THE SUPREME COURT OF SOUTH CAROLINA

APPEAL FROM THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA
Appellate Case No. 2013-000529

South Carolina Energy Users Committee,

Appellant-Respondent,

v.

South Carolina Electric & Gas, Office of Regulatory Staff, Pamela Greenlaw,

Respondents,

and Sierra Club, is Respondent-Appellant.

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RECORD ON APPEAL – VOLUME III

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INDEX

Orders:

Order Approving SCE&G's Request for Modification of Schedules, No. 2012-884, dated November 15, 2012 (without exhibits) 0001

Order Denying Petitions, No. 2013-5, dated February 14, 2013 0080

Pleadings:

Petition of South Carolina Electric & Gas for Updates and Revisions to Schedules Related to the Construction of a Nuclear Base Load Generation Facility at Jenkinsville, South Carolina, dated May 15, 2012 (without exhibits) 0107

Petition to Intervene by Sierra Club, dated May 23, 2012 0122

Petition to Intervene on behalf of South Carolina Energy Users Committee, dated June 1, 2012 0126

Appellant's proposed Order Denying Petition for Updates and Revisions to Schedules, filed with the Commission by letter, dated October 26, 2012 0130

Petition for Rehearing or Reconsideration by Sierra Club, dated November 26, 2012 0152

Petition for Rehearing and/or Reconsideration of Order No. 2012-884 on behalf of South Carolina Energy Users Committee, dated November 28, 2012 0159

Transcript:

Opening Statement, Mr. Guild 0175

Testimony of Kevin B. Marsh

Direct Examination by Mr. Burgess 0178
Summary of Prefiled Direct Testimony 0180
Prefiled Direct Testimony 0192
Summary of Prefiled Rebuttal Testimony 0224
Prefiled Rebuttal Testimony 0227
Cross-Examination by Mr. Guild 0242
Examination by Commissioner Whitfield 0262
Examination by Commissioner Fleming 0265

Testimony of Stephen A. Byrne

Direct Examination by Mr. Zeigler 0270
Summary of prefiled direct testimony 0273
Prefiled direct testimony {w/correction} Public Version 0297
Summary of prefiled rebuttal testimony 0342
Prefiled rebuttal testimony 0347
Cross-Examination by Mr. Guild 0362
Cross-Examination by Mr. Elliott 0363
Cross-Examination by Ms. Greenlaw 0388

Testimony of David A. Lavigne
Direct Examination by Mr. Gissendanner 0399
Summary of prefiled direct testimony 0400
Prefiled direct testimony 0409
Cross-Examination by Mr. Elliott 0427
Examination by Commissioner Howard 0438
Examination by Vice Chairman Mitchell 0446
Examination by Commissioner Fleming 0448
Examination by Commissioner Hall 0455

Testimony of Hubert C. Young, III
Direct Examination by Mr. Burgess 0457
Summary of prefiled direct testimony 0459
Prefiled direct testimony 0465
Cross-Examination by Mr. Elliott 0493
Redirect Examination by Mr. Burgess 0510

Testimony of Carlette L. Walker
Direct Examination by Mr. Gissendanner 0511
Summary of prefiled direct testimony 0514
Prefiled direct testimony 0521
4/4/11 2010-376-E Hearing Testimony 0545
Cross-Examination by Mr. Elliott 0648
Examination by Commissioner Fleming 0662

Testimony of Joseph M. Lynch
Direct Examination by Mr. Zeigler 0679
Summary of rebuttal testimony 0684
Prefiled rebuttal testimony 0692
Cross-Examination by Mr. Guild 0709
Examination by Vice Chairman Mitchell 0725
Examination by Commissioner Howard 0726
Re-direct Examination by Mr. Zeigler 0727
Re-cross Examination by Mr. Guild 0730

Testimony of Mark N. Cooper, Ph.D.
Direct Examination by Mr. Guild 0732
Summary of direct and surrebuttal testimony 0733
Prefiled direct testimony 0742
Prefiled surrebuttal testimony 0762
Summary of supplemental surrebuttal testimony 0770
Supplemental surrebuttal testimony 0777
Examination by Commissioner Hamilton 0783

Panel Testimony of Gary C. Jones and Allyn H. Powell
Direct Examination of Ms. Hudson
Gary C. Jones 0785
Summary of prefiled direct testimony 0790
Prefiled direct testimony, Public Version 0795
Allyn H. Powell 0824
Summary of prefiled direct testimony 0827
Prefiled direct testimony 0831
Cross-Examination by Ms. Greenlaw 0846
Examination by Vice Chairman Mitchell 0850
Examination by Commissioner Hamilton 0852
Examination by Commissioner Howard 0854
Examination by Commissioner Hall 0856
Examination by Commissioner Whitfield 0857
Examination by Chairman Wright 0860

Exhibits

1 0862
2 0920
4 0937
5 0940
6 0943
7 0947
8 0951
9 0955
10 0972
11 1028
12 1037

Notice of Appeal by Sierra Club, dated March 18, 2013 1055

Certificate of Counsel 1058

- A delay of one additional month due to excavated rock conditions for the nuclear island ("NI") basemat for Unit 2 requiring additional fill concrete beyond that originally anticipated; and,
- A delay of an additional 1½ months due to the increased construction time associated with the complexity of the shield building field assembly attributable to design changes.

ORS's review of these changes to the schedule were found to be reasonable. The changes are cumulative in that the work associated with them is sequential (e.g., the basemat concrete pour cannot be performed until the COL is issued) and site-related; therefore, it cannot be performed in parallel or off-site in order to reduce the delay.

In addition to changes to the Substantial Completion Dates, these delays also translate into changes to other construction activities. However, not all activities are affected because some activities are performed off-site and/or are not dependent on site construction. This is particularly true for vendor-supplied equipment fabrication and delivery schedules. In addition, as the Project progresses, knowledge and experience advance and lessons learned are deployed. This means that construction durations are refined and construction sequencing is modified. Therefore, not all activities on the schedule were changed by the same delay interval. In some cases, they were not changed at all. This can readily be seen by a quick review of the BLRA Milestone Comparison table included as Exhibit GCJ-2.

From this Exhibit, one can determine the following with regard to the status of the 146 BLRA Milestones:

- 72 of the milestones are complete with 74 remaining;

- 13 have accelerated dates;
- 48 have delayed dates that vary between 1 to 16 months; and,
- 13 dates remain unchanged.

The Company is still developing a complete and current integrated construction schedule; therefore, it was not available for ORS review. However, SCE&G has revised the major milestones and major portions of the revised construction schedule which were made available and reviewed by ORS to determine whether they represented a reasonable and realistic basis for scheduling Unit 2 construction to meet the revised Substantial Completion Date of March 15, 2017. It should be noted that a detailed integrated schedule based on the previous Substantial Completion Dates had been made available to ORS and was developed to a similar level of detail and in a manner consistent with those schedules for other nuclear power plants with which I have experience. The activities were well defined at a level that can be readily monitored and reported and appeared to be logically sequenced with reasonable durations. It is anticipated that the current version of the integrated schedule will be developed to the same level of detail and in accordance with the same methodology as that previously provided.

Q. WHAT CONCERNS DO YOU SEE IN YOUR REVIEW?

A. It must be noted that the revised construction schedule represents an aggressive and ambitious construction approach that presents a risk to the on-time completion of the Project. While similar projects are meeting and have met similarly aggressive construction schedules in Asia, there is no precedent for attaining similar results on any modern nuclear power plant in the United States. This represents a challenge to the Project that will require rigorous diligence and sustained commitment.

Challenges have already manifested themselves as SCE&G has identified that the Project is currently 63 days behind the most recently revised schedule due to various issues associated with the basemat concrete pour delay. The Company is developing recovery plans to mitigate this delay. 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. Although significant and appropriate corrective actions have been taken by Stone and Webster, a subsidiary of the Shaw Group, Inc. ("Shaw"), Westinghouse Electric Company, LLC ("WEC") and SCE&G to address these delays, close monitoring by ORS will continue.

Also, of concern are the potential for additional delays associated with the shield building modules. Fabrication of these shield building components has not yet begun in earnest. Although there are currently no reports of schedule slippage, many of these components are more complex than the structural modules and will present even greater challenges to fabrication and field erection. As stated above, the shield building has already contributed to a 1½ month delay in the Substantial Completion Date of Unit 2, which prompts a concern that there may be more delays associated with these components. The Company must ensure that the shield building modules receive elevated scrutiny and monitoring.

Q. COULD YOU PLEASE DISCUSS FURTHER THE CHANGE IN THE SUBSTANTIAL COMPLETION DATE OF UNIT 3?

A. SCE&G is also requesting that the Substantial Completion Date for Unit 3 be accelerated to May 15, 2018, as compared to the currently approved date of January 1, 2019. The basis for SCE&G's new date is an extrapolation of the draft Consortium COL Delay Study commissioned via Change Order 11 to the EPC Contract which demonstrated that cost savings could be gained by reducing the interval between the Substantial Completion Dates of the Units to 14 months. The basis of this change was reviewed and will be addressed in more detail when the EPC cost changes are summarized later in my testimony. The same review approach was applied as used on Unit 2 and the same results obtained. The changes to the schedule appear to be reasonable and represent a cost effective acceleration of the Unit 3 Substantial Completion Date.

Q. ARE THERE IMPACTS TO THE BLRA MILESTONES THAT RESULT FROM THESE CONSTRUCTION SCHEDULE CHANGES?

A. Yes. Changes to the construction schedule result in changes to the remaining open BLRA milestones, as identified in Exhibit 1 of SCE&G's filing. These changes are reflected on the attached BLRA Milestone Comparison Table, Exhibit GCJ-2, which provides the currently approved date compared with the requested revised milestone date and provides a summary of the reasons for the changes to those milestone dates. These changes were reviewed and were found to be reasonable and in agreement with the revised construction schedule.

