 875 ITAAC per unit in a timely manner that supports the Project schedule.” [p. 17]

“Several of the CA20 sub-modules will require rework at the Vogtle site. The Company has issued a Stop Work Order (“SWO”) prohibiting shipment of sub-modules from Lake Charles to the Vogtle site.” [p. 18]

“Q. Could the delay in the commercial operation dates be longer than 19 to 21 months?

A. Yes. Many of the upcoming activities on the Project are first-of-a-kind and technical very challenging.” [p. 20]

7th VCM August 2012 – February 2013: Direct Testimony of William R. Jacobs, Jr

“Q. What is the current schedule for the Project?

A. That question is difficult to answer because at this time there is no Integrated Project Schedule (“IPS”) that all parties agree with and support. Per the EPC Agreement, the Guaranteed Substantial Completion Date (“GSCD”) for Unit 3 is April 1, 2016 and April 1, 2017 for Unit 4. These are the certified Commercial Operation Dates (“COD”).” [p. 6]

“I do not consider the November 2016 date [Unit 3 COD] to be reasonable and achievable.” [p. 7]

“Q. Can the Vogtle Project be properly managed using a six-month look ahead schedule?

A. No. It is not prudent to manage a project of the size and complexity of the Vogtle 3 and 4 Project without a fully integrated Project Schedule that is accepted by all parties.” [pp. 7-8]

“The cost of a one year delay in the Project is in the range of hundreds of millions of dollars.” [p. 11]

“However, a key critical path activity, placement of the nuclear island foundation, an activity called First Nuclear Concrete (“FNC”) has been delayed many times from the original scheduled date of October 2011.” [p. 12]

“Module assembly activities were halted in August 2012 due to a lack of delivery of sub-modules to the site and have not yet resumed.” [p. 13]

“While the Consortium has made good progress in the design and construction of some non-safety related structures such as the turbine building and cooling towers, I would characterize the performance of the Consortium to date in certain key safety-related activities that are on the critical path as unsatisfactory.” [p. 13]

“My characterization of Consortium performance as unsatisfactory is supported by my review of the Consortium’s performance of key critical path activities including placement of First Nuclear Concrete, fabrication of sub-modules and assembly of structural modules, development of the detailed plant design in a timely manner that meets the licensing basis and conduct of critical QA source inspections of safety related material.” [p. 14]

“Rebar installation began shortly after the COL was issued and was progressing well until March, 2012 when an NRC inspector found that the rebar being installed did not match the rebar design shown in the DCD. It is disconcerting that the rebar deficiency was found by an NRC inspector.” [p. 14]

“The Consortium’s inability to design, fabricate and assemble structural modules to meet the Project schedule is another example of unsatisfactory Consortium performance that I would characterize as even worse than their FNC performance.” [p. 16]

“When fabrication of some sub-modules was completed, the required quality assurance paperwork was of such poor quality that the completed sub-modules could not be shipped. Quality Assurance (QA) paperwork problems included lost paperwork, missing signatures, and illegible notes. On some occasions, resolution of the quality assurance paperwork issues took longer than fabrication of the sub-modules. One extreme example is sub-module [REDACTED], a critical corner sub-module needed for the assembly of CA20. Fabrication of [REDACTED] was completed in April 2012 but as of this writing [December 2012], this sub-module has not yet been shipped to the Vogtle site due to paperwork deficiencies.” [p. 17]

“Consortium performance has been unsatisfactory in the timely development of CFC [Certified for Construction] packages and in ensuring that the CFC packages

conform to the licensing basis as shown in the approved DCD [Design Control Document].” [p. 18]

“The Consortium’s failure to ensure that the plant design conforms to the licensing basis is a significant performance failure by the Consortium.” [p. 19]

“Since assembly and installation of the structural modules are key critical path activities, an IPS [Integrated Project Schedule] without these activities has no real meaning.” [p. 22]

“The last forecast that the Company provided for CA20 “ready to set” is December 2013, some 22 months after the required set date of February 2012 needed to support the Unit 3 GSCD of April 1, 2012. This forecast was provided in the September 10, 2012 Weekly Metrics report.” [p. 24]

“I believe that the Project is currently at least 14 months late based solely on the delay in FNC.” [p. 25]

“Q. Could the delay in the commercial operation dates be significantly longer than 14 months?

A. Yes.” [p. 25]

“Q. Do you believe that significant schedule compression can be accomplished to recover some of these delays?

A. No I do not.” [p. 26]

6th VCM February – August 2012: Direct Testimony of William R. Jacobs, Jr.

