ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 1 of 126

SURREBUTTAL TESTIMONY

OF

DR. KENNETH PETRUNIK

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2017-305-E

DOCKET NO. 2017-207-E

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND POSITION.

A. My name is Dr. Kenneth "Ken" Petrunik. My business address is 2183 Shawanaga Trail, Mississauga, Ontario. I am a consultant in the nuclear power industry with a range of international clients and currently am a non-executive board member of Horizon Nuclear Power in the U.K.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCE.

A. I grew up in Sault Ste. Marie, Ontario, and have a Ph.D. in Chemical Engineering from the University of Windsor in Canada. I have worked in the nuclear power industry since completing my Ph.D. in 1973 and have nearly 45 years of experience in nuclear power and nuclear power plant construction. From 2009 to 2014, I served as Chief Program Officer for Emirates Nuclear Energy Corporation (ENEC) and led oversight of Korea Electric Power Corporation's construction and delivery of four APR 1400

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 2 of 126

1 nuclear power plants built in the United Arab Emirates. Prior to that,
2 beginning in 1974, I worked for Atomic Energy of Canada, Limited
3 (AECL) in a variety of positions and ultimately served as Chief Operating
4 Officer and also President of the CANDU Reactor Division. In that role, I
5 was responsible for AECL's commercial CANDU nuclear reactor business
6 including marketing and delivery of new-build nuclear reactors and services
7 to nuclear operating stations. During my time with CANDU Reactor
8 Division, I began as a design engineer and before becoming COO and
9 President of AECL CANDU. I worked on all of AECL's CANDU new
10 build projects namely Darlington, Bruce, Pickering, Lepreau and Gentilly
11 in Canada and internationally Embalse, Argentina; Cernavoda, Romania;
12 Wolsong, Korea; and Qinshan, China. As COO and President of AECL
13 CANDU, I was ultimately responsible for the overall commercial business
14 of the enterprise.

15 **Q. DESCRIBE ANY ADDITIONAL PROFESSIONAL**
16 **CERTIFICATIONS OR DISTINCTIONS YOU POSSESS THAT**
17 **SUPPORT YOUR TESTIMONY.**

18 A. Before leaving Canada in 2009, I was a Registered Professional
19 Engineer in the Province of Ontario, Canada and a Fellow of the Canadian
20 Academy of Engineering, a group of Canadian engineers and related
21 professionals elected based on their distinguished service and contribution
22 to society, to Canada and to the engineering profession. I was also a

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 3 of 126

1 member of the Canadian Nuclear Society and the Canadian Nuclear
2 Association where I received a leadership award from the Canadian
3 Nuclear Association for the successful completion of the Qinshan Nuclear
4 Power Plant in China. In addition, I received the K. Y. Lo medal from the
5 Engineering Institute of Canada for contributions to international
6 engineering and the Friendship Award from the Chinese government for
7 technical support to China. The Friendship Award is the highest award
8 given by the Chinese government to a foreign expert.

9 **Q. HAVE YOU EVER TESTIFIED BEFORE THE PUBLIC SERVICE**
10 **COMMISSION OF SOUTH CAROLINA ("COMMISSION")**
11 **BEFORE?**

12 A. Yes, I have filed testimony in these dockets. I also submitted pre-filed
13 rebuttal testimony in Docket No. 2017-370-E which has been consolidated for
14 purposes with these dockets. Because this testimony addressed many of the issues
15 raised here, that pre-filed testimony is attached as Exhibit__(KP-1) to this
16 testimony and incorporated by reference into my pre-filed rebuttal testimony in
17 these dockets.

18 **Q. WERE THERE EXHIBITS ATTACHED TO YOUR PRE-FILED**
19 **REBUTTAL TESTIOMY IN DOCKET NUMBER 2017-370-E?**

20 Yes, and they are included herein and attached to Exhibit__(KP-1).

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

22 A. Yes.

Exhibit__(KP-1) to Surrebuttal Testimony

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 4 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 5 of 126

REBUTTAL TESTIMONY

OF

DR. KENNETH PETRUNIK

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2017-370-E

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND POSITION.

A. My name is Dr. Kenneth "Ken" Petrunik. My business address is 2183 Shawanaga Trail, Mississauga, Ontario. I am a consultant in the nuclear power industry with a range of international clients and currently am a non-executive board member of Horizon Nuclear Power in the U.K.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCE.

A. I grew up in Sault Ste. Marie, Ontario, and have a Ph.D. in Chemical Engineering from the University of Windsor in Canada. I have worked in the nuclear power industry since completing my Ph.D. in 1973 and have nearly 45 years of experience in nuclear power and nuclear power plant construction. From 2009 to 2014, I served as Chief Program Officer for Emirates Nuclear Energy Corporation (ENEC) and led oversight of Korea Electric Power Corporation's construction and delivery of four APR 1400 nuclear power plants built in the United Arab Emirates. Prior to that,

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 6 of 126

1 beginning in 1974, I worked for Atomic Energy of Canada, Limited
2 (AECL) in a variety of positions and ultimately served as Chief Operating
3 Officer and also President of the CANDU Reactor Division. In that role, I
4 was responsible for AECL's commercial CANDU nuclear reactor business
5 including marketing and delivery of new-build nuclear reactors and services
6 to nuclear operating stations. During my time with CANDU Reactor
7 Division, I began as a design engineer and before becoming COO and
8 President of AECL CANDU. I worked on all of AECL's CANDU new
9 build projects namely Darlington, Bruce, Pickering, Lepreau and Gentilly
10 in Canada and internationally Embalse, Argentina; Cernavoda, Romania;
11 Wolsong, Korea; and Qinshan, China. As COO and President of AECL
12 CANDU, I was ultimately responsible for the overall commercial business
13 of the enterprise.

14 **Q. DESCRIBE ANY ADDITIONAL PROFESSIONAL**
15 **CERTIFICATIONS OR DISTINCTIONS YOU POSSESS THAT**
16 **SUPPORT YOUR TESTIMONY.**

17 A. Before leaving Canada in 2009, I was a Registered Professional
18 Engineer in the Province of Ontario, Canada and a Fellow of the Canadian
19 Academy of Engineering, a group of Canadian engineers and related
20 professionals elected based on their distinguished service and contribution
21 to society, to Canada and to the engineering profession. I was also a
22 member of the Canadian Nuclear Society and the Canadian Nuclear

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 7 of 126

Association where I received a leadership award from the Canadian Nuclear Association for the successful completion of the Qinshan Nuclear Power Plant in China. In addition, I received the K. Y. Lo medal from the Engineering Institute of Canada for contributions to international engineering and the Friendship Award from the Chinese government for technical support to China. The Friendship Award is the highest award given by the Chinese government to a foreign expert.

Q. HAVE YOU EVER TESTIFIED BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA ("COMMISSION") BEFORE?

A. Yes, I have filed testimony in Docket Nos. 2017-207-E and 2017-305-E (my "Prior Testimony") before the Public Service Commission of South Carolina (the "Commission").

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The primary purpose of my testimony is to address the direct testimony of Gary C. Jones, Scott J. Rubin and Anthony James. I will also provide the Commission with my conclusions regarding the prudency of SCE&G's oversight of the construction of the Summer Nuclear Units 2 and 3 (the "Units") located in Jenkinsville, South Carolina (the "Project") and the sufficiency of SCE&G's many disclosures to the Office of Regulatory Staff (ORS) and the Commission.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 8 of 126

1 **Q. WHAT INFORMATION HAVE YOU REVIEWED REGARDING**
2 **THE PROJECT?**
3 A. I have read and analyzed the key reports and documents related to
4 the Project, including, but not limited to, SCE&G Quarterly Reports to the
5 Commission, Monthly Reports from Westinghouse ("WEC") and its
6 consortium partner for the Project, first the Shaw Group and later Chicago
7 Bridge and Iron (CB&I), monthly reports prepared by SCE&G's new
8 nuclear development ("NND") team, direct testimony of SCE&G witnesses
9 in proceedings before the Commission related to the Project, direct
10 testimony of ORS witnesses in such proceedings, the resulting Commission
11 orders, legislative reports made by ORS, other documents issued by ORS,
12 and various documents related to or prepared by the Bechtel Corporation.
13 In addition, I have interviewed SCE&G employees and I have visited the
14 Project site. A partial list of the documents I have reviewed is attached as
15 ***Exhibit___, (KP-1).***
16 **Q. HAVE YOU READ AND ANALYZED THE BECHTEL REPORT(S)?**
17 A. Yes, I have read the Preliminary Results of Bechtel Assessment
18 dated October 22, 2015 (the "Bechtel Presentation"), the Project
19 Assessment Reports dated November 9, 2015 and November 12, 2015 and
20 marked "DRAFT" (the "Draft Bechtel Reports"), the Project Assessment
21 Report dated February 5, 2016 (the "Bechtel Report") and the Schedule

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 9 of 126

1 Assessment Report dated February 5, 2016 ("Bechtel Assessment" and
2 collectively the "Bechtel Reports").

3 **Q. HAVE YOU READ ANTHONY JAMES' DIRECT TESTIMONY?**

4 A Yes, I have read Anthony James' direct testimony.

5 **Q. HAVE YOU READ GARY C. JONES' DIRECT TESTIMONY?**

6 A Yes, I have read Gary C. Jones' direct testimony.

7 **Q. HAVE YOU READ SCOTT J. RUBIN'S DIRECT TESTIMONY?**

8 A Yes, I have read Scott J. Rubin's direct testimony.

9 **Q. WHAT IS THE SUBSTANCE OF THAT TESTIMONY THAT YOU**
10 **ARE RESPONDING TO?**

11 A. Mr. James, Mr. Jones and Mr. Rubin raise many issues unrelated to
12 my analysis that will be addressed by other witnesses. I intend to respond to
13 their contentions regarding SCE&G's retention of Bechtel, SCE&G's
14 disclosure of Bechtel's retention, recommendations and schedule estimates,
15 and SCE&G's oversight and management of the Project. More specifically,
16 I will address contentions from Mr. James and Mr. Jones regarding
17 SCE&G's alleged failure to disclose Bechtel's retention, and my view that
18 the estimated substantial completion dates ("SCDs") arrived at by Bechtel
19 amount to opportunistic overreach. I will also address Mr. James' assertion
20 that SCE&G utilized a "hands-off" management style which was imprudent
21 and Mr. Jones' contention - with the benefit of 20/20 hindsight - that the
22 schedules provided to ORS and throughout the project were insufficient and

demonstrate imprudent management of the Project. Finally, I will address Mr. Rubin's contention that a prudent owner would have abandoned the Project in 2013 or 2014.

Q. DO MR. JONES AND MR. JAMES PROVIDE AN ACCURATE ACCOUNT OF THE HOW THE PROJECT PROCEEDED?

A. No they do not. They provide a skewed account of the Project with selective hindsight instead. Hindsight can be helpful, but the Project and decision making proceeded in real time and must be evaluated with that in mind.

Q. HOW DO YOU RESPOND TO THE POINTS MADE BY MR. JAMES' AND MR. JONES' CONTENTIONS REGARDING BECHTEL IN THEIR TESTIMONY?

A. In my Prior Testimony, I outline in detail why ORS had both the information and expertise necessary to understand where the project stood and the risks that WEC faced in meeting its schedule and cost commitments. Mr. Jones' testimony in the 2015 and 2016 update docket clearly show that this was the case. ORS understood as well as anyone could what the risks and dangers were (and which SCE&G disclosed). ORS possessed sufficient information for ORS to understand the magnitude of the Project's issues and challenges that led to the retention of Bechtel. Mr. James and Mr. Jones are simply incorrect when they assert SCE&G withheld material information from the Commission and ORS and that it

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 10 of 126

was imprudent not to disclose the retention of Bechtel or Bechtel's limited findings and conclusions or that disclosure of them would have changed the overall assessment of the value of continuing the Project. The reports and other documents that were made available to ORS contained all of the material information that someone familiar with nuclear construction, specifically ORS's construction experts, would need to understand the status, schedule and challenges of the Project.

While the Bechtel Reports may have contained a limited number of reasonable and useful suggestions for improving the efficiency of the Project, those suggestions are made in response to challenges and problems that were well known and clearly identified in other documents. The Bechtel Reports did not identify any undisclosed issues or challenges. The issues and challenges discussed in the Bechtel Reports were the same issues and challenges that had been discussed and disclosed in numerous reports and other documents provided to ORS. The Bechtel Reports did not provide any material information about those issues and challenges that was not disclosed in other documents and well known to those following the Project.

The documentary record shows that ORS, as the state regulatory agency charged with direct oversight in these matters, had all the information necessary to understand where the Project stood and the challenges it faced without reference to the Bechtel Reports.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 11 of 126

1 In addition, as I explain below and in my Prior Testimony, the
2 construction schedule contained in the Bechtel Presentation and Draft
3 Bechtel Reports and Bechtel Assessment was based on inadequate
4 information, did not reflect key Project data and was properly excluded
5 from the final Bechtel Report.

6 **Q. WHAT IS YOUR UNDERSTANDING OF THE ROLE OF ORS IN**
7 **PROTECTING THE PUBLIC INTEREST RELATED TO THIS**
8 **CONSTRUCTION?**

9 A. As indicated above and in my Prior Testimony, it is my
10 understanding that ORS represented the public interest in these matters and
11 reported its conclusions about the Project to the Commission and the
12 public. It did so through the quarterly reports that it issued on the Project,
13 the testimony and reports it provided in proceedings before the Commission
14 over the course of the Project, the settlement agreements it adopted and
15 other reports and public statements. I have reviewed a number of ORS's
16 reports, documents and public statements related to the Project. They show
17 that ORS understood the challenges faced by the Project very well. I do not
18 see any relevant and material facts discussed in the Bechtel Reports that
19 ORS did not understand or failed to acknowledge in its reports and public
20 statements.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 12 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 13 of 126

1 **Q. WHAT DO YOU CONCLUDE BASED ON YOUR REVIEW OF THE**
2 **INFORMATION PROVIDED TO ORS CONCERNING SCE&G's**
3 **DISCLOSURE OF THE PROJECT STATUS?**

4 A. I have reviewed the monthly construction reports issued by
5 WEC/CB&I and SCE&G, as well as other construction reports and, the
6 quarterly reports that were prepared and filed with ORS and the
7 Commission and made available to the public.

8 The monthly construction reports that ORS reviewed are standard
9 and typical reports used in managing projects of this sort. The monthly
10 reports for this Project were quite comprehensive and very detailed. They
11 included information concerning milestones, delays, problems, schedule
12 issues, inspections, and critical paths. They often ran over 100 pages in
13 length and included a great deal of supporting documentation. They were
14 the basis on which monthly project review meetings were conducted on site
15 and the individuals who contributed to them were questioned about what
16 they reflected.

17 To anyone reasonably experienced in nuclear construction, these
18 reports communicated a clear picture of where the Project stood month-to-
19 month and quarter-to-quarter. They clearly communicated the challenges
20 being faced by the Project and the difficulties the Project was encountering
21 in meeting the substantial completion date commitments which
22 WEC/CB&I made.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 14 of 126

In addition, SCE&G also produced quarterly reports specifically for ORS which summarized and expanded on the material provided in the monthly reports. These in turn were supplemented by annual construction updates conducted either in formal hearings before the Commission or in allowable ex parte information briefings.

I have reviewed all these documents and they clearly indicate that ORS had all the information needed to understand where the Project stood and what challenges it faced, specifically as to the completion schedule, but also concerning the other important challenges involved. The Bechtel Reports did not include material information that was not otherwise disclosed to ORS.

Q. IN YOUR OPINION DID SCE&G ENGAGE IN A GOOD FAITH EFFORT TO PROVIDE ORS AND THE PSC WITH AN ACCURATE CONSTRUCTION SCHEDULE PRIOR TO MARCH 2015?

A. Yes, the schedule in question was fully integrated, allowing for activities of engineering, procurement and modular fabrication portions of the project to interface with the site construction and startup portions of the project schedules. SCE&G had spent over a year pressuring the Consortium to produce it and months reviewing, challenging and revising the schedule and its assumptions with the Consortium. Per the EPC Contract, the Consortium had the right to choose its means and methods of

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 15 of 126

1 planning and constructing the Project. The Consortium had a fully
2 integrated schedule database, and it also maintained a separate, but
3 corresponding database that contained the estimated unit rates, resources
4 and costs. The documents show that the Consortium presented information
5 from both of these databases in the third quarter of 2014 and the SCE&G
6 team spent the subsequent months reviewing the data. The documents
7 show that SCE&G had throughout the course of the Project pressed for
8 better and more comprehensive schedules. In addition, Mr. Jones and ORS
9 were fully aware of these facts as they developed. ORS's testimony in past
10 proceedings and other public statements show that to be the case. I note
11 several comments regarding the need for resource loaded schedules by Mr.
12 Jones. I have not used resource loaded schedules in my nuclear new build
13 experience, which includes completion of multiple nuclear power plants.

14 **Q. IN YOUR OPINION WAS ORS IN A POSITION TO UNDERSTAND**
15 **THE INFORMATION THAT WAS PROVIDED TO IT ABOUT THE**
16 **PROJECT?**

17 A. Absolutely. ORS also had at its disposal the expert advice necessary
18 to review and understand the information provided and to interpret it for
19 ORS and the public. Specifically, ORS was advised in these matters by Mr.
20 Gary Jones whose resume shows him to have sufficient training and
21 practical experience in nuclear construction to understand the information
22 provided, which was extensive. Mr. Jones' work was supplemented by

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 16 of 126

1 ORS employees assigned to this Project who also had experience in
2 technical and construction matters.

3 **Q. DO ORS'S PUBLIC STATEMENTS SHOW THAT ORS IN FACT**
4 **UNDERSTOOD THE SCHEDULE CHALLENGES FACED BY THE**
5 **PROJECT?**

6 A. Yes. As discussed in my Prior Testimony, the record clearly shows
7 that ORS understood the schedule challenges faced by the Project and was
8 in no way misled by any alleged withholding of information. ORS fully
9 understood the risks and challenges encountered during the Project and was
10 not in any way kept in the dark by non-disclosures. Mr. Jones' testimony in
11 prior dockets and the statements ORS has made publicly are very clear.
12 ORS was not in any way ignorant or misled about the status of the Project.
13 In the quarterly reports, the monthly construction reports, and the other
14 information that SCE&G provided, ORS and its experts had the
15 information they needed to understand the schedule concerns faced by the
16 Project. And they did understand those concerns.

17 **Q. CAN YOU PROVIDE EXAMPLES OF SCE&G'S PRIOR**
18 **DISCLOSURE TO THE COMMISSION AND ORS OF THE ISSUES**
19 **DISCUSSED IN THE BECHTEL REPORTS?**

20 A. Yes. Attached to my testimony as ***Exhibit __, (KP-2)*** is a
21 compilation of specific instances of disclosures that are found in the
22 reports, testimony, and other public disclosures associated with the Project.

This compilation organizes those statements and disclosures around the key challenges identified in the Bechtel Reports.

This compilation is an expanded and revised version of a compilation assembled by SCE&G and previously filed in Docket No. 2017-305-E in support of a motion to dismiss the petition in this matter filed by SCE&G. My version of this compilation includes citations to additional documents which have been produced during discovery and goes beyond what was submitted earlier. It shows that each of the major challenges to the Project that were discussed in the Bechtel Reports were fully understood by ORS and disclosed to the public. As mentioned above there is no failure of disclosure related to this Project.

The source documents on which ***Exhibit ___, (KP-2)*** is based are filed with the Commission and attached to my prior testimony as ***Exhibit ____, (KP-3)***. They include hearing and ex parte informational briefing transcripts, quarterly reports filed by SCE&G, quarterly reports filed by ORS, monthly reports by ORS to the General Assembly of the State of South Carolina, presentations made by ORS to the South Carolina Energy Users Committee and in one case, the notes of a presentation by ORS to the General Assembly made on November 29, 2016. These ORS reports and other documents were provided directly by ORS or in response to discovery requests in this matter or filed by ORS in Docket No. 2008-196-E.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 17 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 18 of 126

1 **Q. HAVE YOU READ AND ANALYZED THE PROFESSIONAL**
2 **SERVICES AGREEMENT UNDER WHICH BECHTEL**
3 **CONDUCTED ITS REVIEW?**
4 A. Yes. I have.
5 **Q. FOR WHAT PURPOSE WAS BECHTEL HIRED AND BY WHOM?**
6 A Bechtel was hired by the law firm of Smith, Currie & Hancock LLP,
7 which represented SCE&G and Santee Cooper, to assist those lawyers and
8 the project owners "in better understanding the current status and potential
9 challenges of the Project in anticipation of litigation and to ensure the
10 Project is on the most cost-efficient trajectory to completion." Bechtel's
11 work was specifically intended to be directed by an attorney from Smith
12 Currie & Hancock. The scope of work was set forth in detail in that
13 document. As Mr. Addison and Mr. Kochems testified at the time, there
14 were escalating payment and other disputes that seemed to be leading
15 toward litigation or other forms of legal dispute resolution.
16 Bechtel was asked to conduct a review of the owner's organizational
17 charts and structure, the Consortium's organizational charts, the monthly
18 construction progress reports, the milestone management schedules, the
19 integrated engineering, procurement and construction schedules, cost and
20 schedule forecasts, staffing projections, supply chain and module
21 fabrication information and other documents. Bechtel was to supplement

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 19 of 126

1 this documentary review with meetings with key Consortium personnel,
2 site walk downs and interviews with the owners' leadership team.

3 **Q. DID YOU FIND ANY MATERIAL INFORMATION IN THE**
4 **BECHTEL REPORTS THAT HAD NOT BEEN OTHERWISE**
5 **DISCLOSED?**

6 A. No. I found no material undisclosed information or other surprises in
7 the Bechtel Reports. The issues raised in the Bechtel Reports had been
8 acknowledged and described in detail in quarterly reports to ORS, the
9 monthly construction reports and other material made available to ORS,
10 and in the testimony and other filings before the Commission.

11 Furthermore, as a general matter, the problems that were identified
12 in the Bechtel Reports were generally known in the nuclear construction
13 industry to be problems faced by the two U.S. AP1000 projects. At the
14 time, members of the industry, myself included, were well aware of the
15 nature of these problems, including the project delays.

16 In addition, I also did some review work for WEC in the setting up
17 of the Moorside AP1000 project in the UK and on the WEC bid to
18 construct multiple AP1000 units in India. I was aware of challenges in the
19 existing AP1000 projects because they were a matter of concern and of
20 great importance for WEC and its business. In addition, I visited the
21 Sanmen site in China where the AP1000 units were under construction but
22 behind schedule. In 2010, I took the owner of the Barakah project in the

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 20 of 126

1 UAE to Sanmen to learn about the site infrastructure. Considering what I
2 knew about the Project prior to being retained by SCE&G, there was
3 nothing new or surprising about what I saw in reading the Bechtel Reports.
4 As shown in ***Exhibit ___, (KP-2),*** the issues and challenges
5 confronted by this Project were clearly disclosed.

6 **Q. WAS THE BECHTEL REPORT CURRENT WHEN ISSUED?**

7 A. No. Bechtel issued its report in 2016 based on an analysis conducted
8 in the late summer and fall of 2015. Bechtel formulated its conclusions
9 before the October 2015 Amendment to the Engineering, Procurement &
10 Construction Agreement ("EPC Contract"). The amendment:

11 • Scrapped the Consortium structure,
12 • Released CB&I from the Project,
13 • Allowed Fluor to be hired as construction contractor under WEC,
14 • Allowed for a fixed price guarantee for completing the EPC
15 Contract work,
16 • Increased liquidated damages and completion incentives,
17 • Limited future change orders, and
18 • Restructured other commercial terms of that Agreement.

19 As the Bechtel Reports indicate, many of the individual
20 recommendations –by most counts a majority of them– were negated by
21 these changes in the Consortium structure and other changes made by the

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 21 of 126

1 2015 EPC Amendment. This made the report largely outdated before it was
2 issued.
3 In addition, immediately after the 2015 EPC Amendment was
4 signed, Fluor began to conduct reviews and other initiatives to create new
5 staffing plans, streamline work packages, resolve engineering bottlenecks,
6 formulate mitigation plans, and revise the Project construction schedule. In
7 addition, a new project management oversight structure was imposed in late
8 2015, which negated yet another recommendation contained in the Bechtel
9 Report. Many of the recommendations of the Bechtel Report were in place
10 or in process before the report was issued.
11 For these reasons, the Bechtel Report was essentially outdated when
12 issued and became more outdated with each passing month.
13 **Q. HAVE YOU FORMED ANY OTHER OPINIONS REGARDING THE**
14 **BECHTEL REPORTS?**
15 A. Yes, based on my review I have reached two primary conclusions
16 regarding the Bechtel Reports. First, as stated above and in my Prior
17 Testimony, the Bechtel Reports do not contain material information that
18 was not previously known to SCE&G and disclosed to the ORS. Second,
19 the schedule estimate contained in the Bechtel Presentation, Draft Bechtel
20 Reports and Bechtel Assessment is derived from a limited access to the
21 Project and is unreliable. The decision not to include that schedule estimate
22 in the final version of the report and not to present the Bechtel Assessment

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 22 of 126

1 was entirely logical and supportable. In fact, it might have been imprudent
2 to provide Bechtel's unreliable substantial completion dates.

3 **Q. WAS BECHTEL RETAINED OR AUTHORIZED TO GENERATE**
4 **ITS OWN PROPOSED SCHEDULE FOR THE PROJECT?**

5 A. No. According to the scope of work for the Project, Bechtel was not
6 hired or authorized to generate a proposed schedule for the Project nor was
7 it given access to the information required to do so, as Bechtel itself admits
8 in the report.

9 **Q. IN WHAT WAYS WAS THE SCHEDULE INFORMATION IN THE**
10 **BECHTEL REPORTS FLAWED AND UNRELIABLE?**

11 A. Given the scope of work under which Bechtel was hired, and the
12 limitations under which it operated, Bechtel did not have sufficient
13 information to create an accurate schedule for completion of the Project.
14 Most importantly, as Bechtel freely admitted, it did not have access to the
15 Level 3 Schedule[1] for the Project. It was simply impossible for Bechtel to
16 accurately evaluate schedule and milestone delays and to revise and predict
17 future completion dates without access to a Level 3 Schedule for the
18 Project. In addition, design and procurement for both Westinghouse and
19 CB&I were being done on a functional basis from their respective home
20 offices for all the ongoing AP1000 projects, as compared to Bechtel's

[1] The Level 3 schedule spans the whole of a project and includes all major milestones, major elements of design, engineering, procurement, construction, testing, commissioning and/or start-up.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 23 of 126

1 analysis of these issues only for the Project, making an outside schedule
2 review even more complex.

3 **Q. WERE YOU SURPRISED THAT BECHTEL WAS NOT GIVEN THE**
4 **KIND OF ACCESS TO DATA THAT IT WOULD HAVE NEEDED**
5 **TO COMPILE ITS OWN PROJECT SCHEDULE?**

6 A. No, not at all. There was no reason to give Bechtel the sort of access
7 to data required to create a new project schedule. Bechtel was never
8 authorized to create a new project schedule. In fact, there is no indication in
9 the documents that SCE&G was even aware that Bechtel was preparing an
10 alternative project schedule until one appeared in the presentation materials
11 at the end of Bechtel's work. Moreover, the schedule generated by Bechtel
12 simply confirmed what was already known by SCE&G and ORS - that the
13 Project was delayed and that significant mitigation of the issues plaguing
14 the Project was necessary. The schedule did not provide any new
15 information that would have been meaningful at the time the report was
16 issued.

17 **Q. WHAT SORT OF DATA ACCESS LIMITATIONS DID**
18 **WESTINGHOUSE AND CB&I IMPOSE ON BECHTEL AND WHY?**

19 A. Bechtel is a direct competitor of CB&I and Fluor and at the time
20 could be considered a potential competitor of Westinghouse in the areas of
21 project management and delivery. These companies were understandably
22 reluctant to provide Bechtel with data that Bechtel could use to compete

against them for future business. For that reason, WEC and CB&I required Bechtel to review data in secure reading rooms and not copy that data into Bechtel's systems and programs. These limitations did not prevent Bechtel from conducting review and critique of the existing project schedule that it was tasked to do. But apparently these limitations did prevent Bechtel from exporting the data and information needed to compile its own project schedule into its own computer systems, or for whatever reason, Bechtel was never successful in doing so. This prevented Bechtel from using the existing construction schedule and other site-specific data and information, including information about mitigation plans, to create its own schedule. As a result, the Bechtel schedule was more qualitative than quantitative.