Q. WHAT ARE YOUR RECOMMENDATIONS WITH REGARD TO ACCEPTING THE PROPOSED REVISED SUBSTANTIAL COMPLETION DATES AND THE REVISED BLRA MILESTONE COMPLETION DATES CONSIDERING YOUR PREVIOUSLY DISCUSSED CONCERNS?

A. I recommend that the Commission accept the revised Substantial Completion Dates of March 15, 2017 for Unit 2 and May 15, 2018 for Unit 3 as proposed by SCE&G in their filing in Docket No. 2012-203-E. Furthermore, I recommend that the Commission approve the revised BLRA Milestone Schedule proposed in this same filing.

Q. COULD YOU PLEASE ADDRESS THE EPC CONTRACT CHANGES WHICH YOU REVIEWED AND PROVIDE MORE DETAIL ON THE CHANGES AND ON YOUR REVIEW?

A. Yes. In their filing, SCE&G addressed four major reasons for the changes to the EPC Contract, as follows:

- The additional costs incurred as a result of the delay in receiving the COL from the NRC;
- The additional costs associated with the redesign and increased construction costs of the shield building;
- The additional costs incurred as a result of the redesign of the structural modules; and,
- The additional costs incurred as a result of the bedrock under the Unit 2 NI being deeper than the test borings indicated.

In addition, there were three other change orders that impacted the EPC Contract costs and were included in this filing identified as follows:

- Cyber Security,
- Waste Water Discharge Piping, and
- Health Care Costs.

My testimony will address the four major reasons for the EPC cost changes and the Cyber Security change order. ORS witness Powell will address the EPC cost change orders on Waste Water Discharge Piping and Health Care Costs.

It should be noted that the four major reasons for the EPC Contract cost changes were bundled together and negotiated with WEC/Shaw ("Consortium") as a package. As stated by the Company in their filing, these changes were subject to extensive negotiations extending over several months before a compromise was reached and an agreement ("Settlement Agreement") was made to settle these claims for $137.5 million, the amount requested in the filing. This compromise represented a significant reduction from the originally proposed amount of $214 million. This final negotiated value also included a credit of [redacted] from Shaw reflecting an acceleration of potential rebates.

It should also be noted that the negotiated Settlement Agreement also included a change in the escalation rates for the "Firm with Indexed Adjustment Category" of the EPC Contract, wherein this portion will now be escalated at a fixed escalation rate of [redacted] beginning in July 2012 in lieu of the previously specified Handy-Whitman Indices. SCE&G considers this fixed escalation rate to be beneficial by providing more certainty to the final cost of the Project. Although this change is not a patently obvious benefit to SCE&G based on the recent Handy-Whitman indices rates, uncertainties about the future levels of these indices, coupled with the relatively minor impact of this change on the overall costs, indicate that it is reasonable for the Company to reduce their unknown risks by locking in a fixed escalation rate.

Q. COULD YOU PLEASE DISCUSS THE REVIEW OF THE COL DELAY IN MORE DETAIL?

A. Yes. The COL delay was assigned a cost of [redacted] in 2007 dollars in the Settlement Agreement. The draft Consortium COL Delay Study, dated November 4, 2011, which provided the basis for the increased scope and increased costs, was provided for review. An extrapolation of one of the options presented in the study (delaying Unit 2 by nine months instead of the originally stated six months in the study) presented the basis for the cost increases in Unit 2 and the cost decreases in Unit 3 in this Petition. The cost increases for Unit 2 were primarily associated with having construction personnel and equipment on-site for a nine month duration beyond that originally planned with lower productivity because of work restrictions due to the COL delay. The option of demobilizing during this period was considered infeasible because the duration was actually unknown as to when the work could begin and the loss of skilled labor, support personnel and equipment would not have been acceptable. The cost decreases on Unit 3 were due primarily to being able to more efficiently redeploy craft labor, support personnel and equipment from Unit 2 to Unit 3 and to work more areas in parallel.

The review of the basis of the added costs appeared to be reasonable and in-line with the expected values.

Q. COULD YOU PLEASE DISCUSS THE REVIEW OF THE SHIELD BUILDING CHANGES IN MORE DETAIL?

A. Yes. The cost increase associated with the redesign of the shield building represents by far the largest cost component of the four major changes. This cost is [redacted] in 2007 dollars as designated in the Settlement Agreement. Several detailed documents and reports representing well over a thousand pages were provided to ORS to justify this cost increase. These reports and studies supported the claims that the changes were prompted by

revisions in the NRC regulations and changes in the NRC's acceptance criteria. Most, but not all, of the changes can be attributed to the NRC's review of the WEC design, which was prompted by changes to the regulations addressing the need for the structure to resist the effects of an aircraft impact to the shield building. The NRC significantly revised, via Draft Regulatory Guide DG-1176, dated July 2009, the required loading the shield building must accommodate from that which WEC used in the original design of the Units, and which formed the basis of the EPC Contract, as was delineated in Design Control Document ("DCD"), Revision 16.

Another closely related issue was the NRC's refusal to accept the steel/concrete composite ("SCC") wall design which WEC had included in the original design of the Units. This came about via NRC directives issued on October 15, 2009 which rejected the WEC SCC design. This rejection prompted a prolonged series of redesigns by WEC and reviews between the NRC and WEC which culminated in the design represented by DCD, Revision 19, upon which the Project's COL was based and which forms the basis of the current design.

I reviewed these changes to determine whether the settlement amount is reasonable. The design and construction changes were extensive. I summarize some of the major physical changes below, but this does not represent the full extent of these changes:

- The thickness of the faceplates on each side of the shield building walls was increased from 0.5 inches to 0.75 inches and the material was changed from ASTM 572 Grade 65 to Grade 50 in order to increase the tensile strength;
- Over 30,000 tie bars with a diameter of 0.75 inches were added to span between the faceplates to tie them together, and required a penetration

through the faceplates so that they can be welded on the outside of the faceplates;

- Spacing of the Nelson studs, used to bond the concrete to the steel creating a composite unit, was revised to greatly increase the concentration and number of studs on each inside face of the plates;
- Stiffener plates, reinforcing gusset plates and other reinforcement were added in many areas;
- The air vents that provide passive cooling to the containment vessel were revised from a square configuration to be replaced by round 18 inch Schedule 40 pipe, which is a stronger configuration;
- The connections from the SCC areas to areas of reinforced concrete in the basemat and the auxiliary building were changed from hooked rebar to mechanical connections using threaded rebar, bolted to plates or gussets; and,
- The tension rings at the wall to roof connection were changed from I-beams to a box beam configuration with an increased plate thickness.

The changes required extensive redesign, reanalysis, additional procurement, and additional constructability and Project impact reviews. They also required a significant testing and benchmarking program to prove the capabilities of the SCC structure, involving several outside contractors and institutions. Licensing activities associated with the NRC review and the actual fees required by the NRC to perform the review also represented a significant cost.

In addition, the changes resulted in a considerably more complex structure than originally envisioned which dramatically increased the construction costs of the structure, including the shop fabrication costs and the field labor costs. Welding processes and procedures, non-destructive examination ("NDE") processes and procedures and labor skills and quantities were all impacted by these changes. The complexity also dictated the need to build several mock-ups to refine fabrication and field construction activities. The added complexity in the field erection of the shield building has contributed to the delay of the Project by adding another 1½ months to the completion schedule.

Based on the review of the reasons for the changes and the scope and extent of the changes with the resultant impact on the added complexity of the fabrication and erection process, it is my opinion that the costs associated with the changes to the shield building are reasonable.

Q. COULD YOU DISCUSS THE CHANGES TO THE STRUCTURAL MODULES IN MORE DETAIL?

A. Yes. SCE&G provided documentation for ORS's review that outlined the basis for and the extent of changes to the structural modules. The additional costs quoted in the Settlement Agreement associated with the changes to the structural modules are [redacted] in 2007 dollars. The reason for these changes is very similar to that already described for the changes to the shield building. The changes were prompted by the NRC review of the WEC design associated with the final aircraft impact rule by the NRC after the EPC Contract had been signed and the basis for the design of the structural modules set by the EPC Contract. This issue was further complicated by the NRC's refusal to accept the SCC design which had previously been preliminarily accepted by the NRC. This

caused similar, albeit less extensive and less costly, changes to 94 of the 134 structural modules.

An additional issue unique to the structural modules was the use of stainless steel on the inner faceplates which had a different allowable stress value than the carbon steel material on the outer faceplates. Stainless steel was used on those modules that were assumed to be exposed to water during postulated accident events. The NRC insisted, and the American Institute of Steel Construction Code supported their position, that the faceplates of a composite structure must have similar strength properties. Therefore, it was required that the outside faceplate material be changed from the original ASTM A36 to the more compatible ASTM A572, which is a stronger material that has properties more similar to those of stainless steel.

In addition, the following physical changes were also required in order to gain NRC acceptance of the WEC design:

- Nelson stud spacing was changed from a 10"x10" pattern to a 6"x6" pattern. This significantly increases the number of Nelson studs by over 2.5 times the original number; and,
- Mechanical connections with threaded rebars, bolted to reinforced plates at the basemat connections and other high stress area connections were added.

These changes resulted in added costs associated with redesign, reanalysis and additional procurement, additional constructability reviews and schedule impact reviews and adjustments. Licensing costs, including the payment of NRC fees for additional review, increased over the approximately two years of interface with the NRC required to obtain approval of the final design. Finally, as with the shield building, fabrication and field

construction costs for the structural modules increased due to the added complexity and congestion. Welding processes and procedures required revision and requalification and NDE processes and procedures had to be revamped.