“On February 10, 2012, the Project received the Combined Licenses (“COLs”) for Units 3 and 4. Receipt of the COLs allowed safety related construction at the site to proceed.” [p. 6]

“As described in more detail later in this testimony, the EPC Guaranteed Substantial Completion Dates (“GSCD”) of April 1, 2016 for Unit 3 and April 1, 2017 for Unit 4 are no longer achievable. The Consortium’s most recent monthly status report forecasts the Commercial Operation date (“COD”) of Unit 3 on November 13, 2016, approximately 7.5 months later than the GSCD of April 1, 2016 and Unit 4 COD on November 13, 2017.” [p. 6]

“Finally, many of the issues and concerns that were identified and discussed in the Second, Third, Fourth and Fifth Semi-annual VCM proceedings have not been resolved at this time. These issues include:

- Fabrication of modules and sub-modules at the SMS facility as required to meet the Project schedule;
- Production of Vogtle-specific Certified For Construction (“CFC”) design packages as required to meet the Project schedule.”

[p. 7]

“I believe that the Project schedule status is unclear because a reasonable, achievable Integrated Project Schedule (“IPS”) that all parties agree to and support does not exist at this time. Development of a reasonable, achievable IPS is one of the goals of the current negotiations between the Company and the Consortium.”

[p. 10]

“Given the schedule expansion the Project has experienced to date, schedule compression may not be realistic or economic.” [p. 11]

“Q. Has the Company acknowledged that the GSCDs of April 1, 2016 for Unit 3 and April 1, 2017 for Unit 4 are no longer achievable?

A. Yes.” [p. 13]

“As in past reports, EPC capital expenditures continue to be under budget primarily due to the failure of the Consortium to achieve certain milestones in accordance with the Project milestone schedule.” [p. 15]

“Q. Does the Company continue to face significant challenges in maintaining the budget forecast at or below the certified amount?

A. Yes, as I discussed in my testimony in the 3rd, 4th and 5th VCM proceedings, the Company continues to face significant challenges in maintaining the Project forecast at or below the certified amount.” [p. 15]

“However, many potential change notices have not been resolved and the current negotiations with the Consortium will not resolve all of the outstanding potential change orders that have been submitted.” [p. 17]

“Until the commercial issues impacting prospective Project activities are resolved, it will be difficult for the Company and Consortium to agree upon and fully support an Integrated Project Schedule. The cause for Project delays, the

responsibility for the delays, the cost of the delays and the cost for recovering some of these delays must be resolved before all parties can agree on a schedule.” [p. 17]

“A first of a kind project of this magnitude and complexity cannot be effectively or efficiently managed using 60 to 90 day forecasts over the long term.” [p. 18]

“Q. In your opinion, can the Vogtle 3 and 4 Project be completed for the currently certified cost and schedule?

A. No. In my opinion, the Company will need to request an increase in the certified cost and a change in the certified schedule to a later completion date.” [p. 18]

“Since the last VCM proceeding, the Consortium has implemented many changes in the design, fabrication and quality control processes at the SMS [Shaw Modular Solutions] facility. However, these changes have not resulted in a meaningful increase in delivery of modules to the Vogtle Project site.” [p. 19]

“Fabrication of these modules and submodules is a very significant task and critical to the success of the Project. SMS has not yet demonstrated the ability to meet the required production rate of high quality modules needed to support the Project schedule.” [p. 19]

V. Conclusion and Recommendations

Based on the foregoing facts and arguments the Southern Alliance for Clean Energy requests that the Commission direct that the following actions be taken in its 15th VCM Order:

1. The Company will submit a publicly available revised set of commercial operation dates for Units 3 and 4 that incorporates the construction schedule slippage that has occurred since the January 2016 integrated project schedule was filed.

2. The Company will file a mitigation strategy that supports the revised commercial operation dates.
3. The Commission will expand the scope of its semi-annual Vogtle construction monitoring report to also verify the reasonableness of the Company's commercial operation dates for both units, the total costs of all financing and capital and construction expenditures to include all amounts to be paid by ratepayers, including all taxes and other costs.
4. The Company will provide the Commission with an update on the financial status of Toshiba and Westinghouse and affirm that no additional cost increases will be passed along to ratepayers.
5. Or alternatively, the Commission will order an immediate halt to construction of Vogtle Units 3 and 4 and initiate proceedings for the consideration of approval and construction of lower cost alternatives.

Respectfully submitted this 13th day of February, 2017.



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CERTIFICATE OF SERVICE

I hereby certify that the foregoing **Brief of the Southern Alliance for Clean Energy** for the 15th VCM was filed in Docket 29849 with the Georgia Public Service Commission's Executive Secretary by hand delivery. An electronic copy of same was served upon all parties listed below by electronic mail, unless otherwise indicated, and addressed as follows:

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This 13th day of February, 2017.



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