Q. DID THE UNAUTHORIZED NATURE OF THE BECHTEL SCHEDULE LIMIT IT IN OTHER WAYS?

A. Yes. Because the creation of this schedule was unauthorized, Bechtel could not seek WEC/CB&I's help in incorporating into Bechtel's scheduling software information about the specific mitigation efforts that were underway, the evolution of the Project and its critical path, and the effect of the experience curve on the future productivity and schedule compliance. Going it alone as it did, Bechtel was required to create a schedule based on generic information from other nuclear projects, general productivity and staffing trends, and similar non-specific resources. For that reason, the draft schedule included in the Bechtel Presentation and

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 24 of 126

Draft Bechtel Report was more qualitative than quantitative and incomplete. The report itself indicates as much. The decision not to include this schedule in the final report was entirely justified for those reasons.

Q. WAS ANOTHER, BETTER INFORMED SCHEDULING EFFORT UNDERWAY AT THE TIME THE BECHTEL REPORT WAS ISSUED?

A. Yes. At the time the Bechtel Report was issued in early 2016, Westinghouse and Fluor had already worked together in late 2015 to create a preliminary resource-loaded integrated project schedule that corresponded to the new completion dates in the revised fixed-priced contract negotiated by SCE&G and Santee Cooper. Subsequent to the Westinghouse acquisition of Stone & Webster in January 2016, Fluor was engaged through their contract with Westinghouse to work with Westinghouse to perform a full Estimate-To-Complete, which included creating a new fully resource loaded construction schedule based on access to all relevant data, assessments, mitigation plans, and other information. This is another reason why it made sense not to proceed publicly or otherwise with the Bechtel schedule. In addition, SCE&G and Santee Cooper had negotiated a revised fixed-priced contract with WEC in 2015 which was eventually approved by the Commission in 2016 and which transferred substantial risk to WEC in project completion costs and revised completion dates. These dates were from WEC, the vendor who had all of the project information

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 25 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 26 of 126

1 and very importantly commercially took on these completion risks -
2 including substantial financial risk of liquidated damages - and dates which
3 were challenging. In other words, they put their money on their words.
4 This was an appropriate schedule to rely on. Not Bechtel's.
5 Also, SCE&G's approach was right in a project management sense.
6 The delayed Bechtel dates were factually unsupported. But acknowledging
7 them as reasonable would have taken pressure off of WEC and CB&I to
8 meet the existing and more challenging schedule commitments WEC and
9 CB&I had made. It would have removed the urgency around the existing
10 dates. This is not a theoretical issue. I have seen this happen before. Also
11 in my experience, projects in delay have recovered, most notably in
12 Qinshan, China where the units I led were about four months late at the
13 mid-point but recovered. It took a combined vendor-owner partnership
14 committed to the earlier dates to recover those delays and even resulted in
15 completion one month early. I also experienced the learning curve on the
16 Project which helped to bring the second unit into service some four
17 months early. My interactions with WEC and my discussions with SCE&G
18 personnel indicated a similar learning curve existed for the Project.
19 **Q. WHAT OTHER LIMITATIONS IMPAIRED BECHTEL'S ABILITY**
20 **TO ASSESS THE PROJECT?**
21 A. Several other circumstances hindered Bechtel's ability to prepare an
22 accurate schedule for the Project. Notably, Bechtel did not have any

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 27 of 126

1 experience with the new U.S. Nuclear Regulatory Commission (NRC)
2 regulatory standards which applied to the Project. The Project is subject to
3 Part 52 - LICENSES, CERTIFICATIONS, AND APPROVALS FOR
4 NUCLEAR POWER PLANTS of the NRC regulations ("Part 52"). To my
5 knowledge, Bechtel has never been a vendor or builder of a project subject
6 to Part 52 until it supplanted Fluor Corporation as the contractor for the
7 Vogtle project in late 2017. At the relevant time, therefore, Bechtel lacked
8 the institutional knowledge necessary to understand the value of prior Part
9 52 project lessons learned and to transform those lessons learned into
10 schedule efficiencies. Similarly, Bechtel did not account for SCE&G's
11 formal collaboration with the firms building AP1000 units in China and
12 SCE&G and the Consortium's ability to incorporate lessons learned from
13 AP1000 construction in China into the Project going forward. Each of
14 these circumstances hindered Bechtel's ability to assess the Project and its
15 ability to quantitatively predict a completion schedule for the Project.

16 **Q. WHY WOULD A COMPANY LIKE BECHTEL CREATE A**
17 **PROJECT SCHEDULE THAT THE CLIENT DID NOT REQUEST?**

18 A. It is well recognized in the nuclear construction industry that firms
19 like Bechtel have an economic reason to use one-off consulting
20 opportunities to develop new or expanded assignments of an ongoing
21 nature. There is nothing wrong with this practice, which is well recognized
22 in the industry. It is referred to as "leaving a trail of bread crumbs" and the

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 28 of 126

1 bread crumbs lead to more work for the consulting firm. People with
2 experience in the construction industry understand and expect that
3 consulting firms may do this. And sometimes when they do, they play up
4 negative findings to create a sense of urgency around the need to hire the
5 firm to fix the problems identified. Generally speaking, there is nothing
6 wrong with this, as long as it is recognized and the findings are not
7 misinterpreted. Reports produced in these circumstances need to be read
8 with this fact in mind.

9 **Q. YOU INDICATED EARLIER THAT YOU HAD AN OPINION**
10 **CONCERNING THE PRUDENCY OF SCE&G'S ACTIONS**
11 **RELATED TO THE PROJECT. CAN YOU SHARE THAT OPINION**
12 **WITH US?**

13 A. SCE&G's role in the Project was largely defined by the EPC
14 Contract which it entered into with the Westinghouse Consortium so that it
15 could access the AP1000 Advanced Passive Safety technology. The
16 AP1000 technology was clearly a good choice in light of Westinghouse's
17 experience and standing in the industry, and the technology of the AP1000
18 design itself. Another very important consideration was that SCE&G was
19 already operating a Westinghouse pressurized water reactor at the
20 Jenkinsville site and had been doing so safely and effectively for
21 approximately 30 years. For a number of reasons, it is best to have
22 comparable reactor designs on a given site.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 29 of 126

1 I know the attractiveness of the AP1000 Advanced Passive Safety
2 design from direct experience in competing against it. My former company
3 AECL was a competitor of WEC in China. In the end, China chose
4 AP1000 technology over our design and over the existing, domestic
5 Chinese reactor design. I understood why the Chinese selected the WEC
6 AP1000 over the other designs. The AP1000 passive safety design is a
7 major advance in the technology and WEC was a very well respected
8 design firm.

9 As a practical matter, choosing the AP1000 technology for the
10 Project entailed choosing Westinghouse and its consortium partner to
11 construct the Units under an EPC Contract. Those were the terms on which
12 the technology was offered and bid. As is the case with all projects being
13 delivered under an EPC process, the EPC Contract defined SCE&G's role
14 as owner and set the limits within which SCE&G could effectively operate.

15 **Q. CAN YOU ADDRESS MR. JAMES' CONTENTION THAT**
16 **SCE&G'S "HANDS-OFF" APPROACH TO MANAGING THE**
17 **PROJECT WAS IMPRUDENT AND MR. JONES' CONTENTION**
18 **THAT SCE&G FAILED TO HOLD THE CONSORTIUM FULLY**
19 **ACCOUNTABLE FOR FAILURE TO MEET MILESTONES?**

20 A. Yes. As discussed in my Prior Testimony, the documents that I have
21 reviewed show that SCE&G set a tone and culture of openness and
22 communications in undertaking its role as owner of the Project. I fully

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 30 of 126

1 appreciate the value of this approach as it is the same model that helped my
2 success in China in completing two units ahead of schedule and under
3 budget. SCE&G's approach is quite clear in the documentary record. At
4 every stage of the Project, SCE&G appropriately and consistently focused
5 on finding constructive and practical resolutions to issues as they arose.

6 The documentary record also shows that SCE&G understood its role
7 as an owner operating under an EPC Contract. Its job was to demand
8 performance from the EPC contractors without directing the means or
9 methods used to accomplish the work, or usurping the role of the
10 contractors to manage the work. Under an EPC Contract, the choice of
11 means and methods are exclusively the contractors' responsibility. And that
12 was spelled out in the EPC Contract. When owners seek to dictate means
13 and methods, the contractor can treat all owners' directives as change
14 orders and this can dramatically increase the cost of the project and lead to
15 conflict and disputes. SCE&G's actions show that it understood the line
16 between demanding performance and directing means and methods.
17 SCE&G exercised its authority as owner appropriately and effectively.

18 In addition and much more than the "hands-off" approach described
19 by Mr. James, SCE&G wisely adopted a graded approach to oversight of
20 the Project. By that I mean that SCE&G calibrated its level of oversight and
21 resources committed on an area-by-area basis to reflect the seriousness of
22 the problems in each area of the Project and risks those problems posed.

1 SCE&G identified in a timely and effective way the areas where problems
2 were emerging that posed a threat to the Project and its schedule. And then
3 SCE&G focused its efforts and attention on those areas and enhanced its
4 oversight and commitment of resources to match the difficulty of the
5 problems and the potential consequences if they were not corrected as they
6 developed. I would also note that SCE&G disclosed those focus areas in its
7 quarterly reports in a timely fashion as they emerged. I successfully used
8 the same graded approach in my oversight role over the Korean APR 1400
9 units under construction in Barakah, UAE.

10 The documentary record also shows that SCE&G understood the
11 danger of an owner overplaying its role related to commercial issues.
12 SCE&G quite properly identified its challenge to be that of vigorously
13 enforcing its rights under the EPC Contract while not destroying the
14 working relationships necessary to successfully complete a project of this
15 scope. SCE&G took constructive action at multiple stages of the Project to
16 resolve and mitigate the destructive effects of commercial disputes.
17 SCE&G actively worked to avoid a confrontational culture with the
18 Consortium and to promote efficient and effective problem solving as long
19 as it was possible to do so. Mr. Jones fails to recognize that adopting a
20 confrontational culture early in the Project most certainly would have
21 resulted in higher costs and longer delays, and he is simply incorrect when
22 he asserts that applying more pressure on the Consortium would have

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 31 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 32 of 126

1 achieved improvements in production rates and productivity levels for the
2 Project.

3 Mr. Jones also fails to acknowledge that SCE&G's approach did
4 push commercial issues hard when it saw no other alternative for
5 motivating the Consortium to solve problems that threatened the successful
6 completion of the Units. I would specifically note SCE&G's actions taken
7 in 2014 and 2015 to place commercial pressure on the Consortium by
8 disputing or refusing to pay millions of dollars of invoices that it asserted
9 were the result of delay, poor productivity or inefficiency. In taking this
10 action, SCE&G took a calculated risk. Its actions could have caused a
11 breakdown of the Project and very nearly did. The Consortium threatened
12 in writing to walk off the job in response. CB&I left the Consortium, which
13 was in the end a benefit. But in light of the seriousness of circumstances,
14 taking such risks was justified at that time.

15 As discussed in my Prior Testimony, it has been my experience, over
16 many such projects, that the approach SCE&G took as owner was the most
17 prudent and constructive approach available to an owner under the EPC
18 Contract. It is my opinion that SCE&G discharged its functions as an owner
19 with great insight and care.

20 **Q. MR. RUBIN CONTENDS THAT SCE&G SHOULD HAVE**
21 **ABANDONED THE PROJECT IN 2013 OR NO LATER THAN MID-**
22 **2014. DO YOU AGREE WITH THAT ASSESSMENT?**

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 33 of 126

1 A. No, I do not. SCE&G made prudent decisions when it selected the
2 AP1000 technology and selected WEC to build the AP1000. This
3 technology is sound and could have been completed as evidenced by
4 completion of the reference AP1000 units in China. The international new-
5 build AP1000 program is moving ahead. AP1000 units at Sanmen and
6 Haiyan in China are now in service and added AP1000 units are being
7 actively considered in China indicating that the Chinese are satisfied with
8 final performance and output. The Project and companion AP1000 Vogtle
9 project were premised on following the Chinese lead and program which
10 has struggled but is now actively moving ahead. China has shown that
11 completion of the AP1000 is achievable. Others have testified regarding the
12 economic decisions leading to abandonment of the Project and that is not
13 my area of expertise, but I am an expert on completing nuclear projects and
14 on the success of the AP1000 technology and I would not have
15 recommended abandonment in 2013 or 2014.
16 **Q. ARE YOU FAMILIAR WITH THE NEW STANDARD FOR**
17 **PRUDENCY IN SOUTH CAROLINA REQUIRED BY ACT 258?**
18 A. Not entirely, and I am not a lawyer, but I understand that the
19 legislation allows for an owner, such as SCE&G, to be held responsible for
20 the imprudent actions of contractors, subcontractors or vendors even if
21 those are not contractually assigned to the owner.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 34 of 126

1 **Q. IN YOUR EXPERIENCE ARE THOSE REQUIREMENTS TYPICAL**
2 **OF INDUSTRY STANDRDS?**
3 A. Absolutely not. I've never seen a situation where an owner is
4 accountable in this way. It makes no sense. Construction of nuclear
5 construction projects would cease if this were the norm. The South
6 Carolina legislation transfers all project risk from the vendor / contractors
7 to the owners. No reasonable owner would take on a project if it must
8 assume all the risk for the project. The risk structure created by this
9 legislation is a fiction and cannot work in the real world. I've never seen a
10 project that operates under such a structure.
11 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**
12 A. Yes, it does.

EXHIBIT_(K_P-1)

INDEX TO DOCUMENTS REVEWED BY DR. KEN PETRUNIK

1. Bechtel Project Assessment Report-FINAL – V.C. Summer Nuclear Generating Station, Jenkinsville, SC USA dated February 2, 2016

2. Bechtel Project Assessment Report-DRAFT – V.C. Summer Nuclear Generating Station Units 2 & 3 dated November 9, 2015 (Part 1) (Bates Nos. SCPSA-House_00000182-231)

3. Bechtel Project Assessment Report-DRAFT – V.C. Summer Nuclear Generating Station Units 2 & 3 dated November 9, 2015 (Part 2) (Bates Nos. SCPSA-House_00000282-331)

4. Professional Services Agreement between Bechtel Power Corporation and Smith, Currie & Hancock, LLP dated August 6, 2015

5. Appendix C – Bechtel Report Issues as Discussed in Prior Quarterly Reports and Testimony and in Correspondence from and with ORS

6. Protective Order No. 2018-83-H, Docket Nos. 2017-370-E, 2017-207-E, 2017-305-E dated July 12, 2018

7. Documents Responsive to Interrogatory 1-41 and Request for Production of Documents 1-9, 1-30, 1-32, and 1-37 – PURC Letters

8. Documents Responsive to Interrogatory 1-41 and Request for Production of Documents 1-9, 1-30, 1-32, and 1-37 – General Reports

9. SCE&G Response to Motion to Compel dated June 11, 2018

10. Exhibits of June 11, 2018 SCE&G Response to Motion to Compel (Part 1)

11. Exhibits of June 11, 2018SCE&G Response to Motion to Compel (Part 2)

12. Direct Testimony of Mark W. Crisp, on behalf of the South Carolina Office of Regulatory Staff dated September 22, 2009, Docket No. 2009-293-E

13. Direct Testimony of Stephen A. Byrne on behalf of SCE&G - Confidential, dated September 9, 2009 Docket No. 2009-293-E

14. Direct Testimony of Stephen A. Byrne on behalf of SCE&G - Public, dated September 9, 2009, Docket No. 2009-293-E

15. Direct Testimony of Alan D. Torres on behalf of SCE&G, dated September 9, 2009, Docket No. 2009-293-E

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 35 of 126

16. Direct Testimony of Carlette L. Walker on behalf of SCE&G - Confidential, dated September 9, 2009, Docket No. 2009-293-E

17. Direct Testimony of Carlette L. Walker on behalf of SCE&G - Public, dated September 9, 2009, Docket No. 2009-293-E

18. Order Approving Updates and Revisions to Schedules, Docket No. 2009-293-E – Order No. 2010-12 dated January 21, 2010

19. Direct Testimony of M. Anthony James, P.E. on behalf of the South Carolina Office of Regulatory Staff. dated February 22, 2011, Docket No. 2010-376-E

20. Direct Testimony of Mark W. Crisp, on behalf of the South Carolina Office of Regulatory Staff dated February 22, 2011, Docket No. 2010-376-E

21. Direct Testimony of Carlette L. Walker on behalf of SCE&G, dated January 26, 2011, Docket No. 2010-376-E

22. Direct Testimony of Carlette L. Walker on behalf of SCE&G - Confidential, dated January 26, 2011, Docket No. 2010-376-E

23. Exhibits to Direct Testimony of Carlette L. Walker on behalf of SCE&G, dated January 26, 2011, Docket No. 2010-376-E

24. Direct Testimony of Kevin B. Marsh on behalf of SCE&G, dated January 26, 2011, Docket No. 2010-376-E

25. Direct Testimony of Stephen A. Byrne on behalf of SCE&G - Public, dated January 26, 2011, Docket No. 2010-376-E

26. Direct Testimony of Stephen A. Byrne on behalf of SCE&G - Confidential, dated January 26, 2011, Docket No. 2010-376-E

27. Public Exhibits to Direct Testimony of Stephen A. Byrne on behalf of SCE&G - Public, dated January 26, 2011, Docket No. 2010-376-E

28. Confidential Exhibits to Direct Testimony of Stephen A. Byrne on behalf of SCE&G - Public, dated January 26, 2011, Docket No. 2010-376-E

29. Order Approving Updates and Revisions to Schedules, Docket No. 2010-376-E – Order No. 2011-345 dated May 16, 2011

30. Direct Testimony of Allyn H. Powell, on behalf of the South Carolina Office of Regulatory Staff - Confidential dated August 9, 2012, Docket No. 2012-203-E

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 36 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 37 of 126

31. Direct Testimony of Allyn H. Powell, on behalf of the South Carolina Office of Regulatory Staff - Redacted dated August 9, 2012, Docket No. 2012-203-E

32. Direct Testimony of Gary C. Jones, PE, on behalf of the South Carolina Office of Regulatory Staff - Confidential dated August 9, 2012, Docket No. 2012-203-E

33. Direct Testimony of Gary C. Jones, PE, on behalf of the South Carolina Office of Regulatory Staff - Redacted dated August 9, 2012, Docket No. 2010-203-E

34. Direct Testimony of Carlette L. Walker on behalf of SCE&G, dated July 26, 2012, Docket No. 2012-203-E

35. Exhibits to Direct Testimony of Carlette L. Walker on behalf of SCE&G – Confidential and Public, dated July 26, 2012, Docket No. 2012-203-E

36. Direct Testimony of Hubert C. ("Clay") Young, III on behalf of SCE&G, dated July 26, 2012, Docket No. 2012-203-E

37. Exhibits to Direct Testimony of Hubert C. ("Clay") Young, III on behalf of SCE&G dated July 26, 2012, Docket No. 2012-203-E

38. Direct Testimony of David A. Lavigne on behalf of SCE&G dated July 26, 2012, Docket No. 2012-203-E

39. Direct Testimony of Kevin B. Marsh on behalf of SCE&G dated July 26, 2012, Docket No. 2012-203-E

40. Direct Testimony of Stephen A. Byrne on behalf of SCE&G dated July 26, 2012, Docket No. 2012-203-E

41. Exhibits to Direct Testimony of Stephen A. Byrne on behalf of SCE&G –dated July 26, 2012 and October 1, 2012, Docket No. 2012-203-E

42. Order Approving Updates and Revisions to Schedules, Docket No. 2012-203-E – Order No. 2012-884 dated November 15, 2012

43. Settlement Testimony and Exhibits of M. Anthony James, P.E. on behalf of the South Carolina Office of Regulatory Staff dated June 29, 2015, Docket No. 2015-103-E

44. Direct Testimony with exhibits of Carlette L. Walker on behalf of SCE&G - Confidential dated May 26, 2015, Docket No. 2015-103-E

45. Direct Testimony with exhibits of Carlette L. Walker on behalf of SCE&G - Public dated May 26, 2015, Docket No. 2015-103-E

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 38 of 126

46. Corrected Version of Direct Testimony of Carlette L. Walker on behalf of SCE&G dated July 24, 2015, Docket No. 2015-103-E

47. Corrected Exhibits to Direct Testimony of Carlette L. Walker on behalf of SCE&G dated July 24, 2015, Docket No. 2015-103-E

48. Corrected Version of Direct Testimony of Joseph M. Lynch on behalf of SCE&G dated July 24, 2015, Docket No. 2015-103-E

49. Corrected Version of Direct Testimony of Kevin B. Marsh on behalf of SCE&G dated July 24, 2015, Docket No. 2015-103-E

50. Direct Testimony with exhibits of Joseph M. Lynch on behalf of SCE&G dated May 26, 2015, Docket No. 2015-103-E

51. Direct Testimony of Kevin B. Marsh on behalf of SCE&G dated May 26, 2015, Docket No. 2015-103-E

52. Direct Testimony with exhibits of Ronald A. Jones on behalf of SCE&G dated May 26, 2015, Docket No. 2015-103-E

53. Direct Testimony with exhibits of Stephen A. Byrne on behalf of SCE&G dated May 26, 2015, Docket No. 2015-103-E

54. Order Approving Updates and Revisions to Schedules, Docket No. 2015-103-E – Order No. 2015-661 dated September 10, 2015

55. Settlement Agreement, Docket No. 2015-103-E dated June 29, 2015

56. Settlement Testimony of Gary C. Jones on behalf of the South Carolina Office of Regulatory Staff dated September 28, 2016, Docket No. 2016-223-E

57. Direct Testimony of Jimmy E. Addison on behalf of SCE&G dated July 1, 2016, Docket No. 2016-223-E

58. Direct Testimony with exhibits of Joseph M. Lynch on behalf of SCE&G dated July 1, 2016, Docket No. 2016-223-E

59. Direct Testimony with exhibits of W. Keller Kissam on behalf of SCE&G dated July 1, 2016, Docket No. 2016-223-E

60. Direct Testimony with exhibits of Kevin R. Kochems on behalf of SCE&G dated July 1, 2016, Docket No. 2016-223-E

61. Direct Testimony of Kevin B. Marsh on behalf of SCE&G dated July 1, 2016, Docket No. 2016-223-E

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 39 of 126

62. Direct Testimony with exhibits of Stephen A. Byrne on behalf of SCE&G dated July 1, 2016, Docket No. 2016-223-E

63. Rebuttal Testimony of W. Keller Kissam on behalf of SCE&G dated September 15, 2016

64. Settlement Testimony of Kevin B. Marsh on behalf of SCE&G dated September 15, 2016, Docket No. 2016-223-E

65. Order Approving Updates and Revisions to Schedules, Docket No. 2016-223-E – Order No. 2016-794 dated November 28, 2016

66. Settlement Agreement, Docket No. 2016-223-E dated September 1, 2016

67. Direct Panel Testimony with Exhibits of Zhen Zhu, PhD., George W. Evans, William R. Jacobs, PhD., P.E. Jerry W. Smith, P.E, Mark W. Crisp, P.E. on behalf of the South Carolina Office of Regulatory Staff dated October 17, 2008, Docket No. 2008-196-E

68. Direct Testimony and Exhibits of A. Randy Watts on behalf of the South Carolina Office of Regulatory Staff dated October 17, 2008, Docket No. 2008-196-E

69. Direct Testimony and Exhibits of Douglas H. Carlisle, Jr. on behalf of the South Carolina Office of Regulatory Staff dated October 17, 2008, Docket No. 2008-196-E

70. Direct Testimony and Exhibits of Malini R. Gandhi, CPA on behalf of the South Carolina Office of Regulatory Staff dated October 17, 2008, Docket No. 2008-196-E

71. Direct Testimony and Exhibits of E. Elizabeth Best on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

72. Direct Testimony of Robert B. Whorton on behalf of SCE&G and Safety Analysis Report dated September 16, 2008, Docket No. 2008-196-E

73. Direct Testimony and Exhibits of Hubert C. "Clay" Young, III on behalf of SCE&G dated September 15, 2008, Docket No. 2008-196-E

74. Direct Testimony of David K. Pickles on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

75. Direct Testimony of Jimmy E. Addison on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

76. Direct Testimony and Exhibits of Joseph M. Lynch on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 40 of 126

77. Direct Testimony and Exhibits of Kenneth R. Jackson on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

78. Direct Testimony of Kevin B. Marsh on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

79. Direct Testimony and Exhibits of Stephen E. Summer on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

80. Direct Testimony and SAB Exhibits of Stephen A. Byrne on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

81. Hearing Exhibit SAB-3-C – Confidential

82. Hearing Exhibit SAB-3-P – Public

83. Bechtel Project Assessment Report-DRAFT – V.C. Summer Nuclear Generating Station Units 2 & 3 dated November 12, 2015

84. Direct Testimony and Exhibits of Steven J. Connor on behalf of SCE&G dated September 16, 2008, Docket No. 2008-196-E

85. Order Approving Combined Application (Final Version), Docket No. 2008-196-E, Order No. 2009-104(A) dated March 2, 2009

86. ORS Reports from the Public Service Commission's Docket 2008-196-E Filings

87. Response to Motion To Compel Discovery Responses and Production by SCE&G and Dominion Energy, Docket Nos. 2017-207-E, 2017-305-E, and 2017-370-E dated June 11, 2018

88. Exhibits to Response to Motion To Compel Discovery Responses and Production by SCE&G and Dominion Energy, Docket Nos. 2017-207-E, 2017-305-E, and 2017-370-E dated June 11, 2018

89. SCE&G V.C. Summer Units 2 & # Project Oversight Strategy Plan – Revision 0 dated February 21, 2013

90. SCE&G V.C. Summer Units 2 & # Project Oversight Strategy Plan – Revision 1 dated May 2, 2014

91. SCE&G V.C. Summer Units 2 & # Project Oversight Strategy Plan – Revision 2 dated October 28, 2014

92. SCE&G V.C. Summer Units 2 & # Project Oversight Strategy Plan – Revision 3 dated December 6, 2016

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 41 of 126

93. Bechtel Schedule Assessment Report – V.C. Summer Nuclear Generating Station, Jenkinsville, SC USA dated February 5, 2016

94. Direct Testimony and Exhibits of James R. Chapman on behalf of Dominion Energy Docket No. 2017-370-E

95. Direct Testimony and Exhibits of Robert M. Blue on behalf of Dominion Energy Docket No. 2017-370-E

96. Direct Testimony and Exhibits of Thomas F. Farrell, II on behalf of Dominion Energy Docket No. 2017-370-E

97. Direct Testimony and Exhibits of Allen W. Rooks on behalf of SCE&G Docket No. 2017-370-E

98. Direct Testimony and Exhibits of Ellen Lapson on behalf of SCE&G Docket No. 2017-370-E

99. Direct Testimony and Exhibits of Iris N. Griffin on behalf of SCE&G Docket No. 2017-370-E

100. Direct Testimony and Exhibits of J. Wade Richards on behalf of SCE&G Docket No. 2017-370-E

101. Direct Testimony and Exhibits of R. Glenn Hubbard, PhD. on behalf of SCE&G Docket No. 2017-370-E

102. Direct Testimony and Exhibits of Robert B. Hevert on behalf of SCE&G Docket No. 2017-370-E

103. Direct Testimony and Exhibits of Jimmy E. Addison on behalf of SCE&G Docket No. 2017-370-E

104. Direct Testimony and Exhibits of Joseph M. Lynch on behalf of SCE&G Docket No. 2017-370-E

105. Direct Testimony and Exhibits of Kevin R. Kochems on behalf of SCE&G Docket No. 2017-370-E

106. Direct Testimony and Exhibits of Kyle M. Young on behalf of SCE&G Docket No. 2017-370-E

107. Direct Testimony and Exhibits of Elizabeth H. Warner on behalf of South Carolina Public Service Commission dated August 14, 2018, Docket No. 2017-207-E, 2017-305-E, 2017-370-E

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 42 of 126

108. Direct Testimony and Exhibits of M. Anthony James, P.E. on behalf of the South Carolina Office of Regulatory Staff, dated August 14, 2018, Docket Nos. 2017-207-E, 2017-305-E, 2017-370-E

109. Direct Testimony and Exhibits of Dr. Mark Cooper on behalf of Friends of the Earth and Sierra Club dated August 13, 2018, Docket Nos. 2017-207-E, 2017-305-E, 2017-370-E

110. SCE&G Quarterly Reports to the South Carolina Office of Regulatory Staff for 2009-2018

111. Gary Jones' Summary of Site Visits and Recommendations to ORS - June 2016, July 2016, August 2016, November 2016, December 2016, January 2017 (gaps in dates were not produced by Gary Jones)

112. Gary Jones' Comments on ORS Site Visit Agendas - August 2015-January 2016, March 2016, May 2016-August 2016, October 2016-January 2017, March 2017, May 2017 (gaps in dates were not produced by Gary Jones)

113. Email from Gary Jones to Allyn Powell and Gene Soult - October 8, 2016 and attached article

114. Letter from Dukes Scott to Kevin Marsh - December 29, 2016

115. Gary Jones' Concerns re. SCE&G Responses to ORS AIRs - Draft, May 11, 2016

116. Status of the V.C. Summer Units 2 & 3 Nuclear Power Plants, Presentation to the Electric Cooperatives of South Carolina -March 3, 2016 (multiple drafts)

117. Direct Testimony of Scott J. Rubin on behalf of AARP dated September 18, 2018, Docket No. 2017-370-E

118. Direct Testimony and Exhibits of Gary Jones dated September 24, 2018, Docket No. 2017-370-E

119. Direct Testimony and Exhibits of Elizabeth H. Warren dated September 24, 2018, Docket No. 2017-370-E

120. Direct Testimony of M. Anthony James, P.E. dated September 24, 2018, Docket No. 2017-370-E

121. Direct Testimony of Daniel F. Sullivan dated September 24, 2018, Docket No. 2017-370-E

122. Direct Testimony of Kelvin L. Major dated September 24, 2018, Docket No. 2017-370-E

123. Direct Testimony of Lane Kollen dated September 24, 2018, Docket No. 2017-370-E

124. Direct Testimony of Michael L. Seaman-Huynh dated September 24, 2018, Docket No. 2017-370-E

125. Direct Testimony of Norman K. Richardson, Jr. dated September 24, 2018, Docket No. 2017-370-E

126. Direct Testimony of Richard Baudino dated September 24, 2018, Docket No. 2017-370-E

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 43 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 44 of 126

BECHTEL REPORT ISSUES AS DISCUSSED IN PRIOR QUARTERLY REPORTS AND TESTIMONY AND IN CORRESPONDENCE FROM AND WITH ORS

1. PROBLEMS WITH CONSORTIUM

Bechtel Executive Summary: Issues Facing the Project, p. 1

- The Consortium lacks the project management integration needed for a successful project outcome.
- There is a lack of a shared vision, goals, and accountability between the Owners and the Consortium.
- The Contract does not appear to be serving the Owners or the Consortium particularly well.
- The relationship between the Consortium partners (Westinghouse Electric Company (WEC) and Chicago Bridge & Iron (CB&I)) is strained, caused to a large extent by commercial issues.