Based on the review of the reasons for the changes and the scope and extent of these changes, it is my opinion that the costs quoted in the Settlement Agreement for the structural module changes represent a reasonable cost.

Q. PLEASE PROVIDE MORE DETAIL ON THE REVIEW OF THE BEDROCK ELEVATION ISSUE.

A. With regard to the changes associated with the Unit 2 bedrock elevation issue, the cost of these changes was quoted in the Settlement Agreement as [redacted] in 2007 dollars. The analysis of the basis of this cost increase indicates that the change was caused by an unanticipated local anomaly in the depth of the bedrock under the NI basemat that was not identified in the soil boring data provided to the Consortium. In addition to the costs associated with the additional excavation and fill that was required by the increased depth, the major cost impact is associated with the one month delay in the construction schedule that is attributed to this issue. The delay is protracted because of limitations in the allowable depth of fill concrete (18 inches) that can be poured and the curing time required before an additional pour can be made on top of the first pour. This restriction to 18 inches is required to permit the necessary vibration of the fill concrete to consolidate and compact it. Therefore, this additional depth requires seven additional pours which each require three days to complete. This translates into twenty-one working days which is essentially a calendar month.

Based on the review of this activity and cost of this change, I find the stated cost to be reasonable.

Q. COULD YOU PLEASE DISCUSS THE REVIEW OF THE CYBER SECURITY CHANGE ORDER IN MORE DETAIL?

A. Yes. The final area of my review for the EPC cost increase involves the changes associated with strengthening the plant's defenses against cyber attacks. This cost increase was prompted by the NRC issuance of Regulatory Guide 5.71, "Cyber Security Programs for Nuclear Facilities", dated January 2010, which identifies an acceptable approach to comply with 10 CFR 73.54, "Protection of Digital Computer and Communications Systems and Networks", dated May 2009.

SCE&G elected to approach this work in two phases. Phase I was undertaken for a cost of $914,422 and will more definitively scope the total work that is required by the entire program. Phase I will involve the review of the specific equipment and software of the plant to identify potential vulnerabilities to cyber attack and develop approaches to protect against such attacks. Phase II will complete the programming and other work required to actually protect the potentially vulnerable equipment and software against the identified cyber attacks. The cost of Phase II is estimated at $4.95 million.

SCE&G previously provided ORS with a draft of Change Order No. 14, which formed the basis of the review for this cost change to the EPC Contract. This draft included a detailed scope of work description submitted by the Consortium for Phase I and Phase II, and an analysis of this proposal prepared by SCE&G. Phase I has been essentially completed and is providing the basis for the final estimate for Phase II that is currently under preparation.

The review of the basis of this change establishes a well-defined basis for the performance of Phase I and a good preliminary basis for Phase II. However, Phase II will be better defined based on the results of Phase I and a more detailed and informed estimate will be provided at that time. In addition, there are several aspects of this work that apply generically to the entire generation of U.S. AP-1000 plants and the costs should be shared by all U.S. AP-1000 plants. WEC has acknowledged this sharing, but has not finalized a scheme as to how it will be equitably addressed with regard to the cost implications. The work being performed here explores a new area in the design of nuclear power plants and represents the first effort at attempting to comply with the new NRC requirements. For these reasons, I believe the costs of the Phase I work should be approved, but the $4.95 million cost of the Phase II work should be deferred until a later filing when there is a better definition of the scope and costs and the issue of cost sharing among all U.S. AP-1000 plants has been more clearly defined. Therefore, I recommend that the Commission approve only the $914,422 cost of Phase I of the Cyber Security Change Order Request at this time.

Q. COULD YOU PLEASE SUMMARIZE YOUR RECOMMENDATIONS FOR THE APPROVAL OF THE EPC COSTS COVERED BY YOUR REVIEW?

A. Yes. In summary, I support the $137.5 million adjustment to the EPC Contract associated with the shield building redesign, the structural module redesign, the COL delay, and the Unit 2 rock conditions as requested in the Company's Petition under Docket No. 2012-203-E. In addition, I support the $914,422 adjustment to the EPC Contract representing Phase I of the cyber security issue. I recommend that the costs of $4.95

million representing Phase II of the cyber security change be deferred until additional information is available and that this cost be excluded from this update.

Q. DID YOU ALSO REVIEW THE OWNERS COST UPDATE REQUEST SUBMITTED IN THE SCE&G PETITION UNDER DOCKET 2012-203-E, AND COULD YOU PLEASE SUMMARIZE YOUR REVIEW?

A. Yes. I reviewed the Owners Cost requesting an increase in the SCE&G forecast of approximately $131.6 million. My review included the three major SCE&G program plans and two additional areas of increased costs. The three program plans are identified as the staffing analysis, the software roadmap and the multi-unit facilities study. Documentation on each of these program plans was provided by the Company to ORS for our review. These three areas address a major cost component of the changes in the Owners Cost. The other two cost categories can be classified as non-labor related changes to the operation, maintenance and construction of the Units and miscellaneous cost increases associated with obtaining various site licenses and permits, NRC fees, insurance premiums, recruitment fees for hiring and other costs not readily categorized.

Q. COULD YOU PLEASE DISCUSS THE REVIEW OF THE STAFFING PLAN IN MORE DETAIL?

A. Yes. The costs associated with increased staffing represented by far the most significant portion of the increased Owners Cost. SCE&G advised that in the latter part of 2011 they instituted an extensive review of their staffing levels utilizing a specially constituted panel of experienced personnel to challenge and validate the assumptions on staffing levels with each of their department managers. This resulted in changes to the recommended staffing levels which were reviewed and resulted in an increase of Project

staff by 144 Full Time Employees ("FTE"), comprised of 124 operational and construction FTEs and 20 security FTEs, above those in the approved budget associated with Order 2011-345. The major increases and the bases of these changes are summarized as follows:

- **Operations and Training** – increased by 30 FTEs

  This increase was based on the need to hire and train more operators than originally believed to be required because of the anticipated higher failure rates of operators in their final licensing examinations. This increased failure rate has been experienced industry-wide and locally within the same NRC region (Region II) as the Project.

- **Emergency Planning and Health Physics** – increased by 40 FTEs

  An NRC rulemaking published in November 2011 is requiring a limitation of duties to designated emergency personnel which has resulted in an increase in the number of necessary personnel throughout the nuclear industry. Underlying these new requirements is concern on how to address the emergency response issues resulting from the Fukushima event.

- **Engineering** – increased by 22 FTEs

  Most of the additional engineers (17) are assigned to tasks associated with programs that were originally intended to be developed by the AP-1000 Owners Group ("APOG"). However, the restrictions imposed by WEC on sharing information with utilities that had not signed an EPC Contract has resulted in APOG not being able to fulfill the tasks originally anticipated, which must now be performed by SCE&G and Southern Company alone. The remaining engineers are assigned to program and maintenance support and oversight.

- **Quality Systems** – increased by 20 FTEs

  These additions to the Quality Assurance and Quality Control programs have been identified as required in order to meet SCE&G's obligations for construction and supplier oversight. Quality issues have been identified at several vendors and other subcontractors (e.g., the SMS facility previously discussed) that require an increased number of inspections, audits and reviews. In addition, recent site developments have also indicated the need for increased construction surveillances, inspections, audits and reviews. The current staff of 7 is insufficient to fulfill the functions required as construction and fabrication activities rapidly increase.

- **Security Personnel** – increased by 20 FTEs

  These increases are required in order to meet recent NRC regulations that increased the levels of security required at all U.S. nuclear facilities.

The adjustments in other departments were comparatively minor increases, with the exception of a 16 FTE decrease in the Maintenance Department. This reduction came about in recognition of the ability to share more staff and more skills with the existing V.C. Summer ("VCS") Unit 1 crew.

There were other considerations that also increased the cost of staffing. The most significant of these were the need to account for increased costs due to the COL delay and the need to accelerate the hiring of some staff to reflect the advance in the Unit 3 Substantial Completion Date.

The staffing analysis also indicated cost effective planning because it demonstrated the transfer of selected individuals between the Units and into different roles as the plants

progress through the construction stage and into the testing and operations phases. Reductions in staff at certain appropriate times were also demonstrated.

The staffing increases appear to have a reasonable basis and in many cases were driven by NRC regulatory changes. The final staffing levels are not outside the range of the construction and operations staffing levels on similar plants with which I am familiar. Therefore, I conclude that the requested increase in staffing levels represents a reasonable component of the requested increase in the Owners Cost.

Finally, the cost basis of $72.3 million presented for these staff additions was reviewed against expectations based on my experience and was found to be reasonable and in-line with anticipated staffing costs for similar nuclear power plants with which I am familiar.

Q. COULD YOU PLEASE DISCUSS THE REVIEW OF THE SOFTWARE ROADMAP PROGRAM PLAN IN MORE DETAIL?

A. Yes. SCE&G developed the software roadmap upon the realization that the configuration management and work management systems that were in-place for VCS Unit 1 were inadequate to serve three nuclear units and that their software needed to be further assessed and updated. The software roadmap was developed in conjunction with the corporate Information Technology (IT) group and each of the VCS departments. Each department identified their software needs and presented a business case that justified the need for the software. The corporate IT group coordinated and ensured consistency of the overall software plan.

I reviewed the software plan and found that SCE&G planned to utilize commercially available software with which I am, for the most part, familiar and which is

used on other nuclear power plants of which I have knowledge. However, among their most significant software expenditures will be the purchase of a new configuration management package and an upgrade of their work management system which is based on a proprietary system being developed by CHAMPS.net [redacted] a small software development company. In both cases, these systems will replace outdated systems currently utilized by VCS Unit 1 which are incapable of effectively serving a multi-unit plant. Both of these software systems will process and store vast amounts of data and will produce valuable work products for the plant. CHAMPS.net [redacted] is a small company and this system will only be utilized by VCS Units 1, 2 and 3. SCE&G is currently discussing the procurement of configuration software systems with several vendors which have well established programs that are utilized on other nuclear power plants, and with which I am familiar. However, SCE&G is also considering utilizing vendors who do not have well developed programs and are not suppliers to other nuclear power plants. The development and implementation of work management and configuration management software by inexperienced vendors represent some added risk to the Project. These risks have been acknowledged by SCE&G and actions have been taken or assessments are underway to mitigate these risks. This is an area that ORS will specifically monitor.