Pre-Bechtel Report

February 29, 2012 – C. Dukes Scott Letter (PURC Letters 000355-0357)

In other Electric news, the ORS continues to fulfill its responsibilities and duties under the Base Load Review Act regarding the construction and budget of SCE&G's V.C. Summer Nuclear Units 2 and 3. A monthly New Nuclear Development meeting was held, as well as two on-site document reviews. In a conference call with Georgia Public Service Commission staff, mutual areas of interest that pertain to Shaw-Westinghouse were discussed. Shaw-Westinghouse is the contractor for both the Vogtle units in Georgia and Units 2 and 3 at V.C. Summer. (PURC Letters 000355)

April 27, 2012 – C. Dukes Scott Letter (PURC Letters 000362-0366)

The ORS continues to fulfill its responsibilities and duties under the Base Load Review Act regarding the construction and budget of the V.C. Summer Nuclear Units 2 and 3. A monthly New Nuclear Development (NND) meeting was held at the ORS, as well as two on-site document reviews. Also, a representative from Westinghouse visited the ORS and provided updates to ORS staff and SCE&G NND staff on the AP 1000 design and developments regarding NRC's review of the Fukushima nuclear plant incident. (PURC Letters 000362)

August 30, 2012 – C. Dukes Scott Letter (PURC Letters 000385-000388)

The monthly New Nuclear Deployment (NND) meeting for V.C. Summer Units 2 and 3 was held with representatives of SCE&G, and the purchase of Shaw Corporation by Chicago

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 45 of 126

PROBLEMS WITH CONSORTIUM

Bridge and Iron (CBI) was discussed. NND representatives view this purchase as a positive development, given the vast construction experience of CBI. Also, ORS Electric, Legal, and Audit staff met with NND senior executives to discuss various issues related to construction of the Units. (PURC Letters 000385)

Testimony of Stephen A. Byrne, Ex Parte Hearing, Hearing No. 13-11350, June 26, 2013, Transcript at 64.

"Now, we do have what we call commercial issues with the consortium, that we deal with on a daily basis."

August 12, 2014 – C. Dukes Scott Letter (PURC Letters 000474)

The New Nuclear Consortium (Chicago Bridge & Iron and Westinghouse Electric Co.) has given SCE&G a preliminary revised construction schedule for V.C. Summer Station Units 2 and 3. The schedule indicates that the substantial completion of Unit 2 would occur in late 2018 or during the first half of 2019. The previous date of completion for Unit 2 was the fourth quarter 2017 or first quarter 2018, with Unit 3 being substantially complete approximately 12 months later. These dates do not reflect all of the possible mitigation efforts, nor has SCE&G accepted this new schedule.

According to SCE&G, the proposed extension to the construction schedule is primarily due to delays in the fabrication and delivery of modules from the Consortium. The Consortium has not yet provided SCE&G with any updated cost data, and SCE&G has not accepted responsibility for any delay—related costs. SCE&G anticipates receiving cost estimates by the end of this quarter.

The next step for SCE&G is to have its nuclear construction team, along with Santee Cooper, review the schedule information to validate assumptions and work with the Consortium to reconcile any differences. SCE&G will then start a negotiation process. Much of this negotiation will be predicated on their "entitlement" to recover said costs. The goal is to conclude this process by the end of this year. Once a revised schedule is finalized, SCE&G will petition the Public Service Commission to approve the modified capital cost and construction schedules for the project.

SCE&G hosted a public call August 11, 2014 at 3 p.m. regarding this delay. The replay of the call is available at www.scana.com. (PURC Letters 000474)

September 30, 2014 – C. Dukes Scott Letter (PURC Letters 000478-000481)

According to SCE&G, the Consortium has continued to experience delays in schedule for fabrication and delivery of submodules for the Units and that these schedule delays are the primary purpose for issuing a Revised Schedule. SCE&G has not agreed to the Revised Schedule or accepted responsibility for any delay-related costs; SCE&G expects to have discussions with the Consortium regarding such responsibility. (PURC Letters 000478)

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 46 of 126

PROBLEMS WITH CONSORTIUM

Testimony of Stephen A. Byrne, Ex Parte Hearing, Hearing No. 14-11448, October 15, 2014, Transcript at 84.

"[W]e are disappointed with the CB&I performance and the level of improvement, or the pace of improvement, at the Lake Charles facility. That continues to be problematic for us. So we would love to sit here today and tell you that everything is rosy with CB&I, and we're completely happy with everything they're doing, but we're not. And a lot of it is with the level of effort and the pace of improvement."

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 253-254.

"It is a critical necessity for the project that we effectively enforce the EPC Contract for the benefit of the customers of SCE&G and Santee Cooper. But effectively managing a project of this scope and complexity also requires a close working relationship between the owners and the contractor. This leads to an important challenge, that of maintaining an effective working relationship with WEC/CB&I in spite of mounting commercial disputes over the rights of the parties under the EPC Contract. Striking the proper balance between these two potentially conflicting requirements is a challenge now and will be an increasing challenge going forward. Failure in either direction could be a risk to the project. This effort is complicated by the high level of turnover in WEC/CB&I project management. The senior on-site project managers have resigned, or have been replaced several times since the project began. This turnover has made establishing and maintaining effective working relationships a challenge."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 141-43.

(Cross examination by Robert Guild)

"We have been in discussions with the consortium on numerous occasions since we got the revised integrated schedule. I believe it was in August of last year, and the cost data that went with that schedule followed shortly thereafter. Once we got the cost information, we put a team together on the site, at the project, to review the schedule, to understand the assumptions they'd made, and to challenge the costs and the data that was in that schedule to determine, one, if we thought it was a reasonable estimate to reflect what it would take to complete the plants, based on the timeline they had given us. Our team on site agreed with the costs as the best estimate we had at the time and what it would take to complete the plants by June of '19—Unit 2 in June of '19 and Unit 3 in June of 2020. And based on that, we then began to negotiate over who would be responsible for the costs. So we didn't have a dispute over what the costs were and whether or not they were reasonable; it was a question of accountability or who would be actually the one to pay the costs."

...

We have talked with the consortium about our disagreement with those costs, and the reasons giving rise to those costs, principally—the delay in the structural submodules that have been delivered to us, and some productivity factors based on the work that's being performed at

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 47 of 126

PROBLEMS WITH CONSORTIUM

the plant—and do not believe that we are responsible for paying these costs. We have identified those cost to them. We have, you know, not gone to a legal proceeding at this point, but, certainly, that's an option we will have at some point down the road if we can't find a fair resolution."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 146-148.

(Cross examination by Robert Guild)

"The consortium—I need to be honest with the Commission—they have a position that's very different from ours, which is why we're in negotiations....Certainly, we've identified in our testimony that we don't think the consortium is in compliance with the contract, specifically in the areas of the submodules that are delivered to the plant site, to comprise the modules that are put together there, and in their productivity on the site."

September 30, 2015 Quarterly Report at 15.

"During the period, SCE&G learned that work to incorporate certain design changes to submodules being constructed at CB&I-LC had been delayed due to a commercial dispute between CB&I and WEC concerning responsibility for the cost of the changes."

Letter from Dukes Scott to SCE&G, October 14, 2015

"On September 10, 2015, ORS consultant, Gary Jones, visited Greenberry and Vigor (previously Oregon Iron Works) module-fabrication facilities located near Portland, Oregon. Below are ORS observations and recommendations resulting from Mr. Jones' visit; SCE&G needs to:

****

- Continue to pursue the release of design-change documentation to the fabricators. Changes have been held by CB&I and not released to the fabricators because of contract cost-dispute issues between Westinghouse and CB&I."

Executive Director Questionnaire, Fiscal Year 2015-2016, Performance Summary for: C. Dukes Scott Executive Director (General Reports 000517-0547)

Construction continues to make progress, with 36 of the 146 BLRA milestones remaining as of June 2016. However, the project has been plagued by challenges including, among others, the dissolving of the project's consortium; exit of CB&I; arrival of Fluor; new engineering, procurement and construction contract; increase in the budget; and a further delay in the construction schedule. (General Reports 000532-0533)

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 48 of 126

PROBLEMS WITH CONSORTIUM

Post-Bechtel Report

April 29, 2016 – C. Dukes Scott Letter (PURC Letters 000559-000562)

The ORS continuously monitors the construction of V.C. Summer Nuclear Units 2 and 3 (Units). ORS representatives met with Carl Churchman, Westinghouse Vice President and Project Director and Jeff Hawkins, Fluor Vice President and Site Director, to discuss the status of the project and their views on the transition process. This was the ORS' first meeting with Fluor's Site Director. Both provided informative and candid responses to the ORS' questions. They recognize the major issues confronting the project and are working diligently to resolve them. Among the major areas discussed were the following:

- ...

The ORS is aware of and concerned about recent news media reports regarding the financial stability and viability of Westinghouse's parent company, Toshiba. ORS and SCE&G are both tracking the situation. Toshiba has taken a number of recent steps to improve its financial situation, including selling non-core business units. The EPC contract contains several provisions to help mitigate the risks associated with Toshiba's financial health. Per the EPC contract, Westinghouse is required to provide letters of credit, calculated annually and based on a portion of the estimated construction costs, if Westinghouse's credit rating reaches a certain level. The EPC contract also contains a provision that allows SCE&G to request that certain intellectual property associated with construction be escrowed. SCE&G is in the process of evaluating the extent to which they would like to exercise this escrow provision.

...

(PURC Letters 000559-000560)

June 30, 2016 Quarterly Report at 12.

"Commercial issues between WEC and CB&I related to mechanical modules produced by CB&I-LC remain partially unresolved and are impacting mechanical module production schedule. WEC has undertaken schedule mitigation planning related to this issue. Potential critical-path mechanical modules that had been assigned to CB&I-LC are being shipped to the site in kit form and are being fabricated there. Production of these modules, and other structural and mechanical modules, remains an important focus area for the project."

Pre-filed Direct Testimony of Kevin B. Marsh, July 1, 2016, 2016-223-E, Transcript at 55-56.

"After the July 2015 BLRA update hearing, we continued our efforts to negotiate a resolution with the Consortium. At that time, it became increasingly apparent that disagreements between Westinghouse and CB&I were impeding our attempts to negotiate a settlement with them jointly. In our discussions, we sensed a distinct lack of cooperation and agreement between the Consortium partners. It became obvious to us that there were commercial disputes between those two companies that were causing relationships to deteriorate. But because the Consortium

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 49 of 126

PROBLEMS WITH CONSORTIUM

documents are confidential to us, we did not have a window into those disputes. However, it was clear that the Consortium was not unified in addressing the challenges facing the project.

Outside of our direct negotiations with the Consortium, it became clear that the Consortium partners were in dispute about key matters, such as who was responsible to pay for the schedule mitigation plans of certain subcontractors and who would pay the subcontractors' costs for making late-in-the-process design changes in certain components and submodules. These disputes were threatening efforts to maintain and improve the project schedule.

During the first week of September 2015, Westinghouse and CB&I requested a meeting with us and Santee Cooper. At the meeting, CB&I communicated to us its desire to exit the project and refocus its business on other areas. Under its new direction, CB&I would continue to offer nuclear maintenance and refueling services to the industry, but they no longer wanted to be in the nuclear-power-plant construction business. CB&I further stated its belief that the negotiations between the Consortium, SCE&G and Santee Cooper had stalled and we were headed toward litigation over the costs that SCE&G and Santee Cooper were disputing. The Consortium representatives told us that the litigation related to the two AP1000 units SNC is constructing at the Vogtle site in Georgia had been very expensive, time-consuming, and distracting to the orderly progress of the project. CB&I expressed its belief that it would be in the best interest of all parties if CB&I were to exit the project and a different path forward could be found.

At that juncture, Westinghouse and CB&I told us that they had tentatively resolved their internal disputes through an agreement which would allow CB&I to exit the Consortium."

This same testimony is also provided in the summary of Kevin Marsh's testimony at 37 and at pages 109-110.

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 421-422.

"... Internal Consortium agreements and interactions are confidential as to us. However, by mid-2015, disputes were spilling over into the supply chain and impeding action on important issues. The disputes seemed to be about who in the Consortium was responsible for paying for unanticipated costs in Fixed or Firm cost categories. Important matters were being delayed while the Consortium partners worked out their differences.

At the same time, the Consortium would not engage SCE&G and Santee Cooper in meaningful negotiations about the outstanding disputes we had with them. It seemed to us that CB&I and Westinghouse were avoiding negotiating with us rather than presenting us with a divided front.

We also understood that Consortium members were coming under financial stress because of the large payments SCE&G had begun to withhold in 2015. SCE&G did so to protect its rights under the EPC Contract and to put pressure on the Consortium to improve its schedule and efficiency performance. The Consortium disputed our right to withhold these payments. But in the end, we withheld payments worth over $135 million on a 100% basis. It was not clear what the Consortium would do in response. But we considered litigation to be a likely result.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 50 of 126

PROBLEMS WITH CONSORTIUM

When we met in September of 2015, CB&I stated that in its opinion the project was headed toward litigation, certainly between the Consortium and Santee Cooper and SCE&G, and possibly between members of the Consortium itself. Going to litigation could have been highly damaging to the project."

Pre-filed Testimony of Gary Jones, ORS, September 1, 2016, 2016-223-E, Transcript at 905.

"This contractual ownership change is a positive step forward in completing the Project. The commercial relationship between WEC and CB&I had deteriorated to the point that it was jeopardizing the completion of the Units. I view CB&I's exit as a necessary change."

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 107.

"I believe the issues we talked about in the July hearing and also when we came back in the *ex parte* in November had to do with our relationship with Westinghouse and CB&I. We had indicated in the July hearing that there were a number of issues that were in dispute that we continued to try to resolve with the consortium in a favorable manner for customers. We felt like the amendment to the EPC contract that was signed with Westinghouse in October gave us a chance to resolve those issues, and our effort in November was to update the Commission as quickly as possible as to what had happened, because they showed a keen interest and encouraged us to work extremely hard to resolve those issues at the hearing in July. So that's what we were discussing with the Commission in November."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 392.

"From the project-management perspective, the amendment came at an opportune time. Prior to the amendment, CB&I was experiencing problems as the construction lead in improving labor productivity and meeting schedule goals. SCE&G had been using what it believed to be its rights under the EPC contract to put financial pressure on Westinghouse and CB&I to correct inefficiencies. Disputes between SCE&G and the consortium of Westinghouse and CB&I were escalating and moving towards litigation. Litigation would have been expensive and disruptive, and, worse, it would've made it difficult to agree on schedule mitigation plans and for the parties to communicate openly and cooperate freely in managing the project.

The amendment took us off that course. Westinghouse is now the sole entity responsible for all decisions and all costs under the EPC contract. This change will streamline decision-making, reduce inefficiencies, and allow any disputes to be addressed more quickly. The amendment also cleared the way for Westinghouse to bring the Fluor Corporation into the project...."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 51 of 126

PROBLEMS WITH CONSORTIUM

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 503-504.

(Cross examination by Sandra Wright)

"A: When CB&I came on the project, we thought that they would be an improvement over the Shaw Group, and we were optimistic based on the performance of the CB&I Services group on the site with the shield building contraction, that we would see an improvement in worker efficiencies and those kind of things. That did not materialize.

Q: When did you realize that wasn't materializing?

A: Exactly when, I don't know. But we gave them some opportunities over a year, or so, to come up with improvements. Those improvements weren't happening, and then we starting challenging them on those and started withholding money."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 528-529.

(Cross examination by Sandra Wright)

"A: [Westinghouse] had a myriad of problems and issues. One of the biggest problems and issues is that the consortium partners were not getting along. You know, we saw some of that. We certainly didn't see all of it. Obviously, as a consortium, they had a consortium agreement that we were not privy to, so they had commercial disputes between the two companies. They resolved those as they have exited. So Westinghouse won't have the excuse that they can point at CB&I any longer, and CB&I would, at times, point at Westinghouse, so they were pointing fingers at each other. That issue has gone away because it's now Westinghouse's responsibility."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 572.

(Cross examination by Robert Guild)

"Q: So, Chicago Bridge & Iron, as we've been told and as you've told us, was largely responsible for much of the productivity shortfalls, quality shortfalls, that got us where we are today in terms of additional costs and delaying the project; isn't that the case?

A: CB&I was, yes.

...

Q: And CB&I, therefore, incurred liability to SCANA/SCE&G for those contractual failures to meet schedule, to meet productivity requirements, and to produce product that met quality standards; isn't that the case?

A: Certainly, that was a contentious point between us."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 52 of 126

2. PRODUCTIVITY

Bechtel Conclusions: Issues to be Resolved, p. 61-62

- Construction productivity is poor for various reasons including changes needed to the design, sustained overtime, complicated work packages, aging workforce, etc.
- The indirect to direct craft ratio is high.
- Field non-manual turnover is high.

Pre-Bechtel Report

March 31, 2015 Quarterly Report at 4-5.

"SCE&G sent WEC/CB&I a letter on May 5, 2015, after the close of the reporting period, outlining certain steps SCE&G intends to take to withhold payment of invoiced amounts related to delay and performance factors."

This statement was repeated in the June 30, 2015 Quarterly Report.

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 277.

"At present, SCE&G is challenging several categories of costs being billed to it by WEC/CB&I. Those challenges include:

...

3. Cost invoiced by WEC/CB&I which are the result of WEC/CB&I not meeting productivity factors. SCE&G believes that WEC/CB&I is under a contractual obligation to efficiently conduct its construction activities, and some or all of any labor costs based on failure to meet productivity factors is WEC/CB&I's payment responsibility."

Pre-filed Direct Testimony of Carlette L. Walker, May 26, 2015, 2015-103-E, Transcript at 616-617.

"[T]he cost increases in these categories are primarily attributable to the delay caused by the inability of the module fabrication facility in Lake Charles, Louisiana, to produce submodules for the project in a timely fashion. WEC/CB&I also has not met the overall productivity factors on which its original cost estimates were based and has increased its labor productivity factors resulting in increased Direct Craft Labor cost for the project. Design changes by WEC also have increased the anticipated number of LARS [License Amendment Requests] required during the construction process, and WEC projects that additional licensing support will be necessary to process these LARs. Finally, WEC has proposed to increase the ratio of Indirect Craft Labor to Direct Craft Labor and the ratio of Field Non-manual Labor to Direct Craft Labor. SCE&G asserts that WEC/CB&I is contractually responsible for these issues and the resulting increases in the Delay and Other EAC cost."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 53 of 126

PRODUCTIVITY

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, at Transcript 256-258.

"For various reasons, to date WEC/CB&I has not met the overall PF on which its original cost estimates were based. In preparing the Revised, Fully-Integrated Construction Schedule, WEC/CB&I forecasted an increase its PF across the board. (The higher the rate indicates more hours required for a task). SCE&G has not accepted responsibility to pay for this increased labor. Unfavorable productivity factors have been a matter of frank and direct discussion between the parties, and WEC/CB&I's senior leadership has recognized the need to improve in this area. In justifying their confidence in the revised rate on which the current construction schedule is based, WEC/CB&I points to things like reduced delay in submodule production, increasing levels of design finalization, and lessons learned from construction of the first AP1000 unit in China. They also point to the increasing adaptation by the project's work-force to the requirements of nuclear construction. They further reference the assumption that productivity for Unit 3 will improve due to the experience gained in completing similar scopes of work on Unit 2.

SCE&G fully supports WEC/CB&I in its efforts to improve labor productivity and will continue to monitor WEC/CB&I's performance and demand improvement. But the possibility that WEC/CB&I will fail to meet current productivity assumptions for the project represents an important risk to both the cost forecasts and the construction schedule for the project."

Pre-filed Direct Testimony of Kevin B. Marsh, May 26, 2015, 2015-103-E, Transcript at 88-90 (quoting Combined Application, Docket No. 2008-196-E, Exhibit J, p. 6-12)

"SCE&G's 2008 BLRA application acknowledged that, "[f]or a project of the scope and complexity of the licensing and constructing of the Units, any list of potential risk factors compiled at this stage of the process will not be exhaustive." Petition, Docket No. 2008-196-E, Exhibit J, p. 12. With that caveat, SCE&G listed the specific risks that seemed most important at the time. Among the risks specifically enumerated at that time were many, if not all, of the risks that have resulted in the current update filing: ...

- Construction Efficiencies: "The project schedule and costs are based on efficiencies and economies anticipated from the use of [standardized designed and advanced modular construction processes]. . . . However, standardized design and advanced modular construction has not been used to build a nuclear facility in the United States to date. The construction process and schedule is subject to the risk that the benefits from standardized design and advanced modular construction may not prove as great as anticipated.".... "

June 30, 2015 Quarterly Report at 2-3.

"It is SCE&G's position that the delay and the majority of the increased costs reflected in the current schedules have been due to WEC/CB&I's failure to meet its contractual obligations related to structural module fabrication, timely design finalization, labor productivity, indirect labor costs and other matters, all despite SCE&G's repeated insistence upon improvements in

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 54 of 126

PRODUCTIVITY

performance. Accordingly, SCE&G has advised WEC/CB&I that it remains contractually obligated to satisfy the Guaranteed Substantial Completion Dates previously agreed to in the EPC Contract and other obligations under the EPC Contract, and WEC/CB&I is liable for costs associated with delay and other matters."

Direct Testimony of Stephen A. Byrne, July 21, 2015, 2015-103-E, at Transcript 217.

"It is taking the consortium too much time and too much labor expense for the scopes of work required to complete the project. For the current schedules to be achieved, the consortium must improve the productivity factors of their workforce. Unfavorable productivity factors have been the matter of frank discussions between the parties, and the consortium's senior leadership recognizes the need to improve in this area."

July 30, 2015 – 7/30/2015 ORS Review of Quarterly Report at 22

SCE&G has identified in its Petition that the low productivity of the construction work force has increased the cost of the Project. Corrective measures have been identified to improve this productivity, but the impact of these corrective measures is not yet known. ORS has been concerned with this issue for some time, but it was not definitively apparent until the revised budgets were formulated. Low productivity could also affect schedule performance.

September 30, 2015 Quarterly Report at 10.

"SCE&G continues to monitor WEC/CB&I's labor productivity. Labor productivity continues to be a major challenge for the project. WEC/CB&I is analyzing the factors impeding productivity and is reporting on its efforts to resolve this issue. This is a focus area for the project."

Gary Jones' Additions to October 27 & 28, 2015 ORS Site Visit Agenda (G.J.E.-Mail.2015.Vol.2.001405-001410)

"Discuss additional plans to improve the productivity of on-site construction labor. All areas continue to show productivity factors well above the stated goal of 1.15. Mitigation and improvement plans over the previous 6 months do not appear to have resulted in any significant improvement. (Commercial Review Meeting slides of 2015-09-17, Slides 9 – 15 and summary of the Construction Effectiveness and Efficiency program)."

Letter from Dukes Scott to SCE&G, December 14, 2015

"The increased labor productivity rates necessary to attain the completion dates for the Project have not been realized, and no discernable progress has occurred. Some additional delays can be expected in the transition relating to CB&I's departure and Fluor coming up to speed; therefore, it is difficult to understand how these delays, coupled with the continued below-par productivity rates, support the Project completion dates. This issue will need to be addressed by SCE&G once the transition is completed."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 55 of 126

PRODUCTIVITY

December 31, 2015 Quarterly Report at 2.

"To aid in the transition, WEC and Fluor convened 25 work stream review teams which met during the period to evaluate key aspects of this project and the sister AP1000 construction project, the Southern Company's project to construct Vogtle Units 3 & 4. The goals of these 25 work stream review teams were to streamline processes, eliminate inefficiencies and identify means to increase the levels of productivity and accountability for key work processes. SCE&G personnel participated on multiple work teams as did personnel from Southern Company. As a result of these efforts, WEC and Fluor are moving to standardize and simplify work packages for construction activity related to the nuclear islands (NIs) for the four units, streamline the processes for the transfer of equipment between suppliers and contractors, and minimize design changes being communicated to module and submodule vendors."

December 31, 2015 Quarterly Report at 3.

"Fluor is in the process of updating the construction schedule for the Units to reflect the changes due to the Settlement and its review of the work streams. The activities associated with the transition, specifically achieving the anticipated improvements in efficiency and productivity, along with meeting the new construction schedule when issued, are principal focus areas for SCE&G. Schedule mitigation will be required to meet the substantial completion dates agreed to in the Settlement."

December 31, 2015 Quarterly Report at 9.

"Labor productivity improvement continues to be an important focus area for the project. WEC and Fluor are working on a plan to increase productivity as direct responsibility for on-site construction shifts to Fluor."

Letter from Dukes Scott to SCE&G, January 5, 2016

"If the productivity and efficiency gains required to complete this project in a timely manner and within budget are to be realized, Fluor will need to leverage its vast experience in this area through utilizing specific work processes and management controls, which it can do only if it is granted direct responsibility for the craft labor."

January 31, 2016 – C. Dukes Scott Letter (PURC Letters 000547-000550)

We are concerned that Fluor is functioning only as a subcontracted construction manager and has not assumed full responsibility for the craft labor on the site. If the productivity and efficiency gains required to complete this project in a timely manner and within budget are to be realized, Fluor will need to leverage its vast experience in this area through utilizing specific work processes and management controls, which will be difficult if it is not granted direct responsibility for the craft labor.

...

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 56 of 126

PRODUCTIVITY

We believe SCE&G intends to take a more active role in ensuring that construction work packages are properly prepared and complete, which includes the proper staging of the required equipment and commodities. One of the most significant drains on project construction productivity has been the inability to maintain the craft focused on a work activity due to incomplete or inadequate work packages and material availability. Ensuring accurate and complete preparation of construction work packages should be a top priority that is continually monitored.

Post-Bechtel Report

March 31, 2016 – C. Dukes Scott Letter (PURC Letters 000555-000558)

As of this date, the following is an ORS assessment of the status of the Units.

. . .

Our actual experience has been that:

...

- Construction productivity rates were lower than planned and lower than those experienced in China,

Challenges to the project remain in several key areas, such as:

...

- Productivity continues to be lower than needed to meet construction schedules,

...

o The focus moves to operator training and operations-and-support staff readiness.

...

March 31, 2016 Quarterly Report at 1.

"To mitigate the construction schedule, Fluor has implemented changes to the schedules that construction crews are working. A limited night shift of approximately 300 craft workers is in place. Fluor plans to expand to a full night shift of more than 1,000 craft workers when hiring and training make this feasible. Availability and retention of labor is the principal limiting factor for mitigating the project schedule through a more aggressive labor schedule."

March 31, 2016 Quarterly Report at 2.

"Since the Amendment was signed in the last quarter, Fluor has initiated or proposed a total of 28 Functional Area Assessments (FAAs) to improve project efficiency and schedule

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 57 of 126

PRODUCTIVITY

performance by assessing and restructuring individual work streams. These FAAs are being conducted in collaboration with WEC, SCE&G and Southern Nuclear Company (SNC). Fifteen FAAs have been initiated; seven FAAs are complete. The results of three are fully implemented. These initial FAAs have focused on safety, change management, quality control programs, commercial grade dedication, field engineering, construction programs/productivity, facilities plans, equipment plans and construction permitting. Fluor's review of the Integrated Project Schedule (IPS) continues and will incorporate changes due to the Amendment, the FAAs, and the analysis of schedule mitigation plans."