The other additional software under consideration represents areas where similar software has been applied on other nuclear power plants with which I am familiar, including the following:

- Flow Accelerated Corrosion software for identifying piping and component areas of potential degradation and assessing areas subjected to these adverse effects;

- Air-operated and motor-operated valve testing programs;
- Maintenance Rule implementation and management software; and,
- Whole body counting and radiation exposure monitoring software.

The software plan also addresses on-going software licensing fees and vendor maintenance services. It estimated the costs of these on a reasonable basis, generally assuming 20% of software costs as an annual fee. Costs associated with specific IT hardware required to support the implementation of these programs, such as special cabling, routers, work stations, etc., are also addressed in the plan.

Based on the review of this software plan, the software requirements identified and the costs associated with these additions of $28.7 million appear to be reasonable and consistent with that found on similar nuclear power plants with which I am familiar.

Q. COULD YOU PLEASE ADDRESS YOUR REVIEW OF THE MULTI-UNIT FACILITIES PLAN?

A. Yes. The multi-unit facilities study represented a comprehensive assessment of all new and existing facilities that may be required by the entire nuclear complex represented by VCS Units 1, 2 and 3. Not all facilities included in this report ("Facilities Plan") were fully developed as far as conceptual planning and cost estimates. Also, some of the facilities were not assigned to the budgets for Units 2 and 3, but were to be paid for by corporate or exclusively by VCS Unit 1. In the case of the Nuclear Operations Building, the majority of the costs necessary to construct this facility have been previously approved by the Commission. The amount represented in the Company's current filing represents an increase to the previously approved amount. However, the following near term facilities were sufficiently developed to include in this update and have a cost component assigned

to Units 2 and 3. In some cases, the costs of each of these buildings represent an allocation among VCS Units 1, 2 and 3 of the total cost of the facility since they will be shared among all three VCS units. Therefore, this review addresses only the following facilities:

- **Maintenance of Existing Facilities** – increased by $1.9 million

  This is the largest component of cost within the increase identified by the Facilities Plan. The increased levels of staffing and the acceleration of the timing of hiring the staff result in the increases in the maintenance and operational cost of these buildings.

- **Service Building Furnishings** – increased by $1.3 million

  The cost of constructing the Service Building is included in the EPC Contract; however, it did not include the costs associated with furnishing and equipping the Service Building. The review associated with developing the Facilities Plan identified this circumstance and this increase addresses this need.

- **Maintenance Facilities** – increased by $1.4 million

  Similar to the Service Building, the cost of the Maintenance Facilities are included in the EPC Contract, but not the furnishings, tools or equipment. This increase reflects these additional costs.

- **Nuclear Operations Building ("NOB")** – increased by $0.7 million

  The increased staffing levels required a reconfiguration and reallocation of the NOB. This cost reflects these changes.

- **Emergency Services Building** – increased by $1.0 million

The increased emergency services personnel and equipment mandated by the changes in NRC requirements and the upcoming changes associated with the lessons learned from the Fukushima event required this additional facility to be built.

- **Main Access and Plant Access Facilities** – increased by $1.0 million

  Although the Main Access Facility met the minimum regulatory requirements, SCE&G elected to increase the security of this building by hardening it to better withstand credible security threats and improve the overall security access to the V.C. Summer Plant. In addition, the equipment, furnishings and fixtures of both the Main Access and Plant Access Facilities could not be finalized until the designs of these facilities were available. The increased costs now reflect the addition of this equipment, furnishings and fixtures.

- **Temporary/Modular Buildings** – increased by $1.0 million

  Additional temporary office space is required to accommodate the larger staff and accelerated hiring during the construction phase of the Project and until the permanent facilities are completed and ready for occupancy.

These increases are partially offset by an approximately $0.5 million reduction in the security training classroom facilities, making the total increase $7.8 million. Based on the review of the Facilities Plan and subsequent discussions with SCE&G, I find these cost increases to be justified and reasonable.

Q. WHAT IS YOUR RECOMMENDATION WITH REGARD TO THE APPROVAL OF THE OWNERS COST?

A. Based on the review as summarized above, I have determined that the $131.6 million for the increased Owners Cost, as stated in the Petition filed under Docket No. 2012-203-E represents a reasonable cost increase for the Project.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

BY MS. HUDSON:

Q Ms. Powell, turning to you, would you please state your name, occupation, and business address?

A [POWELL] My name is Allyn Hunter Powell. I am an associate manager in the Electric Department for the South Carolina Office of Regulatory Staff. My business address is 1401 Main Street, Suite 900, Columbia, South Carolina 29201.

Q Have you ever testified before this Commission?

A [POWELL] I have not.

Q Would you please share with the Commission a little bit about your background and nuclear experience?

A [POWELL] I have a Bachelor's degree in Physics from the University of South Carolina. I also have a Master's degree in Physics with an emphasis in nuclear and particle physics from William & Mary, in Williamsburg, Virginia.

After leaving William & Mary, I went to work for the South Carolina House of Representatives Ways & Means Committee on State Budgeting. I worked there for seven years. I went to the South Carolina Energy Office after that, and spent two years there, working on nuclear policy and serving as staff to the South Carolina Governor's Nuclear Advisory Council.

Q Ms. Powell, did you prepare or cause to be prepared 14

pages of direct testimony in question-and-answer format?
A [POWELL] Yes, I did.
Q Do you have any changes, additions, or deletions to your testimony?
A [POWELL] I do not.
Q If you were asked these questions again, would your answers be the same?
A [POWELL] Yes.
Q Do you have any confidential information in your written direct testimony?
A [POWELL] No.

MS. HUDSON: Mr. Chairman, we ask that Ms. Powell's direct testimony be treated as if it were read orally from the stand.

CHAIRMAN WRIGHT: Ms. Powell's direct testimony will be read into the record as if given orally from the stand.

[See pgs 1110-1124]

And before she answers any more questions, check your microphone or get a little bit closer. People are having trouble in the back.

WITNESS: Is that better?

CHAIRMAN WRIGHT: I'm getting head nods. Yes.

WITNESS: Okay.

MS. HUDSON: Well, let us know if it's not.

BY MS. HUDSON:

Q Ms. Powell, in addition to your direct testimony, do you have one confidential exhibit?

A [POWELL] Yes, I do.

Q Do you have any changes, additions, or deletions to this exhibit?

A [POWELL] Not, I do not.

MS. HUDSON: Mr. Chairman, this exhibit was deemed confidential under Commission Order 2012-623. We ask that Ms. Powell's one exhibit be marked for identification and entered into the record as the next hearing exhibit, and treated consistent with that Commission Order.

CHAIRMAN WRIGHT: Ms. Powell's exhibit will be entered into the evidence of the case and will be treated consistent with the order granting confidentiality, and will be Exhibit No. 13.

[WHEREUPON, Hearing Exhibit No. 13, consisting of Confidential AHL-1, was marked and received in evidence.]

MS. HUDSON: Thank you.

BY MS. HUDSON:

Q Ms. Powell, do you have a summary of your direct testimony?

A [POWELL] Yes, I do.

Q Would you please present that to the Commission?

A [POWELL] Sure. Good evening, Mr. Chairman and Commissioners. The purpose of my testimony today is to summarize ORS's regulatory oversight activities with regard to the construction of SCE&G's V.C. Summer Nuclear Units 2 and 3 at Jenkinsville, South Carolina. I will also address portions of the company's request regarding transmission costs and changes to the EPC contract in the areas of healthcare and wastewater discharge piping.

SCE&G's quarterly reports provide the status of the approved BLRA milestone schedule. The BLRA milestone schedule consists of 146 milestone activities. ORS verifies the status of each milestone activity to ensure the activity is within the window allowed by the Commission's order. Milestone activities are allowed to be accelerated by up to 24 months or delayed by up to 18 months. Additionally, milestone activities that have been delayed ten months or more are identified and monitored. These milestone activities are referred to as caution milestones. ORS requests detailed updates on caution milestones each month, and reviews associated documentation.

ORS makes regular visits to the construction site in Jenkinsville to perform on-site document reviews and

site evaluations. During these visits, ORS meets with SCE&G personnel and reviews documents that relate to the approved construction schedule. Evaluations of the construction site itself are also performed, to observe construction activities and to ensure that construction progress is consistent with what is being reported.

The company's quarterly reports provide status of the approved capital cost estimates. ORS evaluates the company's quarterly reports with respect to the capital cost estimates, project cash flow, AFUDC, and escalation. Together, these focus areas determine the status of the project budget. ORS compares the capital cost estimates approved by the Commission to the cost estimates in the company's quarterly reports. The cost variances due to various project changes, such as change orders, are also evaluated to determine if the cumulative amount of these changes impacts the total approved capital cost of the project.

ORS Audit Division personnel conduct regulatory audit procedures on the company's reported project expenditures. ORS evaluates the company's accounting controls over project expenditures and, based on this evaluation, ORS determines the extent to which these controls prevent improper payments. ORS participates in monthly meetings with NND personnel and attends

quarterly meetings with Westinghouse representatives. ORS staff also participates in numerous NRC activities related to the site, attending public meetings near the site, participating in regular conference calls, and attending in-person meetings at the NRC headquarters in Rockville, Maryland, relating to licensing activities.