April 29, 2016 – C. Dukes Scott Letter (PURC Letters 000559-000562)

"The ORS continuously monitors the construction of V.C. Summer Nuclear Units 2 and 3 (Units). ORS representatives met with Carl Churchman, Westinghouse Vice President and Project Director and Jeff Hawkins, Fluor Vice President and Site Director, to discuss the status of the project and their views on the transition process. This was the ORS' first meeting with Fluor's Site Director. Both provided informative and candid responses to the ORS' questions. They recognize the major issues confronting the project and are working diligently to resolve them. Among the major areas discussed were the following:

- Craft Labor Transition — Fluor is in the process of assuming direct responsibility for the craft labor and support personnel previously employed by Westinghouse. The official transition was scheduled to occur from April 2 through April 4. As of April 4, all craft labor that is not otherwise subcontracted will be Fluor employees, even changing to Fluor tan-colored hardhats. Westinghouse will retain some employees at the management level.

- ...

- Process and Procedure Review — Westinghouse and Fluor are reviewing the major site processes and procedures and are instituting improvements where they find opportunities to do so. They anticipate completing these reviews and putting revisions in place by June 2016.

- Productivity Improvement Plan — A productivity improvement plan has been developed that sets goals for productivity factors based on overall sustained project completion of 1% per month by the end of June, increasing to 2% per month by the end of the year, and to 3% per month by the end of March 2017. This plan includes implementing a two-shift schedule, with each shift working ten hours per day, six days per week.

- ...

- Fluor Recruiting Network — Fluor is using its worldwide network to replace certain personnel and to expand the labor force on site. This process is expected to lead to a significant increase in site staffing in the near future.

...

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 58 of 126

PRODUCTIVITY

The work activity level has noticeably increased at the site, and monthly progress is more visible than has been previously observed. The attitude of the craft labor also appears to have improved, as was manifested by many friendly greetings during the ORS' site tour. A positive attitude can benefit the work environment and increase productivity.

While significant challenges to the project remain, Westinghouse and Fluor have added leadership to the project to try to effect the required changes and improve project processes and performance. However, the true impact of these recent changes remains to be seen and will need to be closely monitored over the next several months." (PURC Letters 000559-000560)

Letter from Dukes Scott to SCE&G, May 13, 2016

"Construction labor productivity rates and overall productivity improvements have not yet significantly increased, although the activity levels have increased. Craft labor manpower increases will need to occur soon if there is to be a chance of meeting project completion dates. Process changes in several areas such as welding, procurement, and work-package preparation and closure will also soon need to be implemented to meet completion schedules."

May 31, 2016 – C. Dukes Scott Letter (PURC Letters 000563-000567)

"Thus far during our review process, the ORS has identified the following concerns:

. . .

Concerns

...

- The repairs to Turbine Building Bay 1 relating to an unacceptable concrete cold joint have been significantly delayed and are not progressing well. The hydrolasing contractor, who had been removing concrete from the affected area, did not meet promised productivity levels. SCE&G has ceased hydrolasing activities and is now pursuing alternate paths to resolve this issue.

- Progress on the Turbine Buildings continues to be significantly behind schedule (up to 6 months late in some cases), primarily due to craft labor shortages and diversion of labor to Nuclear Island work. SCE&G is working with Fluor and the nuclear construction organization within Westinghouse (WECTEC) to address this issue.

- Continuing commodity shortages have resulted in delays. Fluor is scheduled to assume greater responsibilities in commodities purchasing and control. Commodities had previously been procured on a "just-in-time" basis. The visibility of commodity needs on construction planning documents has been enhanced. As Fluor's role in the project increases, commodities purchasing and control is an area with opportunities for improvement.

- Construction labor productivity rates and overall productivity improvements have not yet significantly increased, although the activity levels have increased. Craft labor manpower increases will need to occur soon in order to support project completion dates. Process changes

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 59 of 126

PRODUCTIVITY

in several areas such as welding, procurement, and work-package preparation and closure will also soon need to be implemented to meet completion schedules.

..."

(PURC Letters 000563-000567)

Gary Jones' Summary of June 2016 VCS 2&3 Site Visit and Recommendations (G.J.E-Mails.2016.Vol.1.001497-001503)

"Westinghouse and Fluor continue to struggle with craft labor productivity. While a slight improvement was shown during the first three months of Fluor's tenure on site, the most recent two months have trended negatively, with a performance factor now hovering around 2.0, meaning only about half the work is being done for the labor hours expended. The project has never attained the revised 1.15 performance factor that was the basis of the approval of Order Number 2015-661. Fluor's efforts to implement process changes through their Functional Area Assessments and subsequent improvement recommendations appear to be a step in the right direction; however, the efforts and the implementation of the improvements are moving much too slowly. This effort needs to accelerate dramatically if the project is to meet its scheduled completion dates."

...

"Fluor's recruitment efforts to increase craft labor are not meeting the required targets, and the year-end goal of increasing on-site craft labor by 1000 is in jeopardy. Fewer numbers than needed are applying, rejection rates are higher than expected due to lack of qualifications, failed background checks, no-shows and other reasons and candidates are taking other jobs they consider more attractive. In addition, the attrition rate among existing craft employees is higher than expected, primarily due to termination due to continued absenteeism and resignations for other employment. This shortage of needed labor also places the completion dates in jeopardy."

Letter from Dukes Scott to SCE&G, June 30, 2016

"Westinghouse and Fluor continue to struggle with craft labor productivity. While a slight improvement was shown during the first three months of Fluor's tenure on site, the most recent two months have trended negatively, with a performance factor now hovering around 2.0. This score indicates that only about half the work planned is being done for the labor hours expended. Furthermore, the project has not attained the improved productivity factor of 1.15 that formed the basis for the approved schedule and budget in Order No. 2015-661. Fluor's efforts to implement process changes through their Functional Area Assessments and subsequent improvement recommendations appear to be a step in the right direction; however, the assessments and the associated implementation of identified improvements are moving much too slowly. This effort needs to accelerate dramatically if the project is to meet its scheduled completion dates."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 60 of 126

PRODUCTIVITY

June 30, 2016 Quarterly Report at 2.

"Westinghouse Electric Company, LLC (Westinghouse or WEC) and Fluor continue to conduct a series of Functional Area Assessments (FAAs) defining actions to streamline processes and implement performance improvements. Changes identified in the first round of FAAs are being implemented. Fluor's integration into the project continues with the assignment of key personnel to project management functions and with changes in roles and reporting structures to increase clarity regarding the division of responsibility among leadership teams and functional areas."

June 30, 2016 Quarterly Report at 2.

"To mitigate delays in the construction schedule, Fluor continues to operate a 2-6-10 and 1-5-10 schedule, *i.e.,* construction crews are scheduled to work six ten-hour days for two weeks, then five ten-hour days for one week."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 421-422.

"When CB&I became the Consortium's construction lead in 2013, there was good reason to expect positive results. An operating division of CB&I, CB&I Services, had been on site for several years fabricating the containment vessels for the Units. After some initial quality issues that were quickly resolved, CB&I Services' work was consistently timely and of high quality. In its role as construction lead, however, CB&I did not succeed as expected in improving construction productivity on the site or resolving quality issues and timeliness issues at submodule suppliers."

Pre-filed Direct Testimony of Kevin B. Marsh, July 1, 2016, 2016-223-E, Transcript at 53-57.

"Over the last several years, SCE&G and its partner, Santee Cooper, have put increasing pressure on the Consortium to improve construction efficiencies and correct supply chain problems particularly as related to submodule fabrication and fabrication of other components. Initially, we sought to increase pressure on the Consortium through techniques such as increased Quality Assurance and Quality Control (QA/QC) staffing and heightened levels of QA/QC inspections and audits on-site and at key suppliers' locations worldwide. SCE&G posted full-time QA/QC inspectors at the most important suppliers' off-site facilities. We conducted regular oversight meetings with the Consortium. We regularly and very emphatically escalated issues of concern to senior levels within the Consortium and followed up on those issues. We were supported in this effort by our partner, Santee Cooper, and Southern Nuclear Company ("SNC") which is constructing two AP1000 units at its Vogtle site in Georgia.

However, in the years leading up to the Amendment negotiations, we became increasingly frustrated with the results the Consortium was achieving. In July 2014, we began to withhold large payments for calendar-based EPC payments where we did not believe sufficient

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 61 of 126

PRODUCTIVITY

progress had been made to support the amount of the required payments. We also returned invoices unpaid where they reflected additional costs caused by delay or other inefficiency (like additional storage and maintenance cost for equipment stored on site).

Furthermore, under the EPC Contract, SCE&G and Santee Cooper were required to pay actual prices for Craft Labor and supporting indirect labor (i.e., on-site labor to support direct craft workers) and associated materials and supplies. As the project progressed, we became very concerned with poor labor productivity and poor efficiency ratios for indirect labor costs. In June 2015, we began re-computing invoices for these expenses as if the project had met projected productivity and efficiency factors on which earlier project budgets had been based. We disputed the amounts that exceeded the recomputed invoices based on the assertion that the failure to meet the initial projections constituted a failure to use "Good Industry Practices" as required by the EPC Contract. ...

In our last proceeding before this Commission, we committed to you that we would continue to negotiate with the Consortium to reduce these costs and to resolve these matters."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 448-449.

"The Consortium argued that the productivity and efficiency ratios that it used in preparing the prior forecasts were estimates only and SCE&G and Santee Cooper were contractually at risk to pay actual costs. In response, SCE&G and Santee Cooper argued that the EPC Contract contained terms requiring the Consortium to construct the Units using "Good Industry Practice," which encompasses "the practices, methods, standards and acts engaged in and generally acceptable to the nuclear power industry in the United States." SCE&G and Santee Cooper asserted that the failure by the Consortium to achieve its earlier productivity and efficiency estimates was the result of the Consortium's failure to use Good Industry Practice."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 448.

"One group of challenged costs involved invoices that SCE&G and Santee Cooper refused to pay based on productivity concerns. As I indicated earlier in my testimony, beginning in June of 2015, for each invoice involving Target labor, we calculated an alternative invoice by applying the labor productivity factors and labor efficiency ratios that the Consortium used in its original project cost forecasts. (Labor efficiency ratios are the ratios of Indirect Labor and Field Non-Manual labor associated with Direct Craft Labor.) We disputed the difference between the actual and alternative invoices, and withheld 10% of the disputed amount as the EPC Contract provided."

July 8, 2016 – C. Dukes Scott Letter (PURC Letters 000572-000577)

"The ORS is currently in a heightened state of concern regarding the construction cost overruns and schedule delays for V.C. Summer (VCS) Nuclear Units 2 & 3 (the Units). Our concerns are outlined below and include SCE&G' s responses:

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 62 of 126

PRODUCTIVITY

1. ORS Concern: Westinghouse and Fluor continue to struggle with craft labor productivity. While a slight improvement was shown during the first three months of Fluor's tenure on site, the most recent two months have trended negatively. Furthermore, the project has not attained the improved productivity factor of 1.15 that was anticipated in the approved schedule and budget in Order No. 2015-661. Fluor's efforts to implement process changes through their Functional Area Assessments and subsequent improvement recommendations appear to be a step in the right direction; however, the assessments and the associated implementation of identified improvements are moving much too slowly. This effort needs to accelerate dramatically if the project is to meet its scheduled completion dates.

SCE&G Response: SCE&G asserts that SCE&G and Santee Cooper have initiated an effort with Westinghouse and Fluor to align the four companies on the top five project focus areas; the productivity factor will be addressed in one of these five areas, which is construction efficiency and schedule adherence. Fluor has analyzed the Shaw and CB&I Power project controls system and determined that it is necessary to convert the project to Fluor's controls system. Once completed, a more meaningful productivity factor can be monitored and used to identify issues by discipline/area and to more accurately predict resource needs. SCE&G anticipates that initiatives in the other four top focus areas—prevention and timely resolution of design issues, modules, construction resources, and procurement—will also improve the site craft productivity factor.

..."

(PURC 000572-000576)

Letter from Dukes Scott to SCE&G, July 12, 2016, incorporating SCE&G's Responses to June 30, 2016 Letter

"SCE&G asserts that SCE&G and Santee Cooper have initiated an effort with Westinghouse and Fluor to align the four companies on the top five project focus areas; the productivity factor will be addressed in one of these five areas, which is construction efficiency and schedule adherence. Fluor has analyzed the Shaw and CB&I Power project controls system and determined that it is necessary to convert the project to Fluor's controls system. Once completed, a more meaningful productivity factor can be monitored and used to identify issues by discipline/area and to more accurately predict resource needs. SCE&G anticipates that initiatives in the other four top focus areas—prevention and timely resolution of design issues, modules, construction resources, and procurement—will also improve the site craft productivity factor.

...

SCE&G replies that construction resources is a top five project focus area and that Fluor has provided metrics on recruiting and attrition to a much higher level of detail and greater depth than previously provided by CB&I. SCE&G further informs ORS that Westinghouse and Fluor are in the process of pursuing a number of mitigation strategies to increase the number of craft labor personnel including, among other things, evaluating craft compensation packages (mobilization, pay rate, per diem, retention incentive, etc.) against current markets for each

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 63 of 126

PRODUCTIVITY

discipline; subcontracting to augment direct hire craft; and relocating demobilized craft at other Fluor projects to V.C. Summer."

...

SCE&G has scheduled a review of the Functional Area Assessment reports and actions with ORS on July 27, 2016."

Gary Jones' Summary of July 26-28, 2016 VCS 2 & 3 Site Visit and Recommendations (G.J.E-Mails.2016.Vol.1.001339-001341)

"Craft labor productivity still continues to be an issue on the project. The target direct craft labor performance factors are still not being met and the overall productivity is still falling significantly short of the goals set by Westinghouse and Fluor earlier this year."

Letter from Dukes Scott to SCE&G, August 8, 2016

"Very informative briefings were provided by Carl Churchman (Westinghouse Vice President and Project Director) and Jeff Hawkins (Fluor Vice President and Site Project Director). They provided their perspective on the project status and the process improvements underway with respect to site industrial safety, the nuclear safety culture among the workforce, procurement, the project schedule, labor productivity and staffing, module fabrication and installation, field engineering and other aspects of the construction of the plant. Each voiced their deep commitment to completing the project and recognized several key challenges that must be overcome to meet the project schedule.

...

Craft labor productivity still continues to be an issue on the project. The target direct craft labor performance factors are still not being met and overall productivity is still falling significantly short of the goals set by Westinghouse and Fluor earlier this year. The previous monthly production goal for June was for approximately 1.25% of the work remaining to be completed during the month while the actual value achieved was 0.6%. The project construction was scheduled to be at about 25% complete by the end of June while it was actually at about 22% complete. This remains a serious issue that requires continued focus."

Pre-filed Testimony of Allyn Powell, ORS, September 1, 2016, 2016-223-E, Transcript at 725-726.

"Westinghouse has further indicated that the current construction schedule cannot be met without substantial improvement in current production and productivity rates. The current schedule requires the simultaneous use of numerous mitigation strategies, which are worked outside of the main schedule and increase ORS's concern regarding the uncertainty in the schedule. Meeting the current construction schedule will require substantial improvements in both productivity and production....ORS has seen positive changes recently, but with Fluor's fully resource-loaded construction schedule still outstanding a great deal of uncertainty remains. While ORS believes the sequence of construction activities to be valid, ORS has concerns these activities may take longer than previously estimated...."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 64 of 126

PRODUCTIVITY

Pre-filed Testimony of Gary Jones, ORS, September 1, 2016, 2016-223-E, Transcript at 902-903.

"In April 2016, Fluor assumed direct responsibility for craft labor on the Project after working with Westinghouse since January 2016. The evolution of this transition has been slower than anticipated, and as such the full impact of Fluor's process improvements has not yet been realized. However, there are significant process and procedural changes that are underway, which include implementing more streamlined and effective construction work packages to expedite work in the field, changes in the procurement areas to better ensure that construction commodities are available when required and do not delay welders, expedite the availability of welding commodities, and accelerate the welding production; and changes in the field engineering support to reduce turn-around time on design change requests and reduce construction delays.

These changes and other process improvements must be promptly implemented, in addition to significantly increasing the construction labor force, if the increased production levels required to support the Project schedule are to be obtained."

September 30, 2016 Quarterly Report at 7.

"During the period, Fluor continued to implement changes to streamline processes and implement performance improvements based on its Functional Area Assessments (FAAs). Fluor's review of the Integrated Project Schedule (IPS) is ongoing and review and issuance of the plan by WEC is expected to take place around the end of 2016."

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 197.

(Cross examination by Commissioner Fleming, addressing workforce)

"Q: And the workforce?

A: The workforce, they have taken quite a few measures. They have reached out extensively across the country to bring in additional workers. They've been pretty successful doing that. Although, with any project of this size you do have turnover, so while you are bringing in 10 you've got to make sure you don't have three leaving, so you get the net increase in the workers that you need. They've been successful in doing that, to date. They're going to continue to need to be more aggressive in terms of finding those workers as the work ramps up.

They've been unique and novel, I think, in looking at some of the approaches to address the work that needs to be done. They have a non-English-speaking group that they have negotiated with that comes in, where they can assign particular scopes of work to a group of people that are non-English speaking, but they have an English-speaking supervisor so he can communicate both with the Fluor and Westinghouse team and also effectively with the workers on-site. They've been successful at doing that. We have very few labor union workers on the site today, other than those from CB&I that continue to do some of the welding as a subcontractor, but they've been successful in doing that. They're also exploring the possibility

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 65 of 126

PRODUCTIVITY

of bringing in some union workers, again, where they can isolate that work effectively without impacting the ongoing construction team.

So I believe Fluor is pretty creative in trying to identify workers and make sure we can ramp the workforce up."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 395-396.

"In addition, one of Fluor's principal goals today is to implement mitigation plans to meet schedule goals. These mitigation plans will require more total units of labor, more shifts of workers on the site, and more supervisory and indirect labor to support those new work shifts. Westinghouse and Fluor will need to offer higher pay to attract workers who are willing to work the extended hours and these back shifts. For those reasons, we believe that the schedule mitigation will limit opportunities for improving the labor costs."

Also stated during cross examination by Commissioner Hamilton at Transcript page 624.

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 620-621.

(Cross examination by Commissioner Hamilton)

"Q: Have you been able to see, since you've been under the new contract, any improvement in the productivity and efficiency of employees on Unit 3 versus Unit 2?

A: We have seen increases in productivity on Unit 3 over Unit 2. It's hard to say whether those are a function of the contract or a function of Fluor, but had we not entered into the contract, we would not have gotten Fluor. So from that respect, you can say that it's a direct relationship with the contract.

The Westinghouse team, as well, has been changed somewhat on the site. Our Westinghouse team lead has been there for probably 18 months now, and that person seems to be driving towards meeting goals a lot better than his predecessors were...So what we're seeing is, they are hitting milestones. One of the things we're not necessarily seeing yet is the productivity improvements we need to see on Unit 2. Unit 3 is improving because, obviously, they learned lessons on Unit 2."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 657-658.

(Cross examination by Commissioner Fleming)

"Q: And so, you feel like working with Fluor is the answer to improve the productivity?

A: Yeah, I think Fluor is in a much better position to improve productivity than CB&I or Shaw ever were...."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 66 of 126

PRODUCTIVITY

October 31, 2016 – C. Dukes Scott Letter (PURC Letters 000590-000593)

"While there are still challenges and there is much work yet to be done, Westinghouse and Fluor appear to be working well, together with SCE&G, to address issues as they arise and bring them to a more timely resolution. Recently, some setbacks have occurred related to reinforced concrete, but working together they have been able to re-sequence construction in these areas to avoid schedule impacts. One area in which improvement has been slow to manifest is productivity factors. The ORS has been tracking this issue closely and is concerned about what these metrics may mean for areas of the plant off the current critical path for construction. The ORS was pleased to be informed that Westinghouse is also turning its attention to this issue and is completing a productivity evaluation on site, thereby looking at items such as site layout and more efficient staging of materials. Some of these productivity issues may also be due to the way work was tracked under a previous contract. The ORS is looking forward to the availability of the fully resource-loaded integrated construction schedule, which may affect the way these metrics are calculated to more accurately reflect subcontractors and give us better insight going forward. The fully resource-loaded integrated schedule is currently estimated to be available by the end of the calendar year." (PURC Letters 000591)

Gary Jones' Summary of January 24 & 25, 2017 Site Visit and Meetings (G.J.E-Mail.2017.Vol.1.000794-00795)

"Productivity still remains far below the targeted goals (0.6% per month vs. 3.0% per month target) and production is also significantly below the target."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 67 of 126

3. DESIGN FINALIZATION

Bechtel Executive Summary: Issues Facing the Project, p. 1; Conclusions: Top Priority Recommendations, p. 62

- The detailed engineering design is not yet completed which will subsequently affect the performance of procurement and construction.
- The issued design is often not constructible resulting in a significant number of changes and causing delays.

*****

- Consortium – Initiate a focused effort to complete WEC known engineering "debt". (O&Rs E2 and E9)
- Consortium – WEC engineering maintain focus on releasing the over 1,000 drawing holds that exist. (O&R E13)

Pre-Bechtel Report

September 30, 2009 Quarterly Report at 14.

"WEC maintains a system to track the design finalization schedule for major Engineering categories and to flag items where design finalization is below the WEC expectations. Currently, WEC has identified several below-expectation items or areas related to activities in the categories of Nuclear Systems Repair, Replacement and Automation Services; Instrumentation and Control; Valves; Piping; Mechanical Modules; and Procedures."

Summary: Organizational Evaluation Performance Measures FY 2012-2013 (General Reports 001003-01016)

"The ORS is monitoring ongoing challenges that could affect the project including design changes, labor conditions, shipping conditions, and the financial stability of manufacturers due to foreign financial market conditions, among others." (General Reports 0001012)

January 31, 2013 – C. Dukes Scott Letter (PURC Letters 000403-000407)

"The ORS continues to fulfill its responsibilities under the Base Load Review Act regarding the construction and budget of SCE&G's V.C. Summer Units 2 and 3. The monthly New Nuclear Deployment (NND) meeting was held with management representatives of SCE&G as well as an on-site document review conducted by ORS staff. Based upon information obtained via additional ORS monitoring activities of the V.C. Summer (VCS) construction, the ORS has identified the following ongoing challenges in the construction of the Units:

Nuclear Island Basemat — The most immediate challenge to the project is the Nuclear Island basemat concrete pour. This activity must be completed before further meaningful

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 68 of 126

DESIGN FINALIZATION

progress can be made on construction activities in the Nuclear Island. Due to the design and construction issues, approval by the NRC must now be obtained before this work can proceed. The full impact of the delay of the construction schedule is not yet known because the NRC approval date is uncertain, and the potential recovery activities are not yet identified.

...

Additional Challenges — The issues related to the basemat design -- as well as a portion of the issues relating to the structural modules and shield building modules -- are related to compliance with the design approved by the NRC. This structural design compliance is emerging as an issue affecting multiple areas of the project. Also, the delays in starting Unit 2 construction -- in particular those associated with submodule fabrication --may begin to challenge the ability of the project to work on both Units simultaneously while adhering to the approved schedule. This situation has the potential to result in significant challenges to the Unit 3 construction schedule. Other factors, such as design changes, labor conditions, shipping conditions, and the financial stability of manufacturers due to foreign financial market conditions must be monitored closely." (PURC Letters 000403-000404)

March 31, 2014 Quarterly Report at 17.

"As of March 31, 2014, the Units 2 & 3 plant design packages issued for construction (IFC) are 88% complete. This is a lower number than previously reported. WEC/CB&I has informed SCE&G that the change results from a change in the count of plant design packages to be produced due in part to the comprehensive review of engineering requirements which was underway at the close of the period (see Section I.C. above). SCE&G has requested WEC/CB&I to justify this position. IFC delivery from WEC/CB&I continues to be a focus area and SCE&G is conducting monthly oversight meetings with WEC/CB&I concerning this issue."

Testimony of Stephen A. Byrne, Ex Parte Hearing, Hearing No. 14-11448, October 15, 2014, Transcript at 10-11.

"And a big part of the problem is lack of design maturity, whether it's CB&I in Lake Charles or other vendors that have been fabricating parts and pieces, they have complained about the lack of design maturity and design changes as they're constructing."

Testimony of Stephen A. Byrne, Ex Parte Hearing, Hearing No. 14-11448, October 15, 2014, Transcript at 69.

"So we have had an issue with the degree of completeness of some of those engineering packages...Westinghouse and CB&I have undergone a design completeness review. They believe now that they've at least got all of their engineering deliverables identified, with due dates. So that's a big step forward. And we are also buoyed by the level of completeness of the projects in China. So changes from China will start to diminish as they near startup of those units. So the engineering completion has been an issue in the past. It's caused problems not just for the site but for some of our vendors."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 69 of 126

DESIGN FINALIZATION

Pre-filed Direct Testimony of Carlette L. Walker, May 26, 2015, 2015-103-E, Transcript at 616-617.

"Design changes by WEC also have increased the anticipated number of LARS [License Amendment Requests] required during the construction process, and WEC projects that additional licensing support will be necessary to process these LARs."

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 245-246.

"Design finalization has been an important risk factor for the project since its inception. As we stated in 2008,

> Under the current NRC licensing approach, there is engineering work related to the Units that will not be completed until after the COL is issued. Any engineering or design changes that arise out of that work, or the engineering or design changes required to address problems that arise once construction is underway, are potential risks which could impact cost schedules and construction schedules for the Units.

Combined Application in Docket No. 2008-196-E at Exhibit J, page 6.

The most challenging aspect of design finalization of the AP1000 Units is finalization of the Nuclear Island ("NI"). The NI includes the Shield Building and containment vessel which house the reactor, steam-generators, refueling equipment and passive safety components of the Units, and the Auxiliary Building, which houses other nuclear components of the plant. Design delay and design changes related to the NI have been a major source of delay in the project to date and have contributed to delay in submodule production. As of May 2015, design finalization for the NI was approaching completion, indicating that risks associated with this aspect of the project are being mitigated."

Pre-filed Direct Testimony of Kevin B. Marsh, May 26, 2015, 2015-103-E, Transcript at 88-90 (quoting Combined Application, Docket No. 2008-196-E, Exhibit J, p. 6-12).

"SCE&G's 2008 BLRA application acknowledged that, "[f]or a project of the scope and complexity of the licensing and constructing of the Units, any list of potential risk factors compiled at this stage of the process will not be exhaustive." Petition, Docket No. 2008-196-E, Exhibit J, p. 12. With that caveat, SCE&G listed the specific risks that seemed most important at the time. Among the risks specifically enumerated at that time were many, if not all, of the risks that have resulted in the current update filing:...

- Design Finalization: "[T]here is engineering work related to the Units that will not be completed until after the COL [Combined Operating License] is issued. Any engineering or design changes that arise out of that work . . . could impact cost schedules or construction schedules for the Units."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 70 of 126

DESIGN FINALIZATION

June 30, 2015 Quarterly Report at 2-3.

"It is SCE&G's position that the delay and the majority of the increased costs reflected in the current schedules have been due to WEC/CB&I's failure to meet its contractual obligations related to structural module fabrication, timely design finalization, labor productivity, indirect labor costs and other matters, all despite SCE&G's repeated insistence upon improvements in performance. Accordingly, SCE&G has advised WEC/CB&I that it remains contractually obligated to satisfy the Guaranteed Substantial Completion Dates previously agreed to in the EPC Contract and other obligations under the EPC Contract, and WEC/CB&I is liable for costs associated with delay and other matters."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 129.

(Cross examination by Robert Guild)

"We discussed that with the Commission at the initial filing, that these plants to be built at the Jenkinsville site, as well as the ones built at Vogtle by Georgia Power, are the only ones being built in the United States. However, there are four AP1000s under construction in China that started several years before our project started, and we expected and have received some design changes from that process. Mr. Byrne can address that in more detail. But we've tried to incorporate design changes that were considered necessary, that refined the original design, into our process. Of course, it takes time and effort to do that, and that has contributed to some of the delays we have encountered. Mr. Byrne can go into more detail, but there could be constructability issues by the fabricator as they take the design drawings and try to actually produce the work that's in the design drawings, and they have to go back to the designers to work through those issues."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 132-133.

(Cross examination by Robert Guild)

"On a project of this size, you know, design finalization is rarely completed when a project starts. We built our Cope generating facility, our coal fired plant, back in 1996. The design was not completed when that plant started construction. It's typically completed along the way and finishes in time to make sure the components are available and the design is available to finish the project. So there's design that takes place throughout the process.

We never represented to the Commission that the design was completed. We offered that this was a new design; a conceptual design has been done. The design had been certified by the Nuclear Regulatory Commission. There were several dockets that were heard before the Nuclear Regulatory Commission to certify that design. And there were a number of dockets—if I recall, it was probably 18 or 19. I think the design certification was probably docket 19, if I remember my numbers correctly. But there was a lot of work on the initial design, but the detailed design of the individual components had to be done as the project was under construction.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 71 of 126

DESIGN FINALIZATION

Certainly, a large percentage of that is done now. There remains a percentage that will still need to be completed as we move forward. I'll ask you to get Mr. Byrne to give some more detail on that, but we have never represented that the design was completed from the day we started the project. That's not customarily the way large projects of any kind are done, whether it's a large power plant or a large project for any other type facility."

September 30, 2015 – C. Dukes Scott Letter (PURC Letters 000530-000532)

"The ORS is supportive of the construction of the Units and of the BLRA. We believe that the Units will be the key to our economic development, to reliable and affordable electricity, and to meeting the goals of reducing our carbon footprint. With today's technology, nuclear is the single greatest base load carbon-mitigation energy resource available.

We also believe that maintaining financial integrity for utilities is crucial so that they can raise the necessary capital to invest in and maintain the infrastructure required to provide adequate and reliable service. Nevertheless, with the construction delays and budget increases that have occurred, it is reasonable to determine whether the revised rates provision — which provides for recovery of the financing cost (or cost of capital) on an annual basis — continues to be to the customers' benefit.

On August 15, 2015, SCE&G submitted its 2015 2nd Quarter Report related to construction of the Units and covering the quarter ending June 30, 2015. SCE&G reported that a total of 106 of the 146 specific BLRA milestones were completed by the end of that quarter.

The ORS' review of the Report focuses on SCE&G's ability to adhere to the approved schedule and approved budget. During the 2nd quarter of 2015, several major construction milestones were completed. However, the project continues to experience delays due to design and delivery issues.

The critical path continues to be centered on Unit 2 Nuclear Island work necessary to allow additional concrete pours inside the Containment Vessel and within the Auxiliary Building perimeter walls." (PURC Letters 000530-000531)

Letter from Dukes Scott to SCE&G, October 14, 2015

"On September 10, 2015, ORS consultant, Gary Jones, visited Greenberry and Vigor (previously Oregon Iron Works) module-fabrication facilities located near Portland, Oregon. Below are ORS observations and recommendations resulting from Mr. Jones' visit; SCE&G needs to:

...

- Continue to pursue the release of design-change documentation to the fabricators. Changes have been held by CB&I and not released to the fabricators because of contract cost-dispute issues between Westinghouse and CB&I. At the time of their meeting, no changes had been released to Greenberry since late March of this year and none had been

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 72 of 126

DESIGN FINALIZATION

released to Vigor since early June. The withholding of design-change documentation represents hundreds of changes and has resulted in delays in delivery; it will also result in extensive rework at the site once the modules are received. Subsequent to their meetings, Mr., Jones was advised by SCE&G that action has been taken on this issue and that the changes were being prioritized by CB&I and released to the fabricators for incorporation. However, this momentum needs to continue and detailed monitoring is required."

December 31, 2015 Quarterly Report at 14.

"WEC and Fluor are moving to standardize and simplify work packages for construction activity related to the nuclear islands (NIs) for the four units, streamline the processes for the transfer of equipment between suppliers and contractors, and minimize design changes being communicated to module and submodule vendors.

****

Design changes continue to be communicated by WEC to submodule fabrication vendors. The work of incorporating these changes into the fabrication process continues to delay submodule production. This is an area that WEC and Fluor intend to address going forward."

Letter from Dukes Scott to SCE&G, January 5, 2016

"One of the most significant drains on project construction productivity has been the inability to maintain the craft focused on a work activity due to incomplete or inadequate work packages and material availability. Ensuring accurate and complete preparation of construction work packages should be a top priority that is continually monitored."

Post-Bechtel Matters

Status of the V.C. Summer Units 2 & 3 Nuclear Power Plants, Presentation to the Electric Cooperatives of South Carolina, March 3, 2016 at 4. (G.J.E-Mails.2016.Vol.1.002315-002400)

"Problems with certified design are 'not as complete as anticipated...compliance issues with codes, standards and commitments.'"

March 31, 2016 – C. Dukes Scott Letter (PURC Letters 000555-000558)

"As of this date, the following is an ORS assessment of the status of the Units.

. . .

Our actual experience has been that:

...

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 73 of 126

DESIGN FINALIZATION

- The certified design was not as complete as originally thought. Constructability reviews were inadequate in many cases, thus leading to continuing design changes. Also, compliance issues with codes and standards came to fruition. Change requests caused design alterations and change orders,

...”

May 31, 2016 – C. Dukes Scott Letter (PURC Letters 000563-000567)

“Thus far during our review process, the ORS has identified the following concerns:

. . .

Concerns

...

- Progress in completing the areas of the Unit 2 Auxiliary Building that support the SB panels, commonly referred to as the Reactor Containment Areas, has been problematic, primarily due to design changes and commodity shortages. This area is very near critical path and needs additional focus and effort.”

(PURC Letters 000563-000567)

Gary Jones' Summary of June 2016 VCS 2&3 Site Visit and Recommendations (G.J.E-Mails.2016.Vol.1.001497-001503)

“Design changes continue to adversely impact fabrication and construction schedules. The number of changes appears to be high considering the purported design completion status. The causes of these changes need to be further investigated and additional management controls need to be established with the goal of reducing these changes to only those that are absolutely required.”

June 30, 2016 Quarterly Report at 12.

“Design changes continue to be communicated by WEC to submodule fabrication vendors on a schedule that disrupts the fabrication process and delays submodule production. WEC has trained 30 former CB&I engineers who are now employees of the newly formed WEC subsidiary WECTEC to support module design work and the prompt resolution of constructability and fabrication issues. This is a focus area for improving schedule performance and construction efficiency and is receiving a high level of attention from WEC and Fluor.”

Letter from Dukes Scott to SCE&G, June 30, 2016

“Design changes continue to adversely affect fabrication and construction schedules. The number of design changes appears to be high considering the design completion status that the ORS understood in the early stages of the project. The factors driving these changes need to be further investigated, and additional management controls need to be established with the goal of reducing the frequency of design changes to only those that are absolutely required.”

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 74 of 126

DESIGN FINALIZATION

July 8, 2016 – C. Dukes Scott Letter (PURC Letters 000572-000577)

The ORS is currently in a heightened state of concern regarding the construction cost overruns and schedule delays for V.C. Summer (VCS) Nuclear Units 2 & 3 (the Units). Our concerns are outlined below and include SCE&G' s responses:

...

9. ORS Concern: Design changes continue to adversely affect fabrication and construction schedules. The number of design changes appears to be high considering the design completion status that the ORS understood in the early stages of the project. The factors driving these changes need to be further investigated, and additional management controls need to be established with the goal of reducing the frequency of design changes to only those that are absolutely required.

SCE&G Response: SCE&G states that prevention and timely resolution of design issues is a top five focus area for the project. Westinghouse and Fluor are undertaking advanced planning initiatives to maximize early identification and resolution of potential issues; increasing accountability to build as designed where practical and ensure alignment between construction and engineering; and focusing engineering resources on critical areas. The use of field engineering resources and "clash" software by Westinghouse and Fluor is beginning to pay dividends. A recent example is a set of four work packages where 111 issues were identified and corrected prior to work commencing, and only four issues were identified after work commenced. In addition, SCE&G is working with Southern Nuclear and the NRC to add a new license condition to allow construction work to proceed at risk where a License Amendment Request (LAR) is needed.

...

(PURC 000572-000576)

Letter from Dukes Scott to SCE&G, July 12, 2016, incorporating SCE&G's Responses to June 30, 2016 Letter

"SCE&G states that prevention and timely resolution of design issues is a top five focus area for the project. Westinghouse and Fluor are undertaking advanced planning initiatives to maximize early identification and resolution of potential issues; increasing accountability to build as designed where practical and ensure alignment between construction and engineering; and focusing engineering resources on critical areas. The use of field engineering resources and "clash" software by Westinghouse and Fluor is beginning to pay dividends. A recent example is a set of four work packages where 111 issues were identified and corrected prior to work commencing, and only four issues were identified after work commenced. In addition, SCE&G is working with Southern Nuclear and the NRC to add a new license condition to allow construction work to proceed at risk where a License Amendment Request (LAR) is needed.

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"SCE&G has informed ORS that it has discussed these issues with Westinghouse on a regular basis.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 75 of 126

4. OWNER'S PROJECT MANAGEMENT/OVERSIGHT FUNCTION

Bechtel Executive Summary: Issues Facing the Project; Top Priority Recommendations p. 1-2

- The oversight approach taken by the Owners does not allow for real-time, appropriate cost and schedule mitigation.

*****

- Owners – Develop an Owners' Project Management Organization (PMO) and supplement current Owner staff with additional EPC-experienced personnel.

Pre-Bechtel Report

September 30, 2015 Quarterly Report at 10.

"During the period, WEC/CB&I initiated a new Project Management Organization (PMO) to provide a centralized location and project team on site to coordinate all work activities. The PMO's leaders are instituting new approaches to align and focus resources and activities and to organize work at the site."

December 31, 2015 Quarterly Report at 2.

"During the period, SCE&G initiated a new Project Management Organization (PMO) to provide direct oversight of the WEC PMO that was organized last quarter. The SCE&G PMO mirrors the structure of WEC's PMO. It is led by a SCE&G Project Manager as a single point of accountability to oversee the schedule and cost aspects of construction oversight activities of the New Nuclear Deployment (NND) group. SCE&G's PMO leadership is instituting new approaches to align and focus resources and activities to assist Fluor to better organize work at the site. It will oversee the Integrated Project Schedule (IPS), and provide project management for non-EPC Contract related construction activities."

Post-Bechtel Report

March 31, 2016 Quarterly Report at 2.

"The new SCE&G Project Management Organization (PMO) aligns SCE&G's project management oversight with Westinghouse's and Fluor's efforts. It has been implemented and is working effectively."

Repeated in the June 30, 2016 Quarterly Report.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 76 of 126

OWNER'S PROJECT MANAGEMENT/OVERSIGHT FUNCTION

April 29, 2016 – C. Dukes Scott Letter (PURC Letters 000559-000562)

"The ORS continuously monitors the construction of V.C. Summer Nuclear Units 2 and 3 (Units). ORS representatives met with Carl Churchman, Westinghouse Vice President and Project Director and Jeff Hawkins, Fluor Vice President and Site Director, to discuss the status of the project and their views on the transition process. This was the ORS' first meeting with Fluor's Site Director. Both provided informative and candid responses to the ORS' questions. They recognize the major issues confronting the project and are working diligently to resolve them. Among the major areas discussed were the following:

...

- Area Manager Structure — Fluor is moving the project to an Area Manager structure, with the Area Manager responsible for all construction work within his or her designated area. There are seven Fluor Area Managers on the construction site. This restructuring brings the project into alignment with industry practices as it is the management concept used on most large construction projects.

..."

(PURC Letters 000559-000560)

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 77 of 126

5. PROJECT SCHEDULE

Bechtel Executive Summary: Issues Facing the Project, p. 1; Issues to be Resolved, p. 61; Conclusions: Top Priority Recommendations, p. 62

- While the Consortium's engineering, procurement, and construction (EPC) plans and schedules are integrated, the plans and schedules are not reflective of actual project circumstances.

*****

- Consortium – Create a new, more achievable, project schedule. Remove the mandatory constraints from the Integrated Project Schedule and allow the schedule to move based on the logic. Prioritize the development of mitigation/recovery plans based on their impact to the schedule. Ensure appropriate time is allocated for the installation of bulk commodities (large and small bore piping, pipe supports, cable tray, conduit, cabling).

- The Consortium's forecasts for schedule durations, productivity, forecasted manpower peaks, and percent complete do not have a firm basis.

Pre-Bechtel Report

May 29, 2012 – C. Dukes Scott Letter (PURC Letters 000367-000370)

"Progress. A summary of the savings to the South Carolina retail customers is attached.

In other Electric news, the ORS continues to fulfill its responsibilities and duties under the Base Load Review Act regarding the construction and budget of the V.C. Summer Nuclear Units 2 and 3.

Discussions with SCE&G NND representatives were held concerning the construction schedule and capital costs update under the Base Load Review Act and the Company's quarterly report on the status of construction at V.C. Summer for Units 2 and 3. The Company filed both the BLRA update and the NND quarterly report on May 15th." (PURC Letters 000367)

January 31, 2013 – C. Dukes Scott Letter (PURC Letters 000403-000407)

"The ORS continues to fulfill its responsibilities under the Base Load Review Act regarding the construction and budget of SCE&G's V.C. Summer Units 2 and 3. The monthly New Nuclear Deployment (NND) meeting was held with management representatives of SCE&G as well as an on-site document review conducted by ORS staff. Based upon information obtained via additional ORS monitoring activities of the V.C. Summer (VCS) construction, the ORS has identified the following ongoing challenges in the construction of the Units:

Nuclear Island Basemat — The most immediate challenge to the project is the Nuclear Island basemat concrete pour. This activity must be completed before further meaningful

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 78 of 126

PROJECT SCHEDULE

progress can be made on construction activities in the Nuclear Island. Due to the design and construction issues, approval by the NRC must now be obtained before this work can proceed. The full impact of the delay of the construction schedule is not yet known because the NRC approval date is uncertain, and the potential recovery activities are not yet identified.

...

Additional Challenges — The issues related to the basemat design -- as well as a portion of the issues relating to the structural modules and shield building modules -- are related to compliance with the design approved by the NRC. This structural design compliance is emerging as an issue affecting multiple areas of the project. Also, the delays in starting Unit 2 construction -- in particular those associated with submodule fabrication --may begin to challenge the ability of the project to work on both Units simultaneously while adhering to the approved schedule. This situation has the potential to result in significant challenges to the Unit 3 construction schedule. Other factors, such as design changes, labor conditions, shipping conditions, and the financial stability of manufacturers due to foreign financial market conditions must be monitored closely." (PURC Letters 000403-000404)

March 29, 2013 – C. Dukes Scott Letter (PURC Letters 000412-000415)

"We continue to monitor the ongoing progress and challenges in the construction of the V.C. Summer Units 2 and 3. Construction reached a new milestone as the nuclear island basemat for Unit 2 was put in place. This basemat is the first new-construction nuclear concrete to be poured in the United States in the past 30 years." (PURC Letters 000413)

June 28, 2013 – C. Dukes Scott Letter (PURC Letters 000424-000427)

"We continue to monitor the ongoing progress and challenges in the construction of the V.C. Summer Units 2 and 3. Staff also attended an allowable ex parte presentation by SCE&G regarding the status of construction. In a related matter, SCE&G filed its annual request for revised rates under the Base Load Review Act. Staff from the Electric, Audit, and Legal departments, as well as our economist, are reviewing this filing. A site visit was made to review documents as well. The ORS report is due July 30th." (PURC Letters 000424)

August 30, 2013 – C. Dukes Scott Letter (PURC Letters 000434-000436)

"We continue to monitor the ongoing progress and challenges in the construction of the V.C. Summer Units 2 and 3. A focus of the August NND meeting was a milestone of the project that is 17 months behind schedule due to delays in module fabrication and delivery. In a related matter, staff participated in an NRC public meeting to discuss the resolution of issues to support the safety review of licensing actions for V.C. Summer Units 2 and 3 and for the Vogtle plant construction of Units 3 and 4." (PURC Letters 000434)

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 79 of 126

PROJECT SCHEDULE

November 27, 2013 – C. Dukes Scott Letter (PURC Letters 000444-000447)

"The ORS continues its oversight of the construction of V.C. Summer Units 2 and 3. A variety of topics, including delayed fabrication of the modules, was discussed at the monthly NND meeting. In addition, a major milestone was reached as the basemat for Unit 3 was poured this month. In a related matter, ORS staff participated in NRC conference calls to discuss resolution of issues relating to the V.C. Summer construction as well as construction of Vogtle Units 3 and 4 in Georgia." (PURC Letters 000445)

June 30, 2014 Quarterly Report at 2-3.

"During the third quarter of 2013, WEC/CB&I provided SCE&G with revised Unit 2 and Unit 3 construction schedules (Revised Unit 2 and Unit 3 Schedules) which were based on a reevaluation of the submodule production schedule at the CB&I facility in Lake Charles, LA. Based on these schedules, it was anticipated that Units 2 and 3 would be completed in the last quarters of 2017 and 2018 or the first quarters of 2018 and 2019, respectively. From an Engineering, Procurement and Construction Contract (EPC Contract) perspective, SCE&G did not agree to these schedule changes and advised WEC/CB&I that it remained obligated to satisfy the dates previously agreed to in the EPC Contract, as amended."

This was also repeated in the March, 31, 2014 Quarterly Report at 2.

June 30, 2014 Quarterly Report at 2-3.

"During the fourth quarter of 2013, the Consortium began a full re-baselining of the Unit 2 and Unit 3 construction schedules to incorporate a more detailed evaluation of the engineering and procurement activities necessary to accomplish the schedules and to provide a detailed reassessment of the impact of the Revised Unit 2 and Unit 3 Schedules on engineering and design resource allocations, procurement, construction work crew efficiencies, and other items. The result will be a revised fully integrated project schedule with timing of specific construction activities along with detailed information on budget, cost and cash flow requirements (Revised Fully Integrated Construction Schedule). While this detailed re-baselining of construction schedules has not been completed, in August 2014, SCE&G received preliminary information in which the Consortium has indicated that the substantial completion of Unit 2 is expected to occur in late 2018 or the first half of 2019 and that the substantial completion of Unit 3 may be approximately 12 months later. These expected substantial completion dates do not reflect all efforts that may be possible to mitigate delay nor has SCE&G accepted this new schedule. The Consortium has not yet provided any cost estimates related to the delay. Further, based on the preliminary schedule information arising from the re-baselining effort, the completion dates for a number of milestones are expected to extend beyond the 18-month contingency period. SCE&G anticipates that the revised schedule and the cost estimate at completion will be finalized in the latter half of 2014. SCE&G plans to reevaluate and reschedules its owners cost estimates and cash flow requirements in light of that new schedule when it is finalized. Upon completion of the re-baselining and the finalization of the revised schedule and cost of completion, SCE&G expects to petition the Commission for an order to update the Base Load Review Act (BLRA)

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 80 of 126

PROJECT SCHEDULE

construction milestone schedule and/or capital cost estimates schedule for the project as the BLRA permits."

June 30, 2014 Quarterly Report at 2-3.

"SCE&G cannot predict with certainty the extent to which the delays in the substantial completion of the Units will result in increased project costs. SCE&G has not accepted responsibility for any delay-related costs and expects to have discussions with the Consortium regarding such responsibility. Additionally, the EPC Contract provides for liquidated damages in the event of a delay in the completion of the facility, which will also be included in discussions with the Consortium."

These same reports were repeated in the September 30, 2014 report, December 31, 2014 Quarterly Report, and March 31, 2015 Quarterly Report.

October 31, 2014 – C. Dukes Scott Letter (PURC Letters 000482-000485)

"On October 15th, in an allowable ex parte briefing, SCE&G informed the Commission of the project schedule delays and updated cost estimates. In addition, the Company provided information on the continued progress of construction at the site, its commitment to Jenkinsville, and the hiring of an additional 400 well-paid workers since my last letter to you. Last week, this progress was also expressed to ORS staff as they met with the lead project representatives from Westinghouse, Chicago Bridge & Iron, and SCE&G. Also last week, the S.C. Supreme Court affirmed the decision of the Commission for construction-cost updates at SCE&G's new nuclear project. I am proud of Shannon Hudson for successfully arguing ORS' position in support of the Commission before the Court." (PURC Letters 000482)

February 27, 2015 – C. Dukes Scott Letter (PURC Letters 000501-000504)

"Nuclear construction at VC Summer continues to make progress although construction activities have been affected by recurring periods of inclement weather. On February 10th, we met with Steve Byrne, SCE&G President of Generation and Transmission and COO, who provided a quarterly update on the status of construction at the site. Based upon information from the Consortium, SCE&G currently anticipates the substantial completion date of Unit 2 to be June 2019, and the substantial completion date of Unit 3 to be June of 2020. As a result, the completion dates for a number of milestones are expected to extend beyond the 18-month boundary allowed by the Commission's order. SCE&G has been notified by the IRS that the Units are eligible for production tax credits if they are operational before January 1, 2021. The benefit of these production tax credits should be directly passed on to the customers.

SCE&G intends to file a petition requesting that the Commission approve updated schedule and cost estimates. As of the end of 2014, SCE&G has spent approximately $2.8 billion on the project." (PURC Letters 000501-000502)

March 31, 2015 Quarterly Report at 2-3.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 81 of 126

PROJECT SCHEDULE

"During the first quarter of 2015, SCE&G determined that the joint review of the Revised, Fully-Integrated Construction Schedule and the evaluation of mitigation strategies had progressed sufficiently for SCE&G to recognize the Consortium's Revised, Fully-Integrated Construction Schedule as the project schedule for the Base Load Review Act (BLRA) reporting purposes and other purposes related to the management of the project."

March 31, 2015 Quarterly Report at 4.

"Based on these new cost and schedule forecasts, SCE&G filed the March 2015 Update Petition seeking Commission approval of a new capital cost schedule and construction schedule for the Units. The Revised, Fully-Integrated Construction Schedule included with the March 2015 Update Petition is based upon SCE&G's review and analysis of the information provided to the Company by the Consortium. As a result of its review and analysis and representations of the Consortium, SCE&G has recognized the construction schedule as the anticipated construction schedule for the project and as a reasonable and prudent schedule for approval by the Commission under the BLRA."

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 277.

"At present, SCE&G is challenging several categories of costs being billed to it by WEC/CB&I. Those challenges include:

...

Cost invoiced by WEC/CB&I which are related to general project delay. SCE&G takes the position that these delay costs are WEC/CB&I payment responsibility for reasons including WEC/CB&I failure to meet its responsibilities under the EPC Contract to effectively manage the project."

June 30, 2015 – C. Dukes Scott Letter (PURC Letters 000518-000520)

"On March 12th, 2015, SCE&G filed a petition seeking to increase its capital cost schedule and to amend the construction schedule for Units 2&3 at the VC Summer nuclear station. SCE&G seeks to add approximately $698 million to the 2007 budget excluding inflation adjustments and to extend the substantial completion dates to June 19, 2019 and June 16, 2020 for Units 2&3 respectively. Further, along with changes in escalation rates, this addition will increase the gross construction cost of the Units in current dollars from $5.7 billion to $6.8 billion for SCE&G's 55% share.

The ORS has devoted a great deal of time and resources to this issue. Under the Base Load Review Act (BLRA), SCE&G is entitled to these modifications so long as the delays and cost increases are not the result of imprudence on the part of the Company. Based on ORS's review, we have not found a preponderance of evidence to suggest that imprudence on the part of SCE&G is the cause." (PURC Letters 000518)

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 82 of 126

PROJECT SCHEDULE

July 30, 2015 – 7/30/2015 ORS Review of Quarterly Report at 21

"The Units are proceeding based on the revised SCDs for Unit 2 of June 19, 2019 and Unit 3 of June 16, 2020, although SCE&G has not formally accepted these dates and will continue to explore mitigation and further negotiations. ORS repeats its concern that it is important to the successful completion of the Project that the schedule and cost estimates be formally finalized and fully implemented. Continued negotiations over these issues may divert management attention away from concentrating on the successful completion of the Project. This is borne out by SCE&G's statement in their Quarterly Report that the Consortium has already advised the Company that the SCDs have changed to August 10, 2019 for Unit 2 and May 28, 2020 for Unit 3."

Letter from Dukes Scott to SCE&G, October 14, 2015

"With regard to the 2015-09-22 and 2015-09-23 visit to the V.C. Summer site, ORS staff and Mr. Jones were advised that no schedule update was provided to SCE&G by the Consortium in August. The reason provided is that the schedule is being revised to reflect the current delays in the shield building panel deliveries from the fabricator (Newport News Industrial) and the delays in the erection of the shield building panels. These delays are above and beyond those outlined in the recent SCE&G filing under Docket No. 2015-103-E that were approved by the PSC as well as those that had been reported to the ORS in July. It was stated that the expected delay will be an additional four months."

Letter from Dukes Scott to SCE&G, December 14, 2015

"The construction schedule for Unit 3 has not been adequately integrated considering proper sequencing of precursor activities. In addition, the required resources have not been adequately assessed, especially with regard to the impact of delays in the construction of Unit 2 and how this will impact the staffing of Unit 3. The current schedule utilizes overly optimistic assumptions with regard to acceleration of module deliveries and erection, construction productivity improvements on all commodities, and the acceleration of testing and start-up activities. SCE&G needs to reassess the Unit 3 schedule with the EPC Contractor.

. . . .

The required mitigation approach to accelerate the Unit 2 and Unit 3 Shield Building panels from Newport News Industrial was not finalized, and it is not clear that the approach is still viable. SCE&G needs to determine whether mitigation is still an option and determine the impact on the Project.

. . . .

The increased labor productivity rates necessary to attain the completion dates for the Project have not been realized, and no discernable progress has occurred. Some additional delays can be expected in the transition relating to CB&I's departure and Fluor coming up to speed; therefore, it is difficult to understand how these delays, coupled with the continued below-par productivity rates, support the Project completion dates. This issue will need to be addressed by SCE&G once the transition is completed."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 83 of 126

PROJECT SCHEDULE

December 21, 2015 – C. Dukes Scott Letter (PURC Letters 000543-000546)

"Due to the construction delays and budget increases that have occurred, we also determined it was reasonable to have an independent analysis conducted to determine whether the revised rates provision under the BLRA that is being utilized for construction of the V.C. Summer Units by SCE&G is cost beneficial to customers. The firm of Elliot Davis Decosimo, LLC is currently working with SCE&G and progressing through this review. SCE&G has been cooperative with the auditors in this process." (PURC Letters 000544)

Executive Director Questionnaire, Fiscal Year 2015-2016, Performance Summary for: C. Dukes Scott Executive Director (General Reports 000517-0547)

"Construction continues to make progress, with 36 of the 146 BLRA milestones remaining as of June 2016. However, the project has been plagued by challenges including, among others, the dissolving of the project's consortium; exit of CB&I; arrival of Fluor; new engineering, procurement and construction contract; increase in the budget; and a further delay in the construction schedule." (General Reports 000532-0533)

Post-Bechtel Report

March 31, 2016 – C. Dukes Scott Letter (PURC Letters 000555-000558)

"As of this date, the following is an ORS assessment of the status of the Units.

. . .

Our actual experience has been that:

- The federal regulatory environment has not been as good as hoped —

o The issuance of the combined COL was delayed 9 months until March 30, 2012,

...

o Experience in China could not be capitalized on as much as anticipated; the NRC offered only limited credit for testing done there,

- Fabricators were unable to reliably meet schedule and quality requirements, which led to the reassignment and de-scoping of fabricators,

...

- Five filings by SCE&G have occurred since its original Base Load Review Order, to delay construction schedules and/or to add to the budget. Budget additions total to date $1.15 billion, SCE&G's share in 2007 dollars,

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 84 of 126

PROJECT SCHEDULE

- The Unit 2 substantial completion date has been delayed from April 1, 2016 to August 31, 2019,

...

Challenges to the project remain in several key areas, such as:

- Managing the transition between EPC contract holders and integrating the new outside construction manager,

- Module construction, which continues to encounter constructability issues and runs behind schedule,

- Fabrication of some of the most complex structures in the plant has not yet begun,

- Productivity continues to be lower than needed to meet construction schedules,

- Mechanical, Electrical and Instrumentation & Controls installation, which is very complex, still lies ahead, and

..."

Letter from Dukes Scott to SCE&G, May 13, 2016

"The ORS met with the lead Westinghouse Electric Company (WEC) project scheduling staff for the first time since Fluor became involved in the project. This meeting allowed the ORS to review the current revised integrated project schedule in more detail. The ORS now has a better understanding of the assumptions and bases of the schedule and the process of its development over the past few months. We learned that the initial schedule presented by WEC in August 2015 had arbitrarily held constraints that resulted in an unreliable and unrealistic depiction of the schedule for the remaining work. SCE&G and the on-site WECTEC project schedulers have worked to refine and accurately represent the remaining work and the logical ties among the work activities, as well as to reduce the number of arbitrary constraints. The ORS also obtained a better understanding of the documentation available to help us understand the schedule, including a more detailed Project Plan-of-the Day package. However, the ORS remains concerned that the schedule still needs refinement and has not yet received a complete detailed review and revision by Fluor that includes the resources needed to complete each task. This review will not be completed until the third quarter of this year. By that time, the ORS is concerned that additional delays may be identified in the project completion dates, especially on Unit 3."