The focus of my review in this case centered around proposed budget revisions related to transmission, as well as EPC contract changes related to healthcare and wastewater discharge piping.

The first of the two EPC contract changes relate to the impact of federal healthcare legislation on construction costs. More specifically, this change required an increase in the age for dependents covered to 26 years. The cost increase associated with the change order addressing this issue is $135,573. ORS reviewed the data and analysis presented by the company, and this request appears reasonable.

The second of the two EPC contract changes relates to a revision of the wastewater drainage system to redesign approximately 3,000 linear feet of piping and associated structures to make it a gravity drain system. The cost increase associated with this change is $8,250. ORS has reviewed the data and analysis presented by the company, and this request appears reasonable.

The final area of my review focused on the revised transmission costs. There are four main components to the revised transmission cost estimate: The Saluda River Substation; the undergrounding and lowering of a section of the existing Parr/VCSN safeguard 115 kV line; conductor, terminal, and bus upgrades; and settlement and property acquisition. The total requested cost increase associated with this work is approximately $7.9 million. ORS conducted interviews with SCE&G officials, reviewed studies related to the Saluda River Substation project, cost estimates for the terminal and bus upgrades, and cost estimates related to settlement. These revised costs all appear reasonable.

This concludes my summary.

MS. HUDSON: Thank you.

[PURSUANT TO PREVIOUS INSTRUCTION, THE PREFILED DIRECT TESTIMONY OF ALLYN H. POWELL FOLLOWS AT PGS 1110-1124]

THE OFFICE OF REGULATORY STAFF

DIRECT TESTIMONY & EXHIBIT

OF

ALLYN H. POWELL

AUGUST 9, 2012

DOCKET NO. 2012-203-E

Petition of South Carolina Electric & Gas Company for Updates and Revisions to Schedules Related to the Construction of a Nuclear Base Load Generation Facility at Jenkinsville, South Carolina

(Redacted)

DIRECT TESTIMONY & EXHIBIT OF

ALLYN H. POWELL

ON BEHALF OF

THE SOUTH CAROLINA OFFICE OF REGULATORY STAFF

DOCKET NO. 2012-203-E

IN RE: PETITION OF SOUTH CAROLINA ELECTRIC & GAS COMPANY FOR UPDATES AND REVISIONS TO SCHEDULES RELATED TO THE CONSTRUCTION OF A NUCLEAR BASE LOAD GENERATION FACILITY AT JENKINSVILLE, SOUTH CAROLINA

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

A. My name is Allyn Powell. My business address is 1401 Main Street, Suite 900, Columbia, South Carolina 29201. I am employed by the State of South Carolina as Associate Program Manager in the Electric Department of the Office of Regulatory Staff ("ORS").

Q. PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I hold a Bachelor's Degree in Physics from the University of South Carolina and a Master's Degree in Physics from the College of William and Mary. My research focus while at the College of William and Mary was experimental nuclear and particle physics, and I am credited as co-author on several professional publications resulting from my research. I have been employed as Director of State Budgeting and Finance with the

Ways and Means Committee of the South Carolina House of Representatives ("WMC"). I joined WMC in 2002 as a Research Analyst, focusing on sales tax, income tax, higher education and cultural issues. I was responsible for providing background research, summarizing legislation before WMC and drafting portions of the Appropriations Act. Throughout my career at WMC I served as lead staff for a variety of issue areas, including K-12 education, property tax, and budget policy. I was promoted to Director of State Budgeting and Finance in 2007. As Director of State Budgeting and Finance, I was responsible for overseeing the State budget process for WMC and the production of the Appropriations Act. In 2009, I joined the South Carolina Energy Office at the South Carolina Budget and Control Board as a Program Manager. There, I worked with issues relating to radioactive waste disposal and energy assurance planning. I also served as lead staff for the South Carolina Governor's Nuclear Advisory Council. In 2011, I joined ORS as an Associate Program Manager. As Associate Program Manager my responsibilities include supporting senior management in reviewing Base Load Review Act ("BLRA") plant applications, managing efforts relating to energy assurance planning and serving as ORS's lead contact for demand side management and energy efficiency programs.

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

A. No. However, I did present a briefing to the Commission regarding energy emergency planning in South Carolina while I was employed by the South Carolina Energy Office.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to summarize ORS's regulatory oversight activities with regard to the construction of a nuclear base load facility at Jenkinsville, SC (the "Project" or "Facility") by South Carolina Electric & Gas Company (the "Company" or "SCE&G"). I will also provide a technical review of specific areas in SCE&G's Petition ("Petition") for updates and revisions to its capital cost schedule and construction schedule for V. C. Summer Units 2 & 3 ("Units") as delineated in Docket No. 2012-203-E. I will address proposed changes to the Company's Engineering, Procurement and Construction Contract ("EPC Contract") in the areas of health care costs and waste water discharge piping, as well as updates to transmission costs. The other areas of change included in this Petition will be addressed in the testimony of ORS witness Jones.

Q. WHAT ESTABLISHES ORS'S OVERSIGHT RESPONSIBILITIES?

A. Section 58-33-277(B) of the Base Load Review Act ("BLRA") states that "[t]he Office of Regulatory Staff shall conduct on-going monitoring of the construction of the plant and expenditure of capital through review and audit of the quarterly reports under this article, and shall have the right to inspect the books and records regarding the plant and the physical progress of construction upon reasonable notice to the utility."

Q. WHAT ARE THE PRIMARY FOCUS AREAS OF ORS'S OVERSIGHT ACTIVITIES?

A. Section 58-33-275(A) of the BLRA states, "...capital costs are prudent utility costs and expenses and are properly included in rates so long as the plant is constructed or is being constructed within the parameters of: (1) the approved construction schedule

including contingencies; and (2) the approved capital costs estimates including specified contingencies." Accordingly, ORS's oversight activities primarily focus on the Company's ability to adhere to the approved construction schedule and the approved capital costs estimates.

Q. PLEASE DESCRIBE ORS'S OVERSIGHT ACTIVITIES WITH REGARD TO ITS ON-GOING MONITORING OF THE APPROVED MILESTONE SCHEDULE.

A. The Company's required quarterly reports provide a status of the approved BLRA milestone schedule. The BLRA milestone schedule consists of 146 milestone activities. ORS verifies the status of each milestone activity to ensure the activity is in accordance with previous Commission orders relating to this matter, Order Nos. 2009-104(A), 2010-12, and 2011-345. It should be noted that milestone activities are allowed by Commission order to be accelerated by up to 24 months or delayed by up to 18 months. In addition, ORS identifies Caution Milestones as milestone activities that have been delayed 10 months or greater. Caution Milestones are subject to additional ORS examination.

Q. WHAT OTHER ACTIVITIES DOES ORS PERFORM AS PART OF ITS ON-GOING CONSTRUCTION MONITORING?

A. ORS makes regular visits to the construction site in Jenkinsville to perform on-site document reviews and site evaluations. During these visits, ORS meets with SCE&G's New Nuclear Deployment ("NND") personnel and reviews numerous documents that relate to the approved construction schedule. These documents include,

but are not limited to: the weekly construction activities report, detailed construction schedules, milestone comparison activity report, milestone schedule recovery plans, major component fabrication status log and meeting minutes. Also, ORS performs on-site evaluations to physically observe construction activities to ensure construction progress is consistent with NND documentation.

Q. PLEASE DESCRIBE ORS'S OVERSIGHT ACTIVITIES WITH REGARD TO ITS ON-GOING MONITORING OF THE APPROVED CAPITAL COST ESTIMATES.

A. The Company's quarterly reports provide a status of the approved capital cost estimates. ORS evaluates the Company's quarterly reports with a focus on the capital cost estimates, project cash flow, allowance for funds used during construction ("AFUDC") and escalation. Collectively, these focus areas determine the status of the project budget.

ORS compares the capital cost estimates approved by the Commission to the capital cost estimates in the Company's quarterly reports. This comparison focuses on the major cost categories, which are:

- Fixed with No Adjustment
- Firm with Fixed Adjustment A
- Firm with Fixed Adjustment B
- Firm with Indexed Adjustment
- Actual Craft Wages
- Non-Labor Cost
- Time & Materials
- Owners Costs

- Transmission Projects

ORS evaluates cost variances which may be due to various project changes (e.g., shifts in work scopes, payment timetables, construction schedule adjustments, change orders, etc.) to determine if the cumulative amount of these changes impact the total approved capital cost of the project (in 2007 dollars).

In a similar fashion, ORS compares the approved project cash flow to the project cash flow in the Company's quarterly reports. This comparison focuses on any variance to annual cash flow requirements. Lastly, AFUDC and escalation rates are evaluated to determine if appropriate rates have been applied.

Exhibit AHP-1 (Confidential) tracks the updates to the capital cost schedules from Commission Order No. 2010-12 through the Company's request in the Petition.

Q. WHAT OTHER ACTIVITIES DOES ORS PERFORM AS PART OF ITS ON-GOING MONITORING OF THE APPROVED CAPITAL COST ESTIMATES?

A. During on-site visits, the ORS Electric Department staff reviews documents that may impact the project budget. Examples of such documents are contract amendments and change orders. The ORS Electric Department staff also reviews invoices associated with completed milestone activities to ensure milestone payments are consistent with the EPC milestone payment schedules. In addition, ORS's Audit Division further evaluates the Company's actual project expenditures.

Q. COULD YOU PLEASE ELABORATE ON ORS'S AUDIT DIVISION'S EVALUATIONS?

A. Yes. ORS Audit Division personnel conduct regulatory audit procedures on the Company's recorded project expenditures. ORS evaluates the Company's accounting controls over project expenditures and, based on this evaluation, ORS determines the extent to which these controls prevent improper payments.