May 31, 2016 – C. Dukes Scott Letter (PURC Letters 000563-000567)

"Thus far during our review process, the ORS has identified the following concerns:

Costs shown in the Amendment are the result of a negotiation and do not represent a detailed accounting of the costs associated with each and every remaining project activity. Thus

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 85 of 126

PROJECT SCHEDULE

far, no rigorous and detailed comparative roll-up of the final costs is available. This presents a challenge as the ORS evaluates and assesses the project costs presented in the Amendment. It is unclear in some cases how the costs in the Amendment interface with cost increases in Order No. 2015-661, particularly in the area of Estimated at Completion costs, commonly referred to as "EAC." The ORS continues to work with SCE&G in an effort to obtain a clear path for the dollars in the Amendment, with documentation.

The construction schedule, and in particular the Unit 3 construction schedule, remains an area of concern. The currently available Project Integrated Schedule has several major activities with artificially held and constrained dates that do not adequately reflect the impacts of delayed precursor activities. Last month, this schedule still supported the Guaranteed Substantial Completion Dates from the Amendment of August 31, 2019 for Unit 2 and August 31, 2020 for Unit 3. Recently, however, the estimated completion dates have moved out to November 2019 for Unit 2 and September 2020 for Unit 3. Movement with respect to the completion dates is not abnormal as schedules are revised and mitigated; however, these changes in the early stages of the transition warrant attention. The number of mitigation strategies being employed— in addition to the fact that a detailed schedule including Fluor's complete input for both activities and resources is not expected to be available until the fall— is a cause for concern. The ORS believes that additional delays may be identified in the project completion dates, especially in Unit 3. These factors make it difficult for the ORS to evaluate the reasonableness or prudency of the proposed schedule changes associated with the Amendment. The ORS continues to meet monthly with Westinghouse Electric Company (WEC) scheduling personnel and SCE&G regarding the status of the schedule.

SCE&G's 1st Quarter 2016 Report includes several estimates for proposed change orders and discussions regarding proposed changes to Owners' Costs. It is challenging for the ORS to evaluate costs associated with unsigned change orders because the backup documentation is not typically complete until a change order is signed. As such, the ORS did not previously have the opportunity to evaluate these estimates. The ORS currently is working with SCE&G to obtain all available backup documentation to support these potential change orders.

. . .

Concerns

...

- The repairs to Turbine Building Bay 1 relating to an unacceptable concrete cold joint have been significantly delayed and are not progressing well. The hydrolasing contractor, who had been removing concrete from the affected area, did not meet promised productivity levels. SCE&G has ceased hydrolasing activities and is now pursuing alternate paths to resolve this issue.

- Progress on the Turbine Buildings continues to be significantly behind schedule (up to 6 months late in some cases), primarily due to craft labor shortages and diversion of labor

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 86 of 126

PROJECT SCHEDULE

to Nuclear Island work. SCE&G is working with Fluor and the nuclear construction organization within Westinghouse (WECTEC) to address this issue.

- ..."

(PURC Letters 000563-000567)

June 30, 2016 Quarterly Report at 2.

"Fluor's review of the Integrated Project Schedule (IPS) continues and will incorporate changes due to the October 2015 Amendment to the EPC Contract (Amendment), the FAAs, and the analysis of schedule mitigation plans. These changes are anticipated to focus principally on the scheduling and sequences of construction activities within the current Guaranteed Substantial Completion Dates (GSCDs). Changes in the IPS are not anticipated to affect the GSCDs themselves which are contractually established."

Letter from Dukes Scott to SCE&G, June 30, 2016

"Consistently meeting the construction schedule continues be a significant issue for the project. This area must improve if any credibility is to be assigned to the current substantial completion dates and associated mitigation strategies that must be implemented in order to bring the plant to completion."

July 8, 2016 – C. Dukes Scott Letter (PURC Letters 000572-000577)

"The ORS is currently in a heightened state of concern regarding the construction cost overruns and schedule delays for V.C. Summer (VCS) Nuclear Units 2 & 3 (the Units). Our concerns are outlined below and include SCE&G' s responses:

...

6. ORS Concern: Consistently meeting the construction schedule continues be a significant issue for the project. This area must improve if any credibility is to be assigned to the current substantial completion dates and associated mitigation strategies that must be implemented in order to bring the plant to completion.

SCE&G Response: SCE&G asserts that construction efficiency and schedule adherence, including consistently meeting productivity factor, is a top five focus area for the project. SCE&G implemented a Project Management Organization (PMO) this year specifically to provide increased oversight of the project schedule by working with the Westinghouse PMO, which has resulted in the Westinghouse PMO adding key monitoring and reporting of the site milestones and covering schedule mitigation activities on a daily basis. Initiatives in other focus areas should improve the site's ability to meet the schedule.

...

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 87 of 126

PROJECT SCHEDULE

8. ORS Concern: Concerns about the schedule also extend to the installation of components such as piping erection, cable raceway installation and cable pulling, instrumentation and tubing installation, HVAC equipment and ductwork installation, and wiring and termination. Historically, these areas have been the most difficult to complete when constructing nuclear power plants; however, very little of this effort has been completed on the Units. The modular construction methodology may prove beneficial in this regard, but that remains to be seen. The tendency toward slow installation exhibited thus far is especially concerning in light of the project's inability to meet the construction schedule to date. Sustained installation rates will need to be demonstrated before the ORS has confidence in the project's ability to complete these areas in a timely manner.

SCE&G Response: SCE&G replies that it is currently performing an assessment of installation of components on the CA03 module to identify efficiency gaps and will communicate improvement opportunities to Westinghouse and Fluor.

..."

(PURC 000572-000576)

Letter from Dukes Scott to SCE&G, August 8, 2016

"Very informative briefings were provided by Carl Churchman (Westinghouse Vice President and Project Director) and Jeff Hawkins (Fluor Vice President and Site Project Director). They provided their perspective on the project status and the process improvements underway with respect to site industrial safety, the nuclear safety culture among the workforce, procurement, the project schedule, labor productivity and staffing, module fabrication and installation, field engineering and other aspects of the construction of the plant. Each voiced their deep commitment to completing the project and recognized several key challenges that must be overcome to meet the project schedule.

...

ORS also had the opportunity to meet with senior SCE&G staff to discuss observations made during this visit. At the end of the visit, ORS met with Ron Jones, SCE&G and Jeff Archie. ORS provided an assessment of our concerns, especially with regard to schedule performance and the bases for cost increases and change orders being discussed as part of Docket No. 2016-223-E. ORS also discussed observations related to quality programs."

Pre-filed Testimony of Allyn Powell, ORS, September 1, 2016, 2016-223-E, Transcript at 732.

"With respect to the schedule, ORS is concerned regarding the degree of uncertainty remaining regarding the schedule...ORS believes that these dates are optimistic, but that the Project is likely to be completed within 18 months of these dates. For this reason, ORS does not oppose the revised GSCD and BLRA milestone schedule. ..."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 88 of 126

PROJECT SCHEDULE

Pre-filed Testimony of Gary Jones, ORS, September 1, 2016, 2016-223-E, Transcript at 923.

"SCE&G still does not have a reliable schedule for the Project, and will not have a reliable schedule until Fluor completes its review and works through the resource-loaded integrated schedule which is due in the fourth quarter of 2016. ...Fluor's review of and revision to the schedule represent a significant milestone for the Project."

September 30, 2016 – C. Dukes Scott Letter (PURC Letters 000586-000589)

"While many areas are showing improvement, those improvements are yet to be seen in the project metrics for performance and productivity factors. These metrics have even shown a negative trend in the last month. While improved schedule adherence is important, the ORS is concerned about what these metrics may mean for areas of the plant off of the current critical path for construction. The ORS is looking forward to the availability of the fully resource-loaded integrated construction schedule, which may affect the way these metrics are calculated to more accurately reflect subcontracts and will give us better insight going forward." (PURC Letters 000587)

September 30, 2016 Quarterly Report at 7.

"During the period, Fluor continued to implement changes to streamline processes and implement performance improvements based on its Functional Area Assessments (FAAs). Fluor's review of the Integrated Project Schedule (IPS) is ongoing and review and issuance of the plan by WEC is expected to take place around the end of 2016."

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 193-194.

(cross examination by Commissioner Fleming)

"Q: Okay. I'd like to ask you, what do you think are the two or three biggest challenges to successfully completing the V.C. Summer units?

A: There are probably a number of these, and I'm sure Mr. Byrne will correct me if he doesn't agree with me. But, certainly, the completion of the shield building on the first unit. That shield building is one of the newest designs, and in making sure we can fabricate the parts and have them delivered on-site in timely fashion, weld those together and get those places on the nuclear island in a timely fashion and to have those completed...Making sure that design is completed, so those pieces can be delivered in time for early completion of the units or on-time completion of the units is something that I follow pretty closely.

On the second unit, I think it's more with some of the structures on the base end of the new unit, making sure we get out of the ground in a timely fashion....

I continue to have concerns about Fluor being able to attract enough qualified workers to the site. There are a lot of large projects going on around the Southeast right now that don't

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 89 of 126

PROJECT SCHEDULE

involve nuclear, and some workers may prefer not to work in a nuclear environment where you have strict guidelines and strict rules in terms of compliance and documentation and quality control. So making sure we get enough workers on-site is a concern of mine, too.

Q: Okay. And what about the lack of a resource-loaded integrated schedule for the completion?

A: We have a schedule in place today. It was the one that was in place when Fluor completed the—when Fluor came on-site with the new contract. They're in the process of going through that schedule today to make any changes they deem appropriate....

Now, their schedule moves—and if you're looking at a live schedule, they may be ahead a month, maybe behind a couple of months, and that's normal with a project of this size and they're making adjustments to account for those changes as we go through time. It's just not a firm date that never moves when you go through that construction process. They believe they can attract the resources to do that, and I will continue to ask them that question every time we meet."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 642.

(Cross examination by Commissioner Elam)

"A: Yes. So the functional area review team started, actually, before Fluor even came on-site, so they started back in the November-December timeframe; they're continuing today. They include members from Fluor and Westinghouse, from SCE&G, and from Southern Company, and they took a look at discrete areas where they thought that they had opportunities for significant improvement.

Work planning was one example, part of that. They took a look at the work packages that they would give the craft, and they said, 'This is too difficult; we need to streamline those." So they've implemented that plans to streamline those.'"

Testimony of Allyn Powell, ORS, October 12, 2016, 2016-223-E, Transcript at 743.

(cross examination by Robert Guild)

"A: ...What ORS was very concerned about is that there's a lot of uncertainty, in our minds, regarding the construction schedule and how long it's going to take to complete the project, how many man-hours it's going to take to complete the project. We would be much more comfortable if we had Fluor's input at this point, to help us with that...."

November 30, 2016 – C. Dukes Scott Letter (PURC Letters 000594-000597)

"We continue our review of SCE&G's ongoing construction activities for V.C. Summer Units 2 and 3. Westinghouse Electric Company, LLC (Westinghouse) and Fluor Corporation (Fluor) continue to work toward finalizing the new resource-loaded fully integrated project schedule.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 90 of 126

PROJECT SCHEDULE

Delays for Unit 2 are beginning to accumulate. A repair solution for the concrete issues in Bay 1 of the Unit 2 Turbine Building has been finalized after an extended evaluation, and the repair should start before the end of the month. The setbacks related to reinforced concrete in Unit 2 have continued to affect the project, A contractor is currently removing the reinforced concrete in an area surrounding a penetration in the Shield Building. These, and other issues associated with the Shield Building, have delayed the expected substantial completion date of Unit 2 by several months to January 2020. Currently, no viable strategies exist to mitigate these delays." (PURC Letters 000594)

Letter from Dukes Scott to Kevin Marsh, Dec. 29, 2016
(G.J.E-Mails.2016.Vol.1.000003-000004)

"ORS has had ongoing concerns regarding the project schedule since it was informed last spring that Fluor and Westinghouse were undertaking an effort to produce a revised fully resource-loaded Revised Project Schedule using Fluor's construction metrics."

Letter from Kevin Marsh to Dukes Scott, January 18, 2017

"Thanks for your letter dated December 29, 2016 regarding the recent announcement by Toshiba and Westinghouse of pending write-downs associated with the Summer and Vogtle AP1000 nuclear projects. I share your concerns regarding the impact of these write-downs and the delivery of the revised fully integrated construction schedule (the "revised schedule"). As we discussed, our SCANA team along with representatives of Santee Cooper met with Westinghouse and Toshiba in an effort to learn more about this situation and inquire about the delivery of the revised schedule we were expecting by the end of 2016. I also share your high level of interest in receiving the revised schedule as soon as possible.

I provided Westinghouse and Toshiba a copy of your letter to emphasize the importance of having access to the schedule as part of our commitment to keeping both the Office of Regulatory Staff and the Public Service Commission of SC updated on the status of the new nuclear project. Westinghouse and Toshiba have informed me that the revised schedule is a part of the financial review and evaluation of the pending write-downs associated with the AP1000 projects, and that they expect the revised schedule to be available at the time Toshiba releases its financial results in mid-February.

We continue to communicate with Westinghouse and Toshiba in order to monitor this situation as closely as possible and will update you accordingly."

Gary Jones' comments to May 23-24, 2017 ORS Site Visit Agenda
(G.J.E-Mail.2017.Vol.2000439-000444)

"Schedule adherence seems to be declining rather than improving. Scheduled starts were at 44% and scheduled finishes were at 42% during the last reporting period. Please discuss what you see as the primary reasons for this continuing decline. (POD Summary dated 2017-05-11, p. 17)."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 91 of 126

6. PROCUREMENT

Bechtel Executive Summary: Top Priority Recommendations, p. 3; Bechtel Conclusions: Issues to be Resolved, p. 61-62; Conclusions: Top Priority Recommendations, p. 63-63

- Consortium – Complete the inventory revalidation effort and establish a program to continually validate inventory. Complete the procurement schedule adherence effort to ensure equipment delivery dates meet construction need dates.

*****

- There is a significant disconnect between construction need dates and procurement delivery dates.
- The amount of stored material onsite is significant, creating the need for an extended storage and maintenance program.

*****

- Consortium - Expedite the implementation of blanket purchase orders. (O&R P8)
- Consortium - Complete the procurement schedule adherence effort to ensure equipment delivery dates meet construction need dates. (O&R P17)

Pre-Bechtel Report

January 10, 2014 – 1/10/2014 ORS Review of Quarterly Report at 27

"Factors such as design changes, labor conditions, shipping conditions and the financial stability of foreign manufacturers due to financial market conditions still present significant challenges to the on-time delivery of equipment to the project."

May 29, 2015 – C. Dukes Scott Letter (PURC Letters 000514-000516)

"We are focused on SCE&G's 2015 Base Load Review Act (BLRA) nuclear update filing with our testimony due June 24, 2015. A great deal of work has been done studying the issues and law with a review of an enormous amount of information.

In its filing, SCE&G is requesting an increase in its capital budget of $698 million. Approximately 77% of the request, or $539 million, is due to delay and other contested costs. The additional costs are primarily the result of a delay in fabricating sub-modules by Chicago Bridge & Iron at its Lake Charles, Louisiana facility.

At the beginning of the project, two of the risks for delays were considered to be the international vendors and a nuclear power plant incident. However, delays similar to the ones at

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 92 of 126

the domestic vendors have not been experienced with the international vendors, and the Fukushima disaster did not contribute to the delays that have occurred.

We are analyzing this matter with our mission of representing the public interest as it is defined in Act 175 — i.e., balancing the interests of the consumer, economic development, and the financial integrity of public utilities. For the latter, maintaining financial integrity is crucial so that a utility can raise the necessary capital to invest in and maintain the infrastructure required to provide adequate and reliable service. Also, as of now with today's technology, nuclear is the single greatest carbon-mitigation energy resource available." (PURC Letters 000514)

September 30, 2015 – C. Dukes Scott Letter (PURC Letters 000530-000532)

"The ORS is supportive of the construction of the Units and of the BLRA. We believe that the Units will be the key to our economic development, to reliable and affordable electricity, and to meeting the goals of reducing our carbon footprint. With today's technology, nuclear is the single greatest base load carbon-mitigation energy resource available.

We also believe that maintaining financial integrity for utilities is crucial so that they can raise the necessary capital to invest in and maintain the infrastructure required to provide adequate and reliable service. Nevertheless, with the construction delays and budget increases that have occurred, it is reasonable to determine whether the revised rates provision — which provides for recovery of the financing cost (or cost of capital) on an annual basis — continues to be to the customers' benefit.

On August 15, 2015, SCE&G submitted its 2015 2nd Quarter Report related to construction of the Units and covering the quarter ending June 30, 2015. SCE&G reported that a total of 106 of the 146 specific BLRA milestones were completed by the end of that quarter.

The ORS' review of the Report focuses on SCE&G's ability to adhere to the approved schedule and approved budget. During the 2nd quarter of 2015, several major construction milestones were completed. However, the project continues to experience delays due to design and delivery issues.

The critical path continues to be centered on Unit 2 Nuclear Island work necessary to allow additional concrete pours inside the Containment Vessel and within the Auxiliary Building perimeter walls." (PURC Letters 000530-000531)

<u>Post-Bechtel Report</u>

Gary Jones' Summary of April 26 and 27, 2016 Visit to VCS Site (G.J.E-Mails.2016.Vol.1.001624-001626)

"SCE&C received notification on April 21 from WEC of a quality issue with Mangiarotti components already delivered to the site. The issue involves 11 of the 26 subsuppliers of safety-related pressure boundary materials and may impact the accumulator tanks, core make-up tanks, pressurizers, PRHR heat exchangers, flued heads and guard pipes.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 93 of 126

An action plan is due by May 31, and this may be a 10CFR Part 21 reportable infraction. This is especially disconcerting because the accumulator tanks were due to be installed in the next couple of weeks and were to be the first major NSSS component installed in the plant. This may delay their installation."

...

"Continuing commodity shortages have resulted in delays in all areas. Fluor is to assume greater responsibilities in commodities purchasing and control, and SCE&G hopes to see improvements soon."

April 29, 2016 – C. Dukes Scott Letter (PURC Letters 000559-000562)

"The ORS continuously monitors the construction of V.C. Summer Nuclear Units 2 and 3 (Units). ORS representatives met with Carl Churchman, Westinghouse Vice President and Project Director and Jeff Hawkins, Fluor Vice President and Site Director, to discuss the status of the project and their views on the transition process. This was the ORS' first meeting with Fluor's Site Director. Both provided informative and candid responses to the ORS' questions. They recognize the major issues confronting the project and are working diligently to resolve them. Among the major areas discussed were the following:

- ...
- Commodity Procurement and Availability — Fluor will now be in charge of commodity procurement and will be responsible for ensuring the correct material is available when needed for construction. This is an area that needed significant improvement, and Fluor has an opportunity to resolve the issues in this area that have hindered construction progress.

..."

Gary Jones' Concerns Regarding SCE&G's Responses to ORS AIRs, May 11, 2016 (G.J.E-Mails.2016.Vol.1.001613-001614)

"Quality, productivity and schedule adherence issues continue to cause concern. The recently identified Mangiarotti quality issues involving major safety-related equipment already delivered to the site and being readied for installation are a disturbing example of the continuing issues on overall quality. Productivity and construction performance continue to lag, and the rates needed to support the current completion schedule are not being met. Delivery of critical sub-modules and other needed components and commodities continue to experience delays and further jeopardize the completion schedule."

Letter from Dukes Scott to SCE&G, May 13, 2016

"Continuing commodity shortages have resulted in delays. Fluor is to assume greater responsibilities in commodities purchasing and control, and SCE&G hopes to see improvements soon.

. . . .

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 94 of 126

Progress in completing the so-called "Reactor Containment" areas of the Unit 2 Auxiliary Building that support the SB panels has been problematic, primarily due to design changes and commodity shortages. This area is very near critical path and needs additional focus and effort."

May 31, 2016 – C. Dukes Scott Letter (PURC Letters 000563-000567)

"Thus far during our review process, the ORS has identified the following concerns:

. . .

Concerns

- SCE&G received notification on April 21 from WEC of a quality paperwork issue with Mangiarotti components already delivered to the site. The issue involved sub-suppliers of safety-related pressure boundary materials and had the potential to impact the accumulator tanks, core make-up tanks, pressurizers, passive residual heat removal (PRHR) heat exchangers, flued heads, and guard pipes. Currently, the only identified potential impact is to the PRHR heat exchangers. This issue may be a 10 CFR Part 21 reportable infraction.

...

- Continuing commodity shortages have resulted in delays. Fluor is scheduled to assume greater responsibilities in commodities purchasing and control. Commodities had previously been procured on a "just-in-time" basis. The visibility of commodity needs on construction planning documents has been enhanced. As Fluor's role in the project increases, commodities purchasing and control is an area with opportunities for improvement.

- ...

- Progress in completing the areas of the Unit 2 Auxiliary Building that support the SB panels, commonly referred to as the Reactor Containment Areas, has been problematic, primarily due to design changes and commodity shortages. This area is very near critical path and needs additional focus and effort.

- ..."

(PURC Letters 000563-000567)

Gary Jones' Summary of June 2016 VCS 2&3 Site Visit and Recommendations (G.J.E-Mails.2016.Vol.1.001497)

"Unavailability of key commodities continues to plague the project and result in construction work delays. Note that this is not tied to major components, as most of these are now on-site far ahead of their actual construction need date. The commodities in question are rebar, welding rod, standard structural steel, bolting, lubricants, steel plates, Nelson studs and other standard construction commodities. These shortages appear to be the result of

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 95 of 126

Westinghouse's socalled 'just-in-time' approach to ordering and delivery of these commodities. This has proven to be an ineffective approach as the components are not available when required. In my experience, such commodities are routinely stocked in sufficient quantity to ensure they do not delay construction, and I can definitely state that I have never worked on a nuclear project that was delayed by standard rebar availability. This has not been the case at VCS, where standard rebar unavailability has resulted in multiple construction delays of critical path activities.

...

Other procurement issues, primarily associated with the negotiation of subcontracts and change orders are becoming critical. Despite the fact that ten issues requiring change orders were identified in Exhibit C the October 2015 Agreement, SCE&G and Westinghouse have been able to reach agreement on only a handful of these in the intervening eight months and these resolutions were recently. In addition, delays in the full authorization of several key subcontracts are putting the completion dates of the project in doubt."

June 30, 2016 Quarterly Report at 11.

"Fluor is overhauling the legacy Chicago Bridge & Iron Company (CB&I) processes for requisition, procurement and delivery of commodities and other materials and supplies used on site. CB&I's system was geared to 'just in time' delivery which did not allow for sufficient time to process deliveries for documentation review, inspection, stocking and distribution. Delays resulted in shortages that created construction inefficiencies. Fluor is moving to remedy this situation."

Letter from Dukes Scott to SCE&G, June 30, 2016

"The lack of availability of key commodities continues to plague the project and result in construction delays. Note that this issue is not tied to major components, as most of these are now on-site far ahead of their actual construction need date. The commodities in question are rebar, welding rod, standard structural steel, bolting, lubricants, steel plates, Nelson studs, and other standard construction commodities. These shortages are the result of Westinghouse's "just-in-time" approach to the ordering and delivery of these commodities. This approach has proved to be ineffective as the components are not available when required. On large construction projects, such commodities are routinely stocked in sufficient quantity to ensure they do not delay construction. Our consultant states that he has never worked on a nuclear project that was delayed by the lack of availability of standard rebar. At VCS, standard rebar unavailability has resulted in construction delays of critical path activities."

July 8, 2016 – C. Dukes Scott Letter (PURC Letters 000572-000577)

"The ORS is currently in a heightened state of concern regarding the construction cost overruns and schedule delays for V.C. Summer (VCS) Nuclear Units 2 & 3 (the Units). Our concerns are outlined below and include SCE&G' s responses:

...

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 96 of 126

4. ORS Concern: The lack of availability of key commodities continues to plague the project and result in construction delays. Note that this issue is not tied to major components, as most of these are now on-site far ahead of their actual construction need date. The commodities in question are rebar, welding rod, standard structural steel, bolting, lubricants, steel plates, Nelson studs, and other standard construction commodities. These shortages are the result of Westinghouse's "just-in-time" approach to the ordering and delivery of these commodities. This approach has proved to be ineffective as the components are not available when required. On large construction projects, such commodities are routinely stocked in sufficient quantity to ensure they do not delay construction. Our consultant states that he has never worked on a nuclear project that was delayed by the lack of availability of standard rebar. At VCS, standard rebar unavailability has resulted in construction delays of critical path activities.

SCE&G Response: SCE&G states that SCE&G, Santee Cooper, Westinghouse, and Fluor all agree that procurement is a top five focus area for the project. To address availability of key commodities, Westinghouse has recently consolidated the responsibility for delivery of material and equipment into a single organization so that each commodity now has a single point of accountability for scope, schedule, and budget. This organizational transition was completed at the end of June 2016.

5. ORS Concern: Other procurement issues, primarily associated with the negotiation of subcontracts and change orders, are becoming critical. SCE&G and Westinghouse have been able to reach agreement on only a few of the issues identified in Exhibit C of the October 2015 Amendment in the intervening eight months. In addition, delays in the full authorization of several key subcontracts are putting the substantial completion dates of the project at risk.

SCE&G Response: SCE&G replies that, as issues are identified during the project, evaluations are conducted and the parties first attempt collaborative resolution through technical reviews and discussions. The ten issues identified in Exhibit C of the October 2015 Amendment follow this standard process. It was never anticipated that this process would be concluded and these issues would be resolved in eight months. As of June 2016, a change order is pending for two of the ten issues, and SCE&G does not anticipate that the remaining eight issues will have an impact on the project's substantial completion dates. It is possible, but not certain, that a change order will be required for some of the remaining eight issues. Regarding the overall change-order process, SCE&G sent a letter in June 2016 to Westinghouse reiterating previous concerns and requesting that they review their process so that the overall change-order process could be improved.

..."

(PURC 000572-000576)

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 97 of 126

Letter from Dukes Scott to SCE&G, July 12, 2016, incorporating SCE&G's Responses to June 30, 2016 Letter

"SCE&G states that SCE&G, Santee Cooper, Westinghouse, and Fluor all agree that procurement is a top five focus area for the project. To address availability of key commodities, Westinghouse has recently consolidated the responsibility for delivery of material and equipment into a single organization so that each commodity now has a single point of accountability for scope, schedule, and budget. This organizational transition was completed at the end of June 2016."

Letter from Dukes Scott to SCE&G, August 8, 2016

"Very informative briefings were provided by Carl Churchman (Westinghouse Vice President and Project Director) and Jeff Hawkins (Fluor Vice President and Site Project Director). They provided their perspective on the project status and the process improvements underway with respect to site industrial safety, the nuclear safety culture among the workforce, procurement, the project schedule, labor productivity and staffing, module fabrication and installation, field engineering and other aspects of the construction of the plant. . . . .

An additional special briefing was held with Dan Magnarelli (Westinghouse), who heads up the Functional Area Assessments, and Rob Carlon and Mike Valore (Fluor) who are also working in this area. The status of these assessments and the implementation of the recommendations from at least some of these assessments are more advanced than we had previously understood. This briefing concentrated on the assessment of the procurement process and we learned the minimum/maximum methodology for the purchase of construction commodities is being implemented in several areas. This has the potential to result in decreased construction delays due to material unavailability. An extensive inventory of on-site commodities, along with an assessment of their construction readiness, is also underway. ORS plans to discuss the results of the remaining Functional Area Assessments, which cover a variety of fields including quality control, welding/NDE, field engineering and subcontracting, at future meetings."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 643.

(Cross examination by Commissioner Elam)

"A: ...Procurement is one that is still going. The procurement area is one that Fluor saw a lot of areas that they can improve, and so they've implemented a lot of plans in procurement, but there's more coming."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 98 of 126

7. LARS, ITAACS AND STARTUP

Conclusions: Issues to be Resolved, p. 61-62; Conclusions: Top Priority Recommendations, p. 63-63

- There is significant engineering and licensing workload remaining (currently over 800 engineers). ITAAC closure will be a significant effort,

Pre-Bechtel Report

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 259-260.

"Uncertainties about how ITAACs would be administered was an important risk factor that SCE&G identified in 2008: '[T]he NRC is still developing the process for approving the results of ITAAC tests once they are completed and for resolving disputes or other issues related to the results of those tests.' Combined Application, Docket No. 2008-196-E, at Exhibit J, page 4. The NRC has now issued regulatory guidance resolving some of the outstanding issues concerning the review of ITAAC Closure Notification ("ICN") packages. See Guidance for ITAAC Closure, 80 Fed. Reg. 265 (January 2, 2015). However, there are still important issues to be resolved, such as how a hearing will be conducted if ITAAC results are challenged. Furthermore, the sheer number of ITAACs to be completed poses a challenge to the schedule for the substantial completion of the Units.

As of late May 2015, SCE&G has successfully completed 22 ITAAC packages and has submitted 20 ICN packages to the NRC. While the ITAAC process seems to be working satisfactorily at present, completing the required ITAAC program on schedule remains an important risk factor for the project."