Q. DOES ORS EXAMINE EACH DISBURSEMENT TO ENSURE THAT THE CONTROLS OVER DISBURSEMENTS ARE BEING PROPERLY APPLIED?

A. No. In accordance with standard audit procedures, ORS examines a sample of expenditures to ensure that the controls are being applied. These samples are selected from the entire population of charges to the construction project account.

Q. COULD YOU PLEASE DESCRIBE THE PROCEDURES PERFORMED TO ENSURE THAT DISBURSEMENTS COMPLY WITH THE INTERNAL CONTROLS DESCRIBED PREVIOUSLY?

A. For each disbursement selected, Audit staff examines vendor invoices to ensure: invoices are from valid vendors; charges included are related to the project; the charges are for the correct time period; invoices are mathematically correct; proper approval signatures are evident on the invoice routing documents; accounts charged are consistent with the nature of the disbursements; and items have been charged to the proper EPC Contract cost category.

Q. WHAT OTHER ACTIVITIES DOES ORS PERFORM AS PART OF ITS ON-GOING MONITORING OF THE PROJECT?

A. ORS technical staff and executive management from various departments participate in monthly meetings with NND personnel, attend quarterly meetings with

Westinghouse representatives, conduct periodic site tours and attend Nuclear Regulatory Commission ("NRC") public meetings held near the site. Additionally, to keep abreast of the federal licensing process, ORS Electric Department staff have attended NRC hearings relating to the Combined Operating License ("COL") for the Units held in Rockville, MD. Also, ORS routinely participates in NRC conference call meetings to monitor activities related to the project.

Q. ARE THE RESULTS OF ORS'S MONITORING AND OVERSIGHT ACTIVITIES AVAILABLE TO THE PUBLIC?

A. Yes. Subsequent to each quarterly report filed by SCE&G, ORS, as part of its continuing review, elects to generate a report which details ORS's ongoing monitoring and review of the Company's quarterly report as well as other notable activities related to the construction of the Facility. ORS reviews are non-confidential reports and available for public review at www.regulatorystaff.sc.gov.

In addition to ORS's review of SCE&G's quarterly reports, ORS responds to the Company's annual request for revised rates. ORS examines SCE&G's annual revised rates filing which seeks rate recovery for the financing of project expenditures. ORS reviews the request and issues a report documenting its findings. This report incorporates ORS's oversight monitoring activities such as ORS's quarterly reviews and its on-going audit evaluations of Project expenditures. A copy of the report is filed annually with the Commission and is also available for public review.

Q. COULD YOU PLEASE ADDRESS THE EPC CONTRACT CHANGES RELATED TO HEALTH CARE AND YOUR REVIEW OF THE CHANGES IN MORE DETAIL?

A. Yes. My review centered around two change orders that have been signed and approved by the Company. Change Order No. 12 increases the cost of the Project by $135,573 and relates to the impact of federal health care legislation on costs for the Project. Specifically, Change Order No. 12 represents only the impact from a portion of the Health Care and Education Reconciliation Act of 2010 increasing the age for dependants covered to 26 years. The Company stated that future change orders may be necessary to address other portions of this legislation. In its review, the Company considered data from an external consulting firm, as well as data provided by EPC Contract holders Westinghouse Electric Co., LLC and Stone & Webster, Inc. ("Consortium"). The Consortium claimed an entitlement to this change order as the increased costs resulted from legislation passed after the enactment of the EPC Contract. Based on ORS's review of the data and analysis presented by the Company and ORS's review to confirm the age requirement, this request appears reasonable.

Q. COULD YOU PLEASE ADDRESS THE EPC CONTRACT CHANGES RELATED TO THE UPDATE FOR THE WASTE WATER DISCHARGE SYSTEM AND YOUR REVIEW OF THE CHANGES IN MORE DETAIL?

A. Yes. Change Order No. 15 relates to the redesign of 3,050 linear feet of piping and associated structures within the Waste Water Discharge System to make it a gravity drained system at an increased EPC Contract cost to the Company of $8,250. The

original EPC Contract did not specify whether the system would be gravity drained, but as a result of subsequent discussions with the NRC, a decision was made to specify a gravity drained system in the revised COL application. The Company stated that it prefers a gravity drained system as it involves fewer moving parts requiring maintenance. This has the potential to both increase reliability and decrease maintenance costs. Based upon ORS's review of the analysis provided by the Company, a review of the history of changes in the Company's COL application, and a review of the NRC's Final Safety Evaluation Report for the Units, this request appears to be reasonable.

Q. COULD YOU PLEASE ADDRESS THE REVISED COSTS ASSOCIATED WITH TRANSMISSION AND YOUR REVIEW OF THE CHANGES?

A. Yes. There are four main components associated with the revised costs in the Petition associated with transmission. The first of these is the revised costs associated with the construction of the proposed Saluda River Substation. The second is the undergrounding of a section of the existing Parr-VCSN Safeguard 115 kilovolt ("kV") Line and the lowering of the Parr-Midway 115 kV Lines. The third relates to conductor, terminal and bus upgrades. The fourth component is composed of changes resulting from settlements and property acquisition. The total amount requested by the Company for revised costs associated with transmission is approximately $7.9 million.

Q. COULD YOU PLEASE ADDRESS YOUR REVIEW OF THE REVISED TRANSMISSION COSTS ASSOCIATED WITH THE SALUDA RIVER SUBSTATION?

A. Yes. In its initial budget, the Company proposed installing an additional autotransformer at both the Lake Murray and Denny Terrace substations to accommodate the power flow associated with the Units. This decision was made before final routes for the transmission lines were determined, and was based on preliminary system studies. During the environmental evaluation stage of the COL application review, the Company made the decision to, where possible, site new transmission on existing rights-of-way. Further, upon more detailed analysis, there was not adequate space within the existing footprint of the Lake Murray and Denny Terrace substations to accommodate the additional autotransformers without a significant increased cost. The Company performed a study to determine whether a more cost effective option existed now that the exact transmission corridors had been identified. They evaluated three options. The first was similar to the original option, locating an additional autotransformer next to both the Lake Murray and Denny Terrace substations. This option would have required the construction of the equivalent of two entirely new substations adjacent to the existing substations, as well as upgrades to the Lyles substation and several segments of existing conductor. The projected cost of this option was $29.5 million. The second option would involve adding another autotransformer at the Lyles substation and rebuilding the Edenwood-Lake Murray 230 kV line. The projected cost of this option was $20.5 million. The third option was the construction of the proposed Saluda River Substation. The projected cost of this option at the time of the study was $12.2 million, which was later further revised to $15.5 million. From both an economic and a reliability standpoint, the study concluded that the Saluda River Substation was the preferable

option. The incremental increased cost associated with the Saluda River Substation is $1,591,000 as compared to the amount previously budgeted for autotransformers. Based on ORS's review, this request appears reasonable.

Q. COULD YOU PLEASE ADDRESS YOUR REVIEW OF THE REVISED TRANSMISSION COSTS ASSOCIATED WITH THE UNDERGROUNDING OF A PORTION OF THE PARR-VCSN 115 KV SAFEGUARD LINE AND LOWERING THE VCSN PARR-MIDWAY 115 KV LINES?

A. Yes. The Parr-VCSN 115 kV Safeguard Line would have crossed five different 230 kV lines, and should a situation occur where the line came into contact with those five lines, they would be unavailable to provide service. From a reliability standpoint, this would likely result in a scenario where a large number of customers experienced a loss of service. This line cannot run below the 230 kV lines as it is important for the safe operation of V.C. Summer Unit 1, therefore the best remaining option is burial of a portion of the line. The Company estimates that the cost to bury this portion of the line would be approximately $2.9 million.

With regards to the Parr-Midway 115 kV Lines, they cross six existing lines and one planned 230 kV line. The Company is lowering these lines to meet National Electric Safety Code crossing clearances for all of the lines at a cost of $704,000. Based on ORS's review, these requests appear reasonable.

Q. COULD YOU PLEASE ADDRESS YOUR REVIEW OF THE REVISED TRANSMISSION COSTS ASSOCIATED WITH THE REMAINING TERMINAL, CONDUCTOR AND BUS UPGRADES?

A. Yes. These items include a variety of system improvements to accommodate the interconnection of the new transmission lines. The Company states that these costs were not previously identified as the exact path of the transmission lines was not known during the initial forecasting phase. These improvements include the replacement of a disconnect switch in V.C. Summer Switchyard #1, as well as the existing lightning arresters, to accommodate higher capacities. Improvements are also necessary at the Canadys Substation, the Summerville Substation and the Saluda Hydro Substation to accommodate the higher capacities. The Company estimates the increased cost for this work at $2,711,800. Based on ORS's review, this request appears reasonable.

Q. COULD YOU PLEASE ADDRESS YOUR REVIEW OF THE REMAINDER OF THE REVISED TRANSMISSION COSTS?

A. Yes. The remainder of the costs relate to real property acquisitions and settlements. While the majority of the transmission for this project is sited on existing rights-of-way, additional rights-of-way had to be purchased along a segment of the VCS1-Killian 230 kV Line between the town of Blythewood and the Killian Substation. The Company updated the cost estimates for this segment as the exact route of this segment was not known when initial transmission cost forecasts were being developed. The additional cost anticipated for right-of-way acquisition for the Blythewood-Killian line is $369,000. Right-of-way acquisition in this area is still ongoing. While the Company has secured access to all needed rights-of-way, the purchase price has not been finalized where condemnation actions were initiated.

The Company has also incurred additional costs as a result of settlements paid to Richland County and the Town of Blythewood in Docket No. 2011-325-E. These settlements totaled $1,450,000 and resolved all outstanding contentions by the Town of Blythewood and Richland County. As a portion of these settlements are attributable to system improvements, only $1,014,000 is requested for these settlements in this filing. Prior to settling the issues, the Company investigated alternate routes for the affected lines, and determined that the cost for pursuing these alternate routes could have totaled at least $8,300,000. In light of these potential additional costs, the Company's decision to settle the issues appears reasonable.

The Company has also identified a credit of $1,388,300 resulting from a change in the transmission allocation methodology with the South Carolina Public Service Authority, which will partially offset these increased costs.

Q. OUT OF THE COMPANY'S $283.0 MILLION REVISED CAPITAL COST REQUEST, WHAT AMOUNT IS REASONABLE FOR APPROVAL?

A. The result of ORS's testimony is that $278.05 million is reasonable. The $4.95 million difference is discussed in the testimony of ORS witness Jones.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

A [JONES] No, I'm sorry, I do not.
Q Ms. Powell, do you have the date for that one?
A [POWELL] I do not have the date for that.
Q Okay.
A [POWELL] Not with me.
Q All right. Well, I have to ask you this, then. I question your ability for your -- hmm -- grasp of sufficient information to make a decision that what the company is calling delay for receiving their license -- it's actually not a -- it's not actually a delay; it's actually a time discrepancy, because it's a contract, and the contract was not with NRC; the contract was between two parties, SCE&G and Westinghouse, and they cannot contractually pin down a third-party. So I'm wondering how you were able to decide that this was actually a cost.
A [JONES] It is a fairly common practice to establish a start date for a construction project. And in this case, that construction start date for the nuclear safety activities is the receipt of the COL. So it's very common to have that stipulation in the contract as the start date for the contract activities.
Q Would that just not be an educated guess, not something hard and fast? Because we know you've got -- as you said, there's very limited experience in these kinds of

permitting from the NRC, since it is new procedure, and new NRC staff, and they were flooded with applications?

A [JONES] I think that in the case of contractual basis, it is a hard-and-fast member. In the case of a commitment by the NRC, it's not.

Q Okay. So whose fault is that, that the NRC didn't hop to the tune of SCE&G's drum?

A [JONES] I don't think it's anyone's fault. It is a reality of the situation that the licensing process did not proceed as it was originally contemplated.

Q That's a good word, "contemplated." So it was just an educated guess? And, you know, I mean educated.

A [JONES] It was based on the best available information at the time, which was discussions with the NRC.

Q But we -- have you seen documentation of the communications with NRC and SCE&G about setting up a date?

A [JONES] I saw that that date was also in NRC correspondence as an anticipated date.

Q Do you have the date of that correspondence?

A [JONES] No, I do not. And it wasn't a commitment date. It was discussion as a schedule, just planned.

Q It was informal discussion?

A [JONES] In the case of the NRC, I would say yes, because it was not -- the NRC does not commit to specific dates

for just about anything. They don't make that kind of commitment.

Q They can't, for reasons, good solid reasons?

A [JONES] [Nodding head.]

Q Okay. Concerning that, as well, the assigning of a value to a nine-month discrepancy between the time SCE&G thought they were going to get their license and when NRC did, I know that this was bundled in with the other costs and negotiated as a package. Were they able to separate that out for you, so you could see the parts of the package that were bundled together for the settlement?

A [JONES] Yes.

Q How did you decide to your satisfaction that their number for that time discrepancy was sensible?

A [JONES] I reviewed the specific -- the COL Delay Study that was prepared by Westinghouse -- by the contractor. There was a specific COL Delay Study prepared that provided costs for the scenarios of delay. I also reviewed SCE&G's review of that study, and their analysis of it. And so that's how I came to the conclusion that it was a reasonable expense.

Q Okay. And you based that on your experience with looking at delays in other similar constructions, where you have a miscalculation of when the license should

have complete?

A [JONES] Well, the delay study really -- it goes through costs associated with staffing, equipment rental. So it's tangible things that result in a cost. It's not just delay, per se. There are specific things that are identified that cause the costs.

Q And I'm not allowed to see those, because they are confidential. Is that correct?

A [JONES] That is my understanding, yes.

Q Yes. They do it this way in Chicago?

A [JONES] Pardon?

Q Do they do it this way in Chicago? Sounds like a Chicago tactic to me. Don't get me wrong; one of my best friends is from Chicago.

MS. GREENLAW: Oh, let's see. I think that's all I would like to ask today, at this point. Thank you, very much.

CHAIRMAN WRIGHT: Thank you. Mr. Elliott.

MR. ELLIOTT: No questions. Thank you.

CHAIRMAN WRIGHT: Thank you. Mr. Guild.

MR. GUILD: Mr. Chairman, members of the panel, I appreciate your testimony but I have no questions, either. Thank you.

CHAIRMAN WRIGHT: And Mr. Burgess.

MR. BURGESS: We have no questions of these

witnesses.

CHAIRMAN WRIGHT: Any redirect -- or, how about Commissioners? Never mind.

[Laughter]

Commissioners. Commissioner Mitchell.

VICE CHAIRMAN MITCHELL: Thank you.

EXAMINATION

BY VICE CHAIRMAN MITCHELL:

Q I want to ask Mr. Jones -- it seems in reading through your testimony you have a little concern there about the upgrade of configuration about the management and the work management work systems for the Summer units? And you discussed that on pages 23 and 24 of your direct testimony?

A [JONES] Yes, sir.

Q Do you feel like monitoring assessments by the company and the ORS, with their participation, and being proactive will be enough to preclude any schedule or cost impact on the project? You feel like -- I guess what I'm asking you, you showed concerns there, and y'all are working on probably a daily basis, weekly basis. Do you feel like your cooperation with the project and your cooperation with the company, you'll be able to hold down any work-related incidents, as far as meeting schedules or anything?

A [JONES] The specific area that you address are concerned with the software. Is that what --
Q Right, right, right. 23, yeah, of your direct.
A [JONES] First off, I'd like to say that I wanted to acknowledge -- and I acknowledge this in my testimony -- that SCE&G recognizes that there's risk associated with this also.
Q Right.
A [JONES] And so they are taking actions to address those and to ensure they get proper attention and that this software implementation goes through. We plan at ORS to also monitor this closely, because I think it's an area that does need to be monitored closely.
Q So that was more or less brought to your attention and then you had concerns? Is that -- am I --
A [JONES] Yes, sir. That is correct.
Q But you feel comfortable with that. And you mention it, and that's the reason I'm bringing it up. I thought there was some concern there.
A [JONES] Well, one of my assignments with ORS is to identify challenges to the project as soon as possible. And that was the purpose of this. When I first saw -- I subsequently got more detail about their approaches. When I saw who they planned to utilize, that was when it was a concern to me. We've had subsequent discussions

with SCE&G. And so the only reason I'm bringing this up is that it wasn't that they identified it to me first; I brought it up, and then they acknowledged that they had a similar concern.

VICE CHAIRMAN MITCHELL: Thank you. Thank you, very much. Thank you, Mr. Chairman.

CHAIRMAN WRIGHT: Thank you. Commissioner Hamilton.

COMMISSIONER HAMILTON: Thank you, Mr. Chairman.

EXAMINATION

BY COMMISSIONER HAMILTON:

Q Ms. Powell.

A [POWELL] Yes, sir.

Q Happy to have you with us.

A [POWELL] Thank you, very much.

Q In Dr. Mark Cooper's testimony, he characterized the costs, the additional costs that SCE&G is seeking in this proceeding, as cost overruns. Does ORS agree with his characterization?

A [POWELL] I think it would depend on how you define a cost overrun. If you define a cost overrun as exceeding the approved budget, I would agree with that. If you define -- it just depends on your definition of cost overrun.

Q Okay. What was it?
A [POWELL] I think that the majority of these costs are related to changes that occurred or to things that were difficult to estimate on the front end, so I don't know that you can necessarily consider it a cost overrun. In my mind, when you use the word "overrun," it's something that's -- you know, I planned to spend, you know, $10 on something, and I decided I wanted to buy, you know, a better, nicer one when I got to the store, and I spent $20. I think that there are circumstances that changed, that required additional funds. So if you define a cost overrun as just being in excess of the budget, you could say it's a cost overrun. But I don't know that I would use that definition.
Q All right. Thank you. Thank you, very much. Mr. Jones, welcome to South Carolina.
A [JONES] Thank you, sir.
Q Happy to have you. We were not aware that you were kind of with ORS in a consulting capacity, so we're happy to have you with us. I'm looking at page five of your direct testimony, and I just wonder, how did you verify that the delay of the Unit 2 in-service will not significantly impact the generation needed to meet the anticipated 2016 summer peak load?
A [JONES] That was based on information provided to me by

South Carolina Electric & Gas, looking at their load projections.

Q Okay. Did they provide you with what the reserve margin would be that summer?

A [JONES] I believe reserve margin was there. I don't recall what it was.

COMMISSIONER HAMILTON: Thank you, sir.

CHAIRMAN WRIGHT: Commissioner Howard.

EXAMINATION

BY COMMISSIONER HOWARD:

Q Mr. Jones, I guess you can continue with my line of questions. And I'll ask you just point-blank, I assume that you are happy and understand and agree with all the staffing requirements, the additional staffing requirements?

A [JONES] Yes, sir. I did a review of their staffing plan and had several discussions with the SCE&G people relative to that. So, yes. I also made a comparison to staffing at other nuclear plants on the basis of total staff, based on information that I had both from presentations at conferences and I think one of the benchmarking standards or benchmarking studies that had been done by Tim Martin & Associates. I had some access to some of that information. So I looked at, also, the total staffing, to see if that was reasonable, in

addition to reviewing each individual reason for a specific staff increase. So, yes, I am comfortable.

Q Give me the factors that go into determining a peak in 2016. What factors do you utilize in knowing what the peak will be in July of 1916 -- I mean, 2016?

A [JONES] I'm sorry, sir, are you talking peak --

Q Peak.