Direct Testimony of Stephen A. Byrne, July 21, 2015, 2015-103-E, Transcript at 218.

"Another challenge will be the successful completion of inspections, tests, analysis, and acceptance criteria—or ITAAC—required to demonstrate the units' conformity with the design documents. This ITAAC process is new to the nuclear industry. Over 1700 ITAACs must be completed for the project. Initial results are good, but we are in the early stages of this process."

Post-Bechtel Report

March 31, 2016 – C. Dukes Scott Letter (PURC Letters 000555-000558)

"As of this date, the following is an ORS assessment of the status of the Units.

. . .

Our actual experience has been that:

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 99 of 126

- The federal regulatory environment has not been as good as hoped —

o The issuance of the combined COL was delayed 9 months until March 30, 2012,

o NRC oversight during construction has required strict literal compliance with regard to the approved design. This strict interpretation has resulted in the need for License Amendment Requests (LARs),

o As the Units were the first plants to go through the Inspection, Testing, Analyses, and Acceptance Criteria (ITAAC) process, additional work has been required to define and refine the process, and

...

Challenges to the project remain in several key areas, such as:

...

- Federal regulatory compliance remains a challenge as—

o More LARs are processed,

o ITAAC (873/unit required; 20 on Unit 2 and 16 on Unit 3 submitted) closure remains an area of focus, and

..."

Gary Jones' Summary of July 26-28, 2016 VCS 2 & 3 Site Visit and Recommendations (G.J.E-Mails.2016.Vol.1.001339-001341)

"The submittal and processing of Licensing Amendment Requests (LARs) will need to double from 4 to 5 per month to 8 to 10 per month over the next several months in order to support construction. This presents another major challenge for the project."

Letter from Dukes Scott to SCE&G, August 8, 2016

"As the project progresses, an increasing number of Licensing Amendment Requests (LARs) will need to be processed each month to support construction. The number of LARSs to be processed each month must double from 4 or 5 per month to 8 to 10 per month over the next several months in order to support construction activities. This presents another major challenge for the project."

September 30, 2016 Quarterly Report at 14.

"During this period, SCE&G submitted seven ITAAC Closure Notifications to the NRC. Of the 53 submitted ITAAC Closure Notifications, 49 have been verified complete and four are under review by the NRC. ITAAC submittal rates must increase significantly in 2017 to meet schedule requirements. SCE&G has raised concerns with WEC about timeliness and the level of

engineering support being provided by WEC for this process. The ITAAC submittal rate is an area of focus for the project."

Email from Gary Jones to Allyn Powell and Gene Soult, Oct. 8, 2016

"Have you heard of the ITAAC submittal problem discussed in this article from the September issue of Nuclear News? If not, I don't understand why SCE&G did not bring this to our attention and I think we should discuss it with them."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 524.

(Cross examination by Commissioner Howard)

"Q: Let's talk about LARs....Are you comfortable with this many LARs out there?

A: Yes, I think we've identified probably 150 LARs that we will need by the end of the project. So whatever number you are looking at, it's going to grow. When we—we load those into our schedule now, so we know when we're going to need the output of that LAR....

So the LAR process, as you point out, can take some time. It's serious; the NRC takes a lot of time to review. We take a lot of time to prepare them. We need input from Westinghouse or other vendors, significantly. But we've got every one of those loaded into our schedule. All of them now meet our construction need dates...."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 100 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 101 of 126

8. WESTINGHOUSE PRICING/FIXED PRICE OPTION

General Concern, not addressed in Bechtel Report

Post-Bechtel Report

Gary Jones' Summary of June 2016 VCS 2&3 Site Visit and Recommendations (G.J.E-Mails.2016.Vol.1.001497-001503)

"It is not apparent that the so-called "fixed-price option" presented in the filing represents the best value for SCE&G or the South Carolina rate payers. Insufficient justification for the premium associated with exercising this option has been provided by SCE&G. In addition, the loss of control associated with accepting a fixed price contract is not in the best interest of the project. SCE&G has already experienced this through the change in the level of detail that Westinghouse is willing to provide in change orders. There is much less detail in the fixed price change orders that Westinghouse has submitted, and they have been unwilling to provide a sufficient basis for their costs. Westinghouse is maintaining that such detail is not required for fixed price changes. Ultimately, SCE&G will have very little leverage over Westinghouse to affect day-to-day changes and to guide the direction of the project. Their only recourse will come at the end of the project when it will be too late."

Pre-filed Direct Testimony of Joseph M. Lynch, July 1, 2016, 2016-223-E, Transcript at 776.

"When focusing on the most likely range of 2.9% to 5.0% in labor rate growth rates and the PF falling between 1.50 and 2.00, SCE&G estimates that the cost to complete the Units will be between 10.9% [$364 million] and 29.3% [$981 million] higher than the Fixed Price option. While Westinghouse may be able to make significant improvements over past performance, SCE&G believes it is in the best interest of its customers to choose the Fixed Priced option and removed the price uncertainty that exists without it."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 429.

"In [the] negotiations, Westinghouse told us that it recognized the great value represented by its AP1000 business and the need to complete our project successfully to protect that value and Westinghouse's reputation worldwide. Westinghouse was willing to take on substantial new commitments under the EPC Contract to accomplish those goals.

This may turn out to be a strategy for Westinghouse. In June of 2016, less than nine months after the Amendment was executed, Westinghouse announced that it is negotiating a contract to construct six AP1000 units in India. It is working on a similar proposal to construct three new AP1000 units at the Moorside nuclear power station on the west coast of England. We also understand that there is interest in AP1000 units in Europe where nuclear power is increasingly seen as an alternative to continued reliance on Russian natural gas. The AP1000 units remain the safest, most technologically sophisticated and simplest nuclear unit available today.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 102 of 126

WESTINGHOUSE PRICING/FIXED PRICE OPTION

In light of Westinghouse's business interests, we were able to convince Westinghouse to accept new liquidated damages that are capped at $371.8 million for the two Units."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 432-438.

"In the negotiations with Westinghouse, SCE&G was able to convince Westinghouse to provide us with an irrevocable option to move all remaining Firm, Target and Time and Material costs, except for $38.3 million of the Time and Material budget, to the Fixed Price category. The Fixed Price would be approximately $3.345 billion (future dollars) for all invoices paid after June 30, 2015. Any payments made after that date are credited to the Fixed Price amount. We have computed the labor productivity factor that Fluor and Westinghouse must achieve from January of 2016 forward to have actual costs to SCE&G come in less than the Fixed Price, all other things being equal. That labor productivity factor is 1.15. We expect construction to become more efficient under Fluor and with a restructured project team. But it is unlikely that productivity will improve fast enough for the remaining work on the project to be completed at a productivity factor of 1.15 or below. Our experience with the project to date makes us believe that it is highly unlikely that Fluor and Westinghouse can bring the productivity factor to 1.15 or lower measured between January 1, 2016, and the end of the project. This tells us that, all other things being equal, exercising the Fixed Price option is best for the Company and its customers.

Pre-filed Testimony of Allyn Powell, ORS, September 1, 2016, 2016-223-E, Transcript at 727-728.

"...While ORS believes, based on SCE&G's sensitivity study, that the Option on its surface represents a good value given current production and productivity trends, the determination of the Option's true value is based entirely on an analysis of Westinghouse's willingness to abide by the terms of the contract and SCE&G's willingness to hold Westinghouse to those terms....Based on previous experience with this contract and SCE&G's sensitivity study, which at current production and productivity trends shows substantial potential losses to Westinghouse, ORS is concerned that the Option will not truly fix this portion of the cost of the Units. For this reason, in the Settlement ORS insisted that SCE&G agree to stand behind the "fixed price" and provide a guarantee that no additional ratepayer dollars will be requested for items in the scope of the "fixed price" in the Option."

Pre-filed Testimony of Gary Jones, ORS, September 1, 2016, 2016-223-E, Transcript at 908-91.

"In addition, 'fixed price' contracts have generally resulted in reduced participation and influence by the owners of the construction project. The sentiment and approach adopted by the contractor is generally, 'we have guaranteed you the project for this price; leave us alone and we will deliver.' This is not an acceptable approach. ORS regards SCE&G's participation as essential to the satisfactory completion of the Project.

...

However, since the start of the Project, WEC has not consistently demonstrated its ability to meet contractual commitments. The benefit to the ratepayers from the Option is only as good

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 103 of 126

WESTINGHOUSE PRICING/FIXED PRICE OPTION

as WEC's financial ability and willingness to stand behind the EPC Contract. Based on our previous experience in the Project, ORS has little confidence in WEC's assurances that it will be able to deliver on its 'fixed price' commitment."

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 135.

(Cross examination by Robert Guild)

"Q: Notwithstanding those commitments by Westinghouse to deliver a substantially fixed-price contract and completion by specific dates, ORS still expressed reservations and concerns that Westinghouse would be able to meet those commitments; isn't that correct?

A: I think they have their concerns. I believe with their meetings on-site, they got themselves comfortable with the contract based on the changes that were made, specifically on the additional liquidated damages that would help cover some of the costs if they were not able to finish the contract on time, and other issues."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 395.

"As Mr. Marsh mentioned, the fixed-price option represents an increase in the forecasted EPC costs of about $505 million. The amount is net of future change orders and certain time-and-material costs. In June of 2016, SCE&G gave notice to Westinghouse that the company and Santee Cooper had decided to exercise the option. The decision to exercise the option focused on variable labor costs. While a significant amount of the EPC contract costs were already fixed or firm, the remaining variable costs were almost entirely labor related. We concluded that it is very likely that the increase in the variable labor costs will exceed the previously approved forecast by $505.5 million, or more, over the remaining life of the project. It will be exceedingly difficult for Westinghouse and Fluor to bring cumulative productivity factors in line with those used in their own 2014 projections for EAC, or estimated completion. This is true, even if construction work becomes more productive under the new project structure."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 580-81.

(Cross examination by Robert Guild)

"Q: All right. Now you've explained why you think the fixed-price contract is a good deal. Do you acknowledge the concern that has been expressed by ORS's nuclear expert that, historically, such fixed price contracts are more adversarial and that, instead of producing a more amicable, cooperative relationship with Westinghouse, you're likely to be in a more adversarial relationship going forward? Do you understand their concerns to that effect?

A: I'm not sure that that was the exact characterization, but I heard something along those lines from the Office of Regulatory Staff.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 104 of 126

WESTINGHOUSE PRICING/FIXED PRICE OPTION

Q: ...But if, indeed, the fixed-price contract makes your relationship more adversarial and not less adversarial, might things just go downhill even faster than they have in the past? Have you thought about that, Mr. Byrne?

A: Yeah, I don't believe they would go downhill even faster. Again, the renegotiated EPC contract has terms that are intended to specifically avoid those kinds of contentions going forward. We did have a significantly contentious environment. There were some of the commercial disputes we'd been in with Westinghouse for years; there didn't seem to be any rapid resolution to those. So the contract with its new provisions should streamline that process going forward.

So, understanding that fixed-price EPC contracts have had some issues in the past, I think coming in at this point, this far along in the construction process, the renegotiation to a fixed-price was the right thing to do for us at this point in time."

December 31, 2016 Quarterly Report at 20.

"WEC officials, in a discussion the morning of February 14, 2017, indicated that WEC and its parent guarantor, Toshiba Corporation, are committed to completing Units 2 and 3, with a revised completion schedule of April 2020 and December 2020, respectively; however, the Company will continue to monitor WEC's ability to adhere to the new schedule, as well as the financial condition of WEC and Toshiba and its effect on their ability to complete the project. The total project capital cost is now estimated at approximately $7.7 billion including escalation and allowance for funds used during construction (SCE&G's portion in future dollars)."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 105 of 126

9. STORAGE/PREVENTIVE MAINTENANCE

Bechtel Report; 4.1.3, p. 27

Pre-Bechtel Report

March 31, 2015 – C. Dukes Scott Letter (PURC Letters 000506-000508)

"Nuclear construction at VC Summer continues to make progress, with 42 of the 146 BLRA milestones remaining. Adequate storage and preventive maintenance for all the parts that have arrived at the site is an issue. At the end of last month ORS staff, along with SCE&G and CB&I representatives, toured the warehouse in Blythewood that is being retained by CB&I as an off-site storage facility for equipment and components for the Units. Additional off-site storage is needed, and space at Columbia Metropolitan Airport is being considered." (PURC Letters 000506)

Pre-filed Testimony of Ronald Jones, May 26, 2015, 2015-103-E, Transcript at 579-580.

"SCE&G is responsible for the warehouse and storage space for materials and equipment necessary to operate the Units. SCE&G also is required to pay for the office space and related support facilities for its NND team personnel while they are on site. Because of delays in the project schedule, construction teams and operational readiness teams will overlap more, requiring more space. In addition, the maintenance, upkeep and other cost of office space and related support facilities will have to be borne by the project for a longer period of time. SCE&G has taken reasonable steps to reduce the scope and cost of the additional warehouse, storage, office, and other support facilities. Nevertheless, SCE&G forecasts that additional facilities and facilities cost associated with the new Substantial Completion Dates will increase Owner's cost by approximately $6.1 million, or approximately 1% of the total change in the capital cost schedule."

Pre-filed Direct Testimony of Carlette L. Walker, May 26, 2015, 2015-103-E, Transcript at 632.

"Pursuant to the terms of the approved EPC Contract, SCE&G is responsible for the warehouse and storage space for materials and equipment necessary to operate the Units. The Company also is required to pay for the office space and related support facilities for its NND team personnel while they are on site. Because of the delay in the project schedule, it will be necessary for the construction and operational readiness teams to perform certain scopes of work simultaneously. Therefore, additional facilities will be required to provide the teams with sufficient space to complete their respective scopes of work. In addition, the maintenance, upkeep, and other costs of office space and related support facilities will have to be borne by the project for a longer period of time."

September 30, 2015 Quarterly Report at 13.

"Storage of equipment is an issue which the Consortium is addressing in part by securing additional warehouse facilities off-site.

September 30, 2015 Quarterly Report at 19.

"SCE&G continued oversight of on-site storage, preventative maintenance and preservation of components before and after installation. CB&I has recently issued a revised procedure to clarify storage and preservation requirements for all components. SCE&G continues to monitor resolution of CB&I's preventative maintenance (PM) backlog."

Gary Jones' Additions to October 27 & 28, 2015 ORS Site Visit Agenda (G.J.E-Mail.2015.Vol.2.001405-001410)

"Discuss the status of storage at the airport storage facility and the availability for an ORS visit. (Repeat from previous meetings)"

Letter from Dukes Scott to SCE&G, January 5, 2016

"Inventory storage and control present one of the major challenges to successful completion of the project. CB&I intends to conduct a complete site inventory and re-verification of the site warehouses and lay-down areas. This effort will assist the project in properly staging equipment and commodities to support ongoing construction activities."

January 31, 2016 – C. Dukes Scott Letter (PURC Letters 000547-000550)

"...

Inventory storage and control present one of the major challenges to successful completion of the Units. ORS understands that a complete site inventory and re-verification of the site warehouses and lay-down areas will be performed. This effort will assist the project in properly staging equipment and commodities to support ongoing construction activities.

We believe SCE&G intends to take a more active role in ensuring that construction work packages are properly prepared and complete, which includes the proper staging of the required equipment and commodities. One of the most significant drains on project construction productivity has been the inability to maintain the craft focused on a work activity due to incomplete or inadequate work packages and material availability. Ensuring accurate and complete preparation of construction work packages should be a top priority that is continually monitored.

We received the results of an independent analysis conducted by the firm of Elliott Davis Decosimo, LLC with regard to the Units. The analysis was conducted to determine whether the revised rates provision under the Base Load Review Act (BLRA) utilized by SCE&G (the Company) for construction of the Units is cost beneficial.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 106 of 126

The results of the Elliott Davis Decosimo analysis confirm that the revised rates methodology under the BLRA is cost beneficial to customers. In addition to being in the customers' financial interest, the BLRA is in the State's public interest. The cost savings, as confirmed by the Elliott Davis Decosimo analysis, and the coverage of cost of capital under the BLRA allow for the construction of a reliable, greenhouse-gas free source of generation for decades to come.

The analysis confirmed that, in accordance with the BLRA, allowing the Company to establish annual revised rates and collect additional revenue during the construction of the Units will reduce the total costs to construct the Units by approximately $1 billion, compared to accumulating the financing cost over the life of the construction of the Units. In addition, the aforementioned reduction in total construction costs will reduce future depreciation and cost of capital of the Units by approximately $4 billion over the Units' estimated 60-year life.

Further, representatives of Elliott Davis Decosimo told us in conversation that, by their analysis, the benefits may be even greater than what is stated in the report. Specifically, allowing the Company to establish annual revised rates and collect additional revenue during the construction of the Units (in accordance with the BLRA) will reduce the total costs to construct the Units by approximately $1.682 billion. Also, the aforementioned reduction in total construction costs will reduce future depreciation and cost of capital of the Units by approximately $5.8 billion over the Units' estimated 60-year life." (PURC Letters 000547-000548)

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 107 of 126

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 108 of 126

10. MODULE FABRICATION

Multiple Observations in Bechtel Report

Pre-Bechtel Report

Testimony of Steve Byrne, Ex Parte Hearing, September 9, 2011, Transcript at 36.

"Shaw Modular Solutions, they're building sub modules that we will eventually assemble in that module assembly building...They've had some issues with getting the drawings from Westinghouse to Shaw and they've had problems with field implementation. They've had some problems with quality. And some problems with what I would call a nuclear mindset. Again if you're welding for an oil rig, it's a different standard than if you are building a nuclear plant. Some of those folks have struggled with the nuclear standard. Their management team I don't think was adequate upfront when they first opened the facility. Now they have made the changes that we think are necessary in order to produce quality parts out of that facility. They changed their management team. They changed training program. They changed their QA process. But they need to start producing..."

June 30, 2012 Quarterly Report at 8.

"Overall, the fabrication of equipment off-site is proceeding satisfactorily on a schedule that supports the on-site construction schedule. However, the schedule for fabrication of sub-modules from the Shaw Modular Solutions (SMS) facility in Lake Charles, Louisiana remains a significant focus area for the project. This submodule fabrication work has been delayed due to module redesign delays, production issues, and Quality Assurance and Quality Control (QA/QC) issues."

Pre-filed Direct Testimony of Gary C. Jones, P.E., on behalf of ORS, Aug. 9, 2012, 2012-203-E, Transcript at 1052.

"In addition, fabrication delays in the structural modules are occurring at the Shaw Modular Solutions ("SMS") facility in Lake Charles, Louisiana. These delays, which have previously been identified in several ORS Quarterly reports, present a potentially significant schedule impact that may present challenges to the construction completion schedule."

January 31, 2013 – C. Dukes Scott Letter (PURC Letters 000403-000407)

"The ORS continues to fulfill its responsibilities under the Base Load Review Act regarding the construction and budget of SCE&G's V.C. Summer Units 2 and 3. The monthly New Nuclear Deployment (NND) meeting was held with management representatives of SCE&G as well as an on-site document review conducted by ORS staff. Based upon information obtained via additional ORS monitoring activities of the V.C. Summer (VCS) construction, the ORS has identified the following ongoing challenges in the construction of the Units:

...

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 109 of 126

MODULE FABRICATION

Structural Modules — Another significant challenge to the project is the continued inability of Shaw Modular Solutions (SMS) to reliably meet the quality and schedule requirements of the project. SMS has been unable to meet its revised schedules to deliver submodules to VCS in a timely manner. SMS has also continued to struggle with quality issues, ranging from design compliance to the completion of final inspection paperwork. Once the issue of the Nuclear Island basemat concrete pour is resolved, the structural modules issue will become the most immediate challenge to the project. Other significant construction challenges are 1) the on-site weld repairs that need to be made, resulting from an incorrect interpretation of the approved design during the module fabrication process and 2) the assembly of the submodules into modules to be installed in the Nuclear Island.

Shield Building Modules — Shield building module fabrication has been reassigned to Newport News Industrial (NNI), thus freeing SMS to concentrate on the structural modules; however, NNI's performance has not yet been demonstrated. The shield building modules are more complex and present even greater fabrication and erection challenges to the project than the structural modules. The full extent of challenges in this area remains unknown; however, given the project's history with structural module fabrication, it is an area of concern moving forward. NM will need to demonstrate sustained and reliable performance in both the quality and on-time delivery of submodules, and Shaw will need to do the same in the area of erecting the shield building modules on-site.

Additional Challenges — The issues related to the basemat design -- as well as a portion of the issues relating to the structural modules and shield building modules -- are related to compliance with the design approved by the NRC. This structural design compliance is emerging as an issue affecting multiple areas of the project. Also, the delays in starting Unit 2 construction -- in particular those associated with submodule fabrication --may begin to challenge the ability of the project to work on both Units simultaneously while adhering to the approved schedule. This situation has the potential to result in significant challenges to the Unit 3 construction schedule. Other factors, such as design changes, labor conditions, shipping conditions, and the financial stability of manufacturers due to foreign financial market conditions must be monitored closely." (PURC Letters 000403-000404)

November 27, 2013 – C. Dukes Scott Letter (PURC Letters 000444-000447)

"The ORS continues its oversight of the construction of V.C. Summer Units 2 and 3. A variety of topics, including delayed fabrication of the modules, was discussed at the monthly NND meeting. In addition, a major milestone was reached as the basemat for Unit 3 was poured this month. In a related matter, ORS staff participated in NRC conference calls to discuss resolution of issues relating to the V.C. Summer construction as well as construction of Vogtle Units 3 and 4 in Georgia." (PURC Letters 000445)

January 10, 2014 – 1/10/2014 ORS Review of Quarterly Report at 5

"SCE&G announced that its Engineering, Procurement and Construction contract partners, Westinghouse Electric Company and Chicago Bridge and Iron, had preliminarily indicated to SCE&G that the substantial completion date of Unit 2 is expected to be delayed

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 110 of 126

MODULE FABRICATION

until the 4th quarter of 2017 or the 1st quarter of 2017, with the substantial completion date of Unit 3 expected to be delayed similarly. This potential delay is primarily due to challenges in the project schedule related to delays in the sub-module fabrication and delivery, specifically the CA01 module."

January 10, 2014 – 1/10/2014 ORS Review of Quarterly Report at 5

"ORS has identified several ongoing construction challenges that pose a potential risk to the on-time completion of the Units. ORS continues to monitor these areas closely. The most significant issue is the continued delay in the delivery of the structural sub-modules. Despite continuing high-level management and executive focus from Chicago Bridge and Iron, Westinghouse Electric Company and SCE&G, the delivery and quality problems associated with these sub-modules are still not satisfactorily resolved. Delays in these sub-modules affect almost all subsequent critical path sequences in the construction schedule."

January 10, 2014 – 1/10/2014 ORS Review of Quarterly Report at 13

"CB&I-LC continues to be the focus of intense management attention. Delays in sub-module fabrication have contributed to the anticipated delay in the Unit 2 substantial completion date. CB&I has implemented a new leadership team and developed a new schedule for Unit 2 sub-module production. In an effort to improve delivery times, CB&I shifted work, including the CA04 module, the CA03 module, and Shield Building modules, from CB&I-LC to other fabricators. Further delays in the sub-module fabrication schedule, particularly the CA01 module, may result in miles stones exceeding the 18-month delay allowed by the Base Load Review Order."

January 10, 2014 – 1/10/2014 ORS Review of Quarterly Report at 13

"Delays also continue with the fabrication and delivery of the CA20 sub-modules from CB&I-LC. The sub-modules needed to proceed with the final assembly of module CA20 are not yet on site. This may impact the construction of the shield building and further delay the project."

January 10, 2014 – 1/10/2014 ORS Review of Quarterly Report at 24

"On September 25, 2013, ORS visited the CB&I-LC facility in Lake Charles, Louisiana to review the fabrication and shipping status of the Units' structural sub-modules…Also, on each sub-module ORS observed, there were multiple "red tags" indicating non-conformances that required re-work. CB&I indicated that most of these were legacy issues inherited from Shaw and that CB&I's new processes and procedures should reduce these non-conformances on future sub-modules."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 111 of 126

MODULE FABRICATION

January 10, 2014 – 1/10/2014 ORS Review of Quarterly Report at 25

"As identified in previous ORS quarterly reports, the most significant, current challenge to the project remains the continued inability of CB&I-LC to reliably and predictable meet the quality and schedule requirements of the project."

January 10, 2014 – 1/10/2014 ORS Review of Quarterly Report at 29

"All sub-modules associated with module CA20 have been delivered to the site; however many of these still require rework/repair and final inspection by the on-site extension of CB&I-LC before they are released to the site construction crew for final assembly of the module in the MAB."

March 31, 2014 Quarterly Report at 14.

"[T]he fabrication and delivery of CA20 and CA01 submodules is a critical path items for both Units. Accordingly, production of these modules remains a very important focus area for the project. SCE&G maintains a presence on site at CB&I-LC to monitor activities at CB&I-LC and interact with CB&I-LC leadership on a regular basis."

March 31, 2014 Quarterly Report at 15.

"Delays in setting the CA01 module would likely affect the schedule for setting the CA03 module and therefore the other construction activities that follow the setting of that module. For this reason, SCE&G is monitoring the schedule for completing and setting the CA01 module closely."

March 31, 2014 Quarterly Report at 16.

"CB&I has transferred fabrication for the principal Unit 3 CA20 and CA01 submodules to Oregon Iron Works, and Toshiba/IHI Corporation, respectively. Each of these entities is experienced in modular construction."

March 31, 2014 Quarterly Report at 16.

"Senior management from both SCE&G and WEC/CB&I continue to monitor the fabrication and delivery process related to submodules. WEC personnel continue to provide onsite engineering support for production at CB&I-LC. SCE&G continues to maintain a permanent resident inspector at the CB&I-LC facility who provides additional monitoring. SCE&G will monitor closely the startup processes at Oregon Iron Works and Toshiba/IHI Corporation. The fabrication of the submodules continues to be an important area of focus for the project."

April 30, 2014 – C. Dukes Scott Letter (PURC Letters 000459-000462)

"The second matter of concern is the delay of a module, specifically the Auxiliary Building module, which is a component of the construction's critical path. Its delay may impact

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 112 of 126

MODULE FABRICATION

the substantial completion dates of both nuclear units under construction." (PURC Letters 000459)

June 20, 2014 – 6/20/2014 ORS Review of Quarterly Report at 17

"As identified in previous ORS reviews, the most significant issue related to the construction of the Units remains the continued inability of Chicago Bride and Iron – Lake Charles ("CB&I-LC") to reliably and predictably meet the quality and schedule requirements....During the Review Period, several Unit 2 CA01 sub-modules were delivered to the site; however, SCE&G has not received the sub-modules necessary to start erecting the Unit 2 CA01 module."

June 30, 2014 Quarterly Report at 13.

"[T]he fabrication and delivery of CA01 submodules is a critical path item for both Units. Accordingly, production of these modules remains a very important focus area for the project. SCE&G maintains a presence on site at CB&I-LC to monitor activities at CB&I-LC and interact with CB&I-LC leadership on a regular basis."

September 22, 2014 – 9/22/2014 ORS Review of Quarterly Report at 22

"According to SCE&G, the Consortium has continued to experience delays in schedule for fabrication and delivery of submodules for the Units; and that, these schedule delays are the primary purpose for issuing a Revised Schedule. SCE&G has not agreed to the Revised Schedule or accepted responsibility for any delay-related costs, and expects to have discussions with the Consortium regarding such responsibility."

November 25, 2014 – C. Dukes Scott Letter (PURC Letters 000486-000489)

"Anthony James and Gene Soult are actively monitoring the construction progress at V.C. Summer Units 2&3. SCE&G is closely monitoring the work being performed and how time is being charged. The Consortium approved a wage increase for the craft trades to attract more skilled labor. SCE&G has now assigned resident inspectors (these are contractors) at several module-fabrication facilities to oversee quality. These resident inspectors are in addition to the quality controls (and personnel) already in place. Gaby Smith and her team of auditors tour the construction site on a bi-monthly basis and participate in the interviews of principal accounting personnel. On a monthly basis, listings of all construction expenditures are obtained and supporting invoices are selected for examination to ensure the costs are appropriate and that the cumulative costs of construction are accurately stated.

After several schedule changes, SCE&G completed the Unit 2, Layer 2 Containment concrete pour last week. This is a significant pour in the bottom of the containment vessel which will allow several other major construction activities to happen sequentially."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 113 of 126

MODULE FABRICATION

December 18, 2014 – 12/18/2014 ORS Review of Quarterly Report at 4

"Currently, SCE&G's Milestone Schedule reflects a delay in the Unit 2 substantial completion date from March 15, 2017 to December 15, 2017, and a delay in the Unit 3 substantial completion date from May 15, 2018 to December 15, 2018. This expected delay is primarily attributed to submodule fabrication and delivery."