A [JONES] -- peak load, or --

Q Yeah, peak load.

A [JONES] I can't address that, specifically. I didn't get into the peak load study in that detail.

Q I guess I'm confused, because if you don't know what the peak load is, how can you determine what the reserve margin would be?

A [JONES] Well, I knew what the value of the peak load was, in their studies. I did not know -- I don't know the methodology that got them there.

Q I guess I was thinking of climate conditions and, you know, how do we know in 2012 the climate implications in 2016, which, to me, would be critical in a summer load?

A [JONES] I can acknowledge that that would be a factor. I mean, there are many factors done in determining utility load calculations, and I'm not -- I'm not conversant in what South Carolina Electric & Gas uses.

Q No, I'm just -- I just was curious, trying to level out

my learning curve that just gets deeper every day. Thank you for helping me.

A [JONES] Thank you.

CHAIRMAN WRIGHT: Commissioner Hall.

COMMISSIONER HALL: Thank you, sir.

EXAMINATION

BY COMMISSIONER HALL:

Q Good afternoon, Mr. Jones. I just wanted to ask you -- can you tell me more about your role in assisting ORS, in monitoring the schedule? How much time do you devote, and do you have an ongoing contract with them? I'm just curious to know.

A [JONES] Yes. I began my assignment with ORS in August of 2011. Ms. Powell mentioned we have monthly meetings with them, which I participate in. Also, the site visit; we have a site tour each month. We have a meeting with the on-site people where we go through -- we prepare an agenda and we go through items. Much of it is based on our review of the documentation that is presented to us, and we discuss the status of the ongoing construction and issues associated with the plant. So this is done on a monthly basis, and then we have a meeting that I participate in with the management of ORS and the management of SCE&G at the ORS offices each month.

Q Okay. And how long are your services through -- I mean, do you have contract?

A [JONES] I do. I have a yearly contract. It's subject to annual renewal.

Q Okay.

A [JONES] And I got that annual renewal in August.

Q Okay. Congratulations.

A [JONES] Thank you.

CHAIRMAN WRIGHT: That's why he has a smile.

[Laughter]

Commissioner Whitfield.

COMMISSIONER WHITFIELD: Thank you, Mr. Chairman.

EXAMINATION

BY COMMISSIONER WHITFIELD:

Q Well, since you've got that annual renewal, I've got a question for you looking into the future a little bit, Mr. Jones. Happy to have you with us. Obviously, you've got a lot of experience in new nuclear construction, both here and abroad. I'd like to, if I could, go back to a statement you made on page seven, I believe, of your direct testimony, where you say, "The revised construction schedule represents an aggressive and ambitious construction approach that presents a risk to the on-time completion of the project. While similar

projects are meeting and have met similarly aggressive construction schedules in Asia, there is no precedent for obtaining similar results on any modern nuclear power plant in the United States."

And I guess, looking at the 146 BLRA milestones, 72 are complete and with 74 remaining, and I think -- I believe you were here when Ms. Walker said approximately 27 percent of the funds had been expended on this project. And, of course, now that NRC has issued their license in March, I guess we're looking at, obviously, a really compressed, accelerated schedule, I guess you could say. And could you comment on what you see in the near future here, on this project?

A [JONES] Yes. A couple of things. Again, I go back to one of my roles is to identify challenges that I see on the project. The construction schedule that we've got here, really the majority of the construction work is just now starting. The real, tough construction activities are just now starting, with the upcoming pour of the first nuclear concrete. From then, we'll go into the erection of the containment and the erection of the shield wall, and all those kinds of things still have to come. So those are -- and the installation of piping, installation of the reactor vessel. All the major construction activities are really still to come. And

that is the schedule that is going to be challenging.

There are special techniques that are planned for this project that are different from previous construction projects, the earlier nuclear plants, and a lot of modular construction, which is going to help that. There's been a lot of study done, both by the nuclear steam supply vendors and by the utilities of how to put these plants together, how to optimize that construction. So there's a lot of work that's been done on how to do this. And I'm certainly not willing to say it can't be done, because it is being done. It is being done in Asia. We should be able to do it also. But it is going to be a challenge and it's going to be something that we really have not done before. So that's why I thought it was necessary to advance that as a challenge to the project.

Q So with your experience abroad and here, you feel like it's a manageable risk. You feel like it's an attainable goal.

A [JONES] Yes, I do. But I thought that it needed to be brought forth as something that you should be aware of.

COMMISSIONER WHITFIELD: Thank you, sir. That's all I have, Mr. Chairman.

CHAIRMAN WRIGHT: Thank you. Commissioners, any other questions?

[No response]

EXAMINATION

BY CHAIRMAN WRIGHT:

Q I have one, to Ms. Powell.

A [POWELL] Yes, sir.

Q I think you'd probably be the best one to answer this. We have talked during the day about caution milestones. You know, we've heard about how many of them maybe exist, and how many months some of these milestones have been delayed. What is ORS's opinion as to the proper procedure, I guess, for the company, as these delays, these caution milestones, approach maybe the 18-month mark?

A [POWELL] I think that if a milestone reaches 18 months, the company would certainly need to come in to the Commission. There's a milestone that is approaching 18 months at this time. ORS did -- and the company, I believe, did not specifically notify the Commission about that milestone -- it's not at 18 months; it's just approaching it -- because there was already a schedule revision pending before the Commission. But there are several milestones that are getting very close.

Q Okay.

A [POWELL] We monitor the difference between the milestone date and the site-need date for the components. And at

the moment, those components aren't affecting the site need to construct.

CHAIRMAN WRIGHT: Okay, thank you. Commissioners, any other?

[No response]

Now, we'll go to any redirect?

MS. HUDSON: No redirect.

CHAIRMAN WRIGHT: Okay.

MS. HUDSON: And that concludes ORS's witnesses.

CHAIRMAN WRIGHT: Very good. You may step down and be excused.

WITNESS JONES: Thank you.

CHAIRMAN WRIGHT: Thank you.

[WHEREUPON, the witnesses were excused.]

CHAIRMAN WRIGHT: Is there anything further to come before us from the parties? Closing statements or anything like that? Ms. Greenlaw?

MS. GREENLAW: Yes, sir. Do you want me to go over --

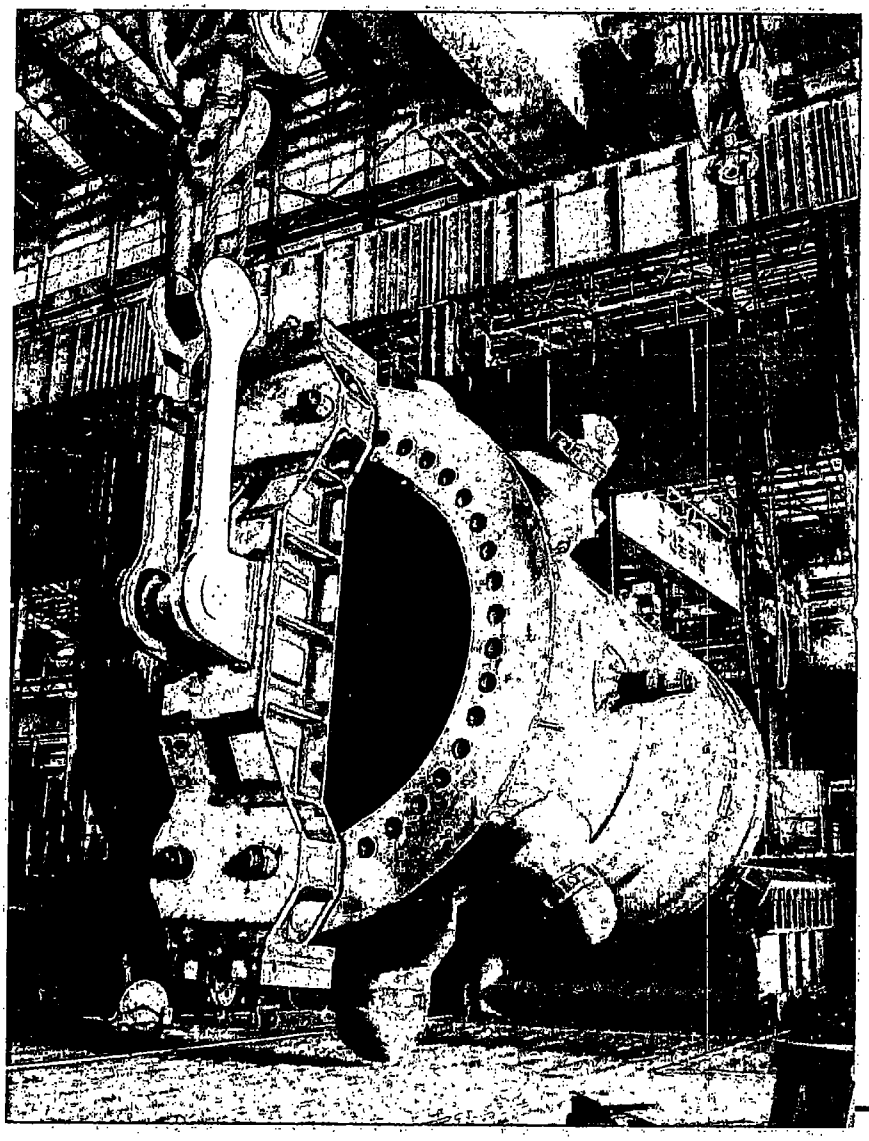
CHAIRMAN WRIGHT: Yes.

MS. GREENLAW: I understand that you have data I don't have, and I'm not going to be able to get it. And it could be that my letter is useless, because you may have all the information you have

EXHIBIT 1

Hearing on October 2 & 3, 2012

Docket No. 2012-203-E



Unit 2 reactor vessel at Doosan, South Korea