Summary: Organizational Evaluation Performance Measures FY 2014-2015 (General Reports 001155-01174)

"The ORS devoted a great deal of time and resources to this issue. Under the BLRA, SCE&G is entitled to these modifications so long as the delays and cost increases are not the result of imprudence on the part of the Company. Based on the ORS' review, the ORS did not find a preponderance of evidence to suggest that imprudence on the part of SCE&G was the cause. Approximately 77% of the request, or $539 million, was due to delay and other contested costs. The additional costs are primarily the result of a delay in fabricating sub-modules by Chicago Bridge & Iron at its Lake Charles, Louisiana facility.

The ORS analyzed this matter in line with its mission of representing the public interest as it is defined in Act 175 – i.e., balancing the interests of the consumer, economic development, and the financial integrity of public utilities. For the latter, maintaining financial integrity is crucial so that a utility can raise the necessary capital to invest in and maintain the infrastructure required to provide adequate and reliable service. Also, as of now with today's technology, nuclear is the single greatest carbon-mitigation energy resource available." (General Reports 0001167)

January 12, 2015 – C. Dukes Scott Letter (PURC Letters 000495-000497)

"I am writing to provide you a summary of major developments during 2014 regarding SCE&G's VC Summer new nuclear project (the Units) in Jenkinsville.

As part of the ORS' oversight of new nuclear development construction schedules and budget, ORS New Nuclear Development (NND) and Audit staff members actively monitor the Units. NND staff Anthony James and Gene Soult visit the construction site weekly. Gaby Smith and her team of auditors tour the site on a bi-monthly basis and participate in interviews of principal accounting personnel. On a monthly basis, listings of all construction expenditures are obtained and supporting invoices are selected for examination to ensure the costs are appropriate and that the cumulative costs of construction are accurately stated.

. . .

According to SCE&G, the Consortium continued to experience delays in fabrication and delivery of submodules for the Units; these delays were the primary reason for issuing a revised schedule. In October, SCE&G issued a press release stating that the Consortium provided preliminary cost estimates reflecting the revised schedule. SCE&G's 55% portion of this preliminary estimate is approximately $660 million (in 2007 dollars). This amount will be

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 114 of 126

MODULE FABRICATION

adjusted upward once the Company determines its corresponding Owner's Cost." (PURC 000495-000496)

March 31, 2015 Quarterly Report at 12.

"[T]he fabrication and delivery of Shield Building components and structural submodules for the Unit 3 CA01 module are critical path items for the project. Accordingly, production of these components and submodules, and other structural and mechanical modules, remains a very important focus area for the project."

March 31, 2015 Quarterly Report at 15.

"After the close of the period, WEC/CB&I made the decision to transfer fabrication of the Unit 3 CA03 modules from the MetalTek-SMCI Division (SMCI) in Lakeland, Florida to CB&I-LC due to production issues at SMCI."

This was repeated in the June 30, 2015 Quarterly Report at 17.

Pre-filed Direct Testimony of Kevin B. Marsh, May 26, 2015, 2015-103-E, Transcript at 88-90 (quoting Combined Application, Docket No. 2008-196-E, Exhibit J, p. 6-12).

"SCE&G's 2008 BLRA application acknowledged that, "[f]or a project of the scope and complexity of the licensing and constructing of the Units, any list of potential risk factors compiled at this stage of the process will not be exhaustive." Petition, Docket No. 2008-196-E, Exhibit J, p. 12. With that caveat, SCE&G listed the specific risks that seemed most important at the time. Among the risks specifically enumerated at that time were many, if not all, of the risks that have resulted in the current update filing:

...

- Module production: "It is possible that manufacturers of unique components (e.g., steam generators and pump assemblies or other large components or modules used in the Units) and manufacturers of other sensitive components may encounter problems with their manufacturing processes or in meeting quality control standards. . . . Any difficulties that these foundries or other facilities encounter in meeting fabrication schedules or quality standards may cause schedule or price issues for the Units."

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 255-256.

"Delay in production of modules, submodules and Shield Building panels has been a major source of delay for the project. This remains a key focus area for concern going forward.

However, there are indications that problems in this area are lessening. Three of the six major structural modules for Unit 2 (CA04, CA05, and CA20) have now been fabricated and set in place. The fabrication of a fourth (CA01) is physically complete. All submodules for a fifth (CA02) are on site. Submodules for the sixth module (CA03) are being received. There are one

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 115 of 126

MODULE FABRICATION

hundred and sixty-seven (167) Shield Building cylinder panels for each Unit. As of May 2015, more than sixty-eight (68) Unit 2 and six (6) Unit 3 Shield Building cylinder panels had been received on site and initial welding of the first ring of them had begun. However, module and submodule production remains a major challenge for the project."

June 30, 2015 Quarterly Report at 2-3.

"It is SCE&G's position that the delay and the majority of the increased costs reflected in the current schedules have been due to WEC/CB&I's failure to meet its contractual obligations related to structural module fabrication, timely design finalization, labor productivity, indirect labor costs and other matters, all despite SCE&G's repeated insistence upon improvements in performance. Accordingly, SCE&G has advised WEC/CB&I that it remains contractually obligated to satisfy the Guaranteed Substantial Completion Dates previously agreed to in the EPC Contract and other obligations under the EPC Contract, and WEC/CB&I is liable for costs associated with delay and other matters."

June 30, 2015 Quarterly Report at 16-17.

"Due to production issues at SMCI in Lakeland, Florida, and with input from SCE&G, WEC/CB&I has decided that parts and materials for future Unit 2 CA03 submodules will be shipped from SMCI to the Jenkinsville site in kit form where they will be assembled and welded together by CB&I personnel."

June 30, 2015 Quarterly Report at 24

"WEC/CB&I subcontracted the construction of the steel panels which will form the walls of the Shield Buildings to NNI in Newport News, Virginia. Schedule delay related to the finalization of design of these panels have placed the fabrication of these panels on the critical path for timely completion of the project. CB&I and NNI are in discussions to expand its manufacturing facility to allow for additional panels to be worked in parallel, thus mitigation potential schedule delay."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 127.

(Cross examination by Robert Guild)

"Module production goes through a number of phases...The challenge has been in producing those submodules in a way that met the design applications. Many cases, some of the designs changes, as they were building the modules—the submodules, because of constructability concerns. They needed to make sure they were in compliance with all the quality-control assurances that we needed for a nuclear project....The challenge has been in the initial fabrication of those submodules, before they are sent to the site for assembly."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 116 of 126

MODULE FABRICATION

Direct Testimony of Stephen A. Byrne, July 21, 2015, 2015-103-E, Transcript at Transcript 218.

"In our initial BLRA filing in 2008, SCE&G identified uncertainties around the use of modular construction for nuclear units as a potential source of delay. This is a new technique for commercial nuclear builds. Much of the current delay in the substantial completion dates of the units has been caused by delays in fabrication and delivery of submodules for the units.

Beginning in 2010, SCE&G began raising concerns about delays in submodule fabrication. SCE&G worked diligently to convince the consortium to address these issues."

July 30, 2015 – 7/30/2015 ORS Review of Quarterly Report at 21

"As identified in previous ORS reviews, one of the most significant issues related to the construction of the Units remains the continued inability of Chicago Bridge & Iron - Lake Charles ("CB&I-LC") and the other sub-contracted module fabricators to reliably and predictably meet the quality and schedule requirements for fabricating and delivering the submodules, including the associated quality-related documentation. However, significant progress was made in this area.

Welding on the Unit 2 CA01 module was nearing completion in the MAB and the module should be ready for setting in the CV. However, delays in pouring of concrete for Layer 3 inside the CV due to issues relating to the licensing basis code compliance of weldable couplings, as further discussed in the "Notable Activities Occurring after March 31, 2015," on page 18 of this report, may further delay the setting of CA01. Unit 2 module CA05 was set in the CV and work continues on its final alignment and installation. In addition, all sub-modules of Unit 2 CA02 are on-site and are now under assembly in the MAB with 5 of the 5 upended and ready for welding.

Metal-Tek SMCI in Lakeland, FL continued fabrication of the Unit 2 CA03 sub-modules and Unit 3 CA03 and CA04 sub-modules, and had their first delivery to the site. One of the seventeen sub-modules for Unit 2 CA03 and four of the five sub-modules for Unit 3 CA04 have been delivered to the site, along with their associated Certificates of Conformance. Work was underway to assemble and align the Unit 3 CA04 module. However, due to poor quality and schedule performance, the fabrication of Unit 3 CA03 sub-modules has been transferred from SMCI back to CB&I-LC."

July 30, 2015 – 7/30/2015 ORS Review of Quarterly Report at 21

"Structural Modules

...

Work appears to be progressing well at Toshiba/IHI on the fabrication of the Unit 3 CA01 sub-modules with 2 of 47 delivered to the site. Oregon Iron Works has now delivered 16 of 72

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 117 of 126

MODULE FABRICATION

sub-modules for Unit 3 CA20. In addition, all sub-modules for Unit 2 CA22 from Greenberry in Oregon were delivered to the site and the floor module is fully assembled and ready for set.

Work continued on the installation of the anchor blocks for Unit 2 module CA20 in the AB with approximately three quarters of them installed. However, the north wall of the already installed module had to be removed and realigned due to concerns about the tolerances of the existing installation exceeding allowable limits. The issue dealing with the capacity of the Heavy Lift Derrick identified in ORS's 4th Quarter 2014 Report regarding the handling of the Unit 3 module CA01 has been resolved and will not impact the construction.

Although the fabrication, delivery, erection and installation still remain a critical issue on both units, progress is slowly being made, but is outside the bounds of the schedule. ORS remains concerned about this issue.

Shield Building Panels

The critical path of both units is now identified as the fabrication and delivery of the SB panels. NNI's performance continues to show improvement with 57 of the 167 Unit 2 panels and 4 of the 167 Unit 3 panels delivered to the site. The first course of Unit 2 panels have been fitted-up and aligned on the special assembly pad and detailed measurements made in preparation for their installation on the top of the AB walls. The second course has also been fitted on the assembly pad in preparation for welding two panel pairs together before installation on top of the first course SB panels. The delay in installation of the SB panels is also associated with resolution of the weldable coupling issue identified in the Structural Module section above. It is very important to the Project that installation of the SB panels begins soon if the Revised Schedule is to be met."

September 30, 2015 Quarterly Report at 16.

"In the second quarter of 2015 WEC/CB&I decided that parts and materials for future Unit 2 CA03 submodules will be shipped from SMCI to the Jenkinsville site in kit form where they will be assembled and welded together by CB&I personnel....The production schedule to date of Unit 3 CA01 and CA20 submodules by Toshiba, IHI Corporation, Oregon Iron Works and CB&I-LC does not support the construction schedule for the Units. WEC/CB&I is formulating plans with these vendors to mitigate these potential schedule delays."

September 30, 2015 Quarterly Report at 17.

"During the period, CB&I stopped production of mechanical modules at the CB&I-Island Park facilities in Beaumont, Texas and transferred production of these modules to CB&I-LC. The reason for doing so was the inadequate rate of production at the Island Park facility. To accelerate production, CB&I-LC continues to fabricate higher-priority Unit 2 mechanical modules on site and to assemble first floor Auxiliary Building mechanical modules there."

Letter from Dukes Scott to SCE&G, October 14, 2015

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 118 of 126

MODULE FABRICATION

"On September 10, 2015, ORS consultant, Gary Jones, visited Greenberry and Vigor (previously Oregon Iron Works) module-fabrication facilities located near Portland, Oregon. Below are ORS observations and recommendations resulting from Mr. Jones' visit; SCE&G needs to:

- Ensure that the Consortium improves the continuity and performance of their source inspectors assigned to the subject facilities. Turnover of CB&I source inspectors at Greenberry, especially among the leadership, has been high. This turnover has contributed to the delays in module delivery due to re-inspections. Every change in leadership produces new directions and new inspectors restarting the process. In fact, the Westinghouse lead assigned to the area had never visited the Greenberry facilities or offices.

- Pursue changes with the Consortium source-inspection processes and procedures at these facilities and possibly at other module-fabrication facilities. The extent of the required documentation to be submitted as part of the module and sub-module Certificates and Conformance is excessive and unnecessary. CB&I inspectors could perform their inspections and checks earlier in the process, rather than waiting until all the paperwork has been completed by the fabricators. These issues have resulted in unnecessary delivery delays.

- Continue to pursue the release of design-change documentation to the fabricators. Changes have been held by CB&I and not released to the fabricators because of contract cost-dispute issues between Westinghouse and CB&I. At the time of their meeting, no changes had been released to Greenberry since late March of this year and none had been released to Vigor since early June. The withholding of design-change documentation represents hundreds of changes and has resulted in delays in delivery; it will also result in extensive rework at the site once the modules are received. Subsequent to their meetings, Mr., Jones was advised by SCE&G that action has been taken on this issue and that the changes were being prioritized by CB&I and released to the fabricators for incorporation. However, this momentum needs to continue and detailed monitoring is required."

Letter from Dukes Scott to SCE&G, December 14, 2015

"Delayed structural module fabrication and delivery continue as a critical issue for the Project. Improvements are needed from all subcontractors and the continued role of CB&I - Lake Charles needs immediate attention and resolution."

December 31, 2015 Quarterly Report at 8.

"WEC and NNI have reached agreement on a mitigation plan to accelerate Shield Building panel fabrication. In addition, WEC is de-scoping much of the submodule and mechanical modules work initially assigned to CB&I-LC and CB&I-Island Park including fabrication of the Tension Ring and Air Inlet components of the Shield Buildings. WEC is preparing a revised critical path for the project to reflect current schedule information and

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 119 of 126

MODULE FABRICATION

mitigation plans. Additional mitigation will be required in critical path areas to bring the current Integrated Construction Plan (ICP) into compliance with the substantial completion dates."

December 31, 2015 Quarterly Report at 15.

"During the period, production of mechanical modules at the CB&I-Island Park facilities in Beaumont, Texas was de-scoped and sent back to CB&I-LC. In addition, work on six mechanical modules for Unit 2 and thirteen for Unit 3 were de-scoped from CB&I-LC and the materials and parts are being shipped to Jenkinsville for fabrication on site."

Post-Bechtel Report

Status of the V.C. Summer Units 2 & 3 Nuclear Power Plants, Presentation to the Electric Cooperatives of South Carolina, March 3, 2016 at 4. (G.J.E-Mails.2016.Vol.1.002315-002400)

"Problems with modular construction are 'fabricators unable to reliably meet schedule and quality requirements, continuing design changes, inadequate constructability reviews, reassignment and de-scoping of fabricators.'"

March 31, 2016 Quarterly Report at 12.

"Design changes continue to be communicated by WEC to submodule fabrication vendors on a schedule that disrupts the fabrication process and delays submodule production. This is an area that WEC and Fluor are addressing as a focus area for improving schedule performance and construction efficiency.

WEC is de-scoping much of the submodule and mechanical modules work initially assigned to CB&I-LC and CB&I-Island Park and has authorized NNI to begin engineering and procurement work for the Shield Building Tension Rings and Air Inlets."

March 31, 2016 Quarterly Report at 13.

"The production schedule to date of Unit 3 CA01 submodules by Toshiba and IHI Corporation does not support the construction schedule for the Units. WEC continues to formulate plans with these vendors to mitigate these potential schedule delays. A number of these mitigation plans are focused on shortening transportation time from Japan."

March 31, 2016 – C. Dukes Scott Letter (PURC Letters 000555-000558)

"As of this date, the following is an ORS assessment of the status of the Units.

. . .

Our actual experience has been that:

...

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 120 of 126

MODULE FABRICATION

- Fabricators were unable to reliably meet schedule and quality requirements, which led to the reassignment and de-scoping of fabricators,

...

Challenges to the project remain in several key areas, such as:

- Managing the transition between EPC contract holders and integrating the new outside construction manager,

- Module construction, which continues to encounter constructability issues and runs behind schedule,

- Fabrication of some of the most complex structures in the plant has not yet begun,

..."

Gary Jones' Summary of April 26 and 27, 2016 Visit to VCS Site (G.J.E-Mails.2016.Vol.1.001624-001626)

"Mechanical module delivery continues to fall behind schedule and SCE&G and WECTEC are considering moving fabrication to the site. While this may improve quality and better support construction, it will increase the demands on site craft labor and project costs."

April 29, 2016 – C. Dukes Scott Letter (PURC Letters 000559-000562)

"The ORS continuously monitors the construction of V.C. Summer Nuclear Units 2 and 3 (Units). ORS representatives met with Carl Churchman, Westinghouse Vice President and Project Director and Jeff Hawkins, Fluor Vice President and Site Director, to discuss the status of the project and their views on the transition process. This was the ORS' first meeting with Fluor's Site Director. Both provided informative and candid responses to the ORS' questions. They recognize the major issues confronting the project and are working diligently to resolve them. Among the major areas discussed were the following:

- ...

- Module Suppliers — A summit meeting with all module suppliers was held March 30, 2016, with the goal of familiarizing suppliers with current requirements and accelerating the production and delivery of quality sub-modules to the site. If successful, it will have a positive effect on module production, which is a critical path activity.

...

Sub-module delivery and erection continue to be a major cause of construction delays.

Progress occurred on the fabrication of the Unit 2 CA03 module in March, and a portion of the concrete fill of the Unit CA02 module was completed in April. Good progress has also

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 121 of 126

MODULE FABRICATION

been made on the Unit 3 CA05 module, which is complete and ready to be installed; however, sub-module fabrication for the Unit 3 CA01 module and Shield Building panel fabrication continue to be a challenge for the project. Delivery of Unit 2 sub-modules from all vendors also continues to be delayed.

..."

(PURC Letters 000559-000560)

Letter from Dukes Scott to SCE&G, May 13, 2016

"With regard to construction progress on the project:

Positives

a. SCE&G completed the concrete fill within the walls of the Unit 2 CA20 structural module on April 5. As the first concrete fill of a major structural module on the site, completion of this item is a significant accomplishment.

b. All 17 submodules on Unit 2 CA03 are now standing upright on the plenum in the fabrication tent on site, and final welding and outfitting of the module are underway. The module is on schedule for its placement in the containment vessel in June.

c. Newport News Industrial has made good strides in meeting their most recent schedules for delivery of Shield Building (SB) panels, and the erection of Course 4 of the SB panels has been completed at the construction site.

d. Progress has been made on the on-site fabrication of the Unit 3 CA20 module, subassemblies 1 & 2, in the Module Assembly Building (MAB) that supports a July 2016 placement date. All 72 submodules for this module have been delivered to the site, and subassemblies 3 & 4 have already been placed in the Unit 3 Auxiliary Building.

e. Progress was evident in the MAB on the Unit 3 CA0l module. Six submodules were erected on the plenum in a single week in April, which represents the highest production yet on this activity.

f. Unit 3 Containment Vessel (CV) Ring # 1 installation was completed on April 13.

Concerns

. . . .

m. Mechanical module delivery continues to fall behind schedule. As a result, SCE&G and WECTEC are considering moving fabrication to the site. While this

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 122 of 126

MODULE FABRICATION

may improve quality and better support construction, it will increase the demands on craft labor on site, and may increase project costs."

May 31, 2016 – C. Dukes Scott Letter (PURC Letters 000563-000567)

Thus far during our review process, the ORS has identified the following concerns:

. . .

Concerns

...

- Mechanical module delivery continues to fall behind schedule. As a result, SCE&G and WECTEC are considering moving more fabrication to the site. While this may improve quality and provide better support construction, it will increase the demands on craft labor on-site and may increase project costs."

(PURC Letters 000563-000567)

Gary Jones' Summary of June 2016 VCS 2&3 Site Visit and Recommendations (G.J.E-Mails.2016.Vol.1.001497-001503)

"Module fabrication and delivery continue to determine the critical paths on the project, although the focus is gradually shifting from structural modules to mechanical modules and structural steel modules in the nuclear island. In addition, the transition areas at the Shield Building to Auxiliary Building roof and the air inlet/tension ring areas of the upper Shield Building are becoming increasingly important. Contracts need to be finalized and fabrication releases need to be expeditiously forthcoming."

June 30, 2016 Quarterly Report at 11.

"The last of the submodules required to fabricate the Unit 3 Module CA01 arrived on site during the period. As a result, fabrication of structural modules and submodules is no longer on the project's primary critical path."

Letter from Dukes Scott to SCE&G, June 30, 2016

"Module fabrication and delivery continue to drive the critical paths for the project; however, the focus is gradually shifting from structural modules to mechanical modules and structural steel modules in the Nuclear Island. In addition, the transition areas at the Shield Building to Auxiliary Building roof and the air inlet/tension ring areas of the upper Shield Building are becoming increasingly important. Contracts need to be finalized, and fabrication releases need to be expeditiously forthcoming in order to avoid schedule impacts. As it is, because these contracts have taken so long to be finalized, these items will be on a very tight schedule with little margin."

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 123 of 126

MODULE FABRICATION

July 8, 2016 – C. Dukes Scott Letter (PURC Letters 000572-000577)

"The ORS is currently in a heightened state of concern regarding the construction cost overruns and schedule delays for V.C. Summer (VCS) Nuclear Units 2 & 3 (the Units). Our concerns are outlined below and include SCE&G' s responses:

...

7. ORS Concern: Module fabrication and delivery continue to drive the critical paths for the project; however, the focus is gradually shifting from structural modules to mechanical modules and structural steel modules in the Nuclear Island. In addition, the transition areas at the Shield Building to Auxiliary Building roof and the air inlet/tension ring areas of the upper Shield Building are becoming increasingly important. Contracts need to be finalized, and fabrication releases need to be expeditiously forthcoming in order to avoid schedule impacts. As it is, because these contracts have taken so long to be finalized, these items will be on a very tight schedule with little margin.

SCE&G Response: SCE&G asserts that modules, including fabrication and delivery, is a top five focus area for the project. In addition, SCE&G asserts that it maintains its on-site presence at key module vendors, has recently increased oversight efforts, and is working daily with Westinghouse personnel to align priorities, reporting, and mitigations. According to SCE&G, Westinghouse has given suppliers advance authorization to fabricate the Shield Building roof steel and Air Inlet/Tension Ring panels. Westinghouse is also reporting weekly to SCE&G on contract finalization for upcoming scopes of work and has increased authority levels for more than 30 engineers to resolve issues to improve supplier response times. Finally, Westinghouse has moved the responsibility for structural steel procurement from the commodity delivery organization to the module organization to aid this procurement.

..."

(PURC 000572-000576)

Letter from Dukes Scott to SCE&G, July 12, 2016, incorporating SCE&G's Responses to June 30, 2016 Letter

"SCE&G asserts that modules, including fabrication and delivery, is a top five focus area for the project. In addition, SCE&G asserts that it maintains its on-site presence at key module vendors, has recently increased oversight efforts, and is working daily with Westinghouse personnel to align priorities, reporting, and mitigations. According to SCE&G, Westinghouse has given suppliers advance authorization to fabricate the Shield Building roof steel and Air Inlet/Tension Ring panels. Westinghouse is also reporting weekly to SCE&G on contract finalization for upcoming scopes of work and has increased authority levels for more than 30 engineers to resolve issues to improve supplier response times. Finally, Westinghouse has moved the responsibility for structural steel procurement from the commodity delivery organization to the module organization to aid this procurement.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 124 of 126

MODULE FABRICATION

...
SCE&G replies that it is currently performing an assessment of installation of components on the CA03 module to identify efficiency gaps and will communicate improvement opportunities to Westinghouse and Fluor."

Gary Jones' Summary of July 26-28, 2016 VCS 2 & 3 Site Visit and Recommendations (G.J.E-Mails.2016.Vol.1.001339-001341)

"It was somewhat distressing to learn that the fabrication of the sub-modules for Unit 3 CA03 is to remain with CB&I-Lake Charles. Although the logic (material availability, primarily) for this decision appears to be sound, the past performance of CB&I-LC does not inspire confidence."

Letter from Dukes Scott to SCE&G, August 8, 2016

"Construction progress was significantly more visible during this visit than last month. The Unit 2 CA03 module has been set inside of containment. This involved a complicated lift with the Heavy Lift Derrick (HLD) and very precise module placement. The overall setting of the module appears to have been well executed and the lessons learned from both China and Vogtle appear to have been incorporated appropriately. It was disappointing, however, that the scheduled date for this module set slipped several times. This leaves the CA02 module as the remaining major structural module to be installed in Unit 2. In addition, visible progress was seen in the Unit 2 Annex Building and the Unit 2 Turbine Building. The installation of structural steel in the top section of the Turbine Building also has progressed well.

. . . .

It was concerning to learn that the fabrication of the sub-modules for the Unit 3 CA03 module will remain with CB&I-Lake Charles. Although the logic (material availability, primarily) for this decision appears to be sound, the past performance of CB&I-LC with respect to producing modules on schedule and with the appropriate paperwork is concerning."

September 30, 2016 Quarterly Report at 7.

"The fabrication of Shield Building components and structural submodules for Unit 3 Module CA01 is a potential critical path item for the project. Additional mitigation will be required in certain of these critical path areas to support the substantial completion dates described below."

September 30, 2016 Quarterly Report at 10.

"The on-site assembly of structural modules remains a potential critical path item for the project as does the quality and fabrication schedule of mechanical modules."

September 30, 2016 Quarterly Report at 10.

"Commercial issues between WEC and CB&I related to mechanical modules produced by CB&I-LC remain unresolved and are impacting mechanical module production schedule.

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 125 of 126

MODULE FABRICATION

During the period, WEC implemented contingency purchase orders for the mechanical modules CB&I-LC had been supplying. Other vendors now will be supplying these modules. WEC continues schedule mitigation planning related to these modules and issuing purchase orders to other vendors. Production of these modules, and other structural and mechanical modules, remains an important focus area for the project."

September 30, 2016 Quarterly Report at 10-11.

"One hundred twenty-seven (127) of the 167 Shield Building Panels for the Unit 2 Shield Building have been received on site from NNI. Seventy-three (73) of the Unit 3 Shield Building panels are on site. NNI continues to meet quality and schedule expectations. NNI is actively implementing its mitigation plan to accelerate shield building panel fabrication."

September 30, 2016 Quarterly Report at 11.

"During the period, NNI issued a schedule for fabricating the Unit 2 and Unit 3 Air Inlet and Tension Rings. This schedule meets construction need dates for these components."

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 100-101.

(Cross examination by Sandra Wright)

"Q: Okay. All right. So now we have a consortium of two?

A: That's correct."

Q: CB&I and Westinghouse. And Westinghouse and CB&I are having problems. But we're having problems, too; SCE&G is having problems at the site. We're having problems with major errors happening, construction errors. Is that correct?

A: There were a number of issues that caused issues in the plant construction. The largest one was probably the manufacture or the fabrication of the submodules which were being done by CB&I at their plant site in Lake Charles, trying to make sure they met the quality control standards that we expected for the work to go into the nuclear plants . . . ."

DRAFT

ACCEPTED FOR PROCESSING - 2018 October 30 8:14 AM - SCPSC - 2017-207-E - Page 126 of 126

MODULE FABRICATION

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 196.

(Cross examination by Commissioner Fleming, addressing construction of shield building)

"A: Well, we encouraged CB&I at the time to have more than one site to fabricate parts and pieces for these plants, especially submodules and some of the major components that go along with the submodules. They now have, I believe it's five different locations where we are fabricating parts. Newport News, in Virginia, is doing the majority of the shield building parts for the first new unit. We have people on-site supervising activities up there. We visit on a regular basis. We stay close, to find out if there are any issues coming up. I know, in talking with Westinghouse and Fluor when they assumed responsibility for the project, they recognized that as one of the areas they needed to focus attention and I know Westinghouse has put additional money and effort and resources into making sure Newport News has what it needs to complete those shield building panels."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 524.

(Cross examination by Sandra Wright)

"A: ...Originally, the premise, from starting with the Shaw Group, was that they were going to do all of the big modules at one place. That was something that we pushed them to change as soon as they started that project. They were loath to change that. Chicago Bridge & Iron, when they took over, they saw the single facility bottleneck as a problem and started to finally diversify the supply chain.

So, as opposed to relying on a facility that's called CB&I Lake Charles, in Lake Charles, Louisiana, for all the big modules and a number of mechanical modules, we now have moved those to different fabricators around the country, and we're getting better quality and more timely deliveries. "

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 635-636.

(Cross examination by Commissioner Howard)

"Q: ...Please update us on the commercial issues relating to the mechanical modules produced by CB&I at the Lake Charles facility. Where is the module? Is it on-site, or have you disassembled it to be repaired?

A: There are a variety of different types of modules. ...We did get some [mechanical modules] in that didn't meet our quality standards. We did have to do some rework of those. In the rework arena, it could be anything from a couple of welds needing to be touched up to, you know, this is deficient and we might as well start from the rails. So we're doing that largely on-site now. We do have inspectors in some of the facilities to let us know what's going on in the facilities. And then we've, again, diversified the supply chain...

So the diversification of that supply chain is largely complete. The commercial disputes have been resolved...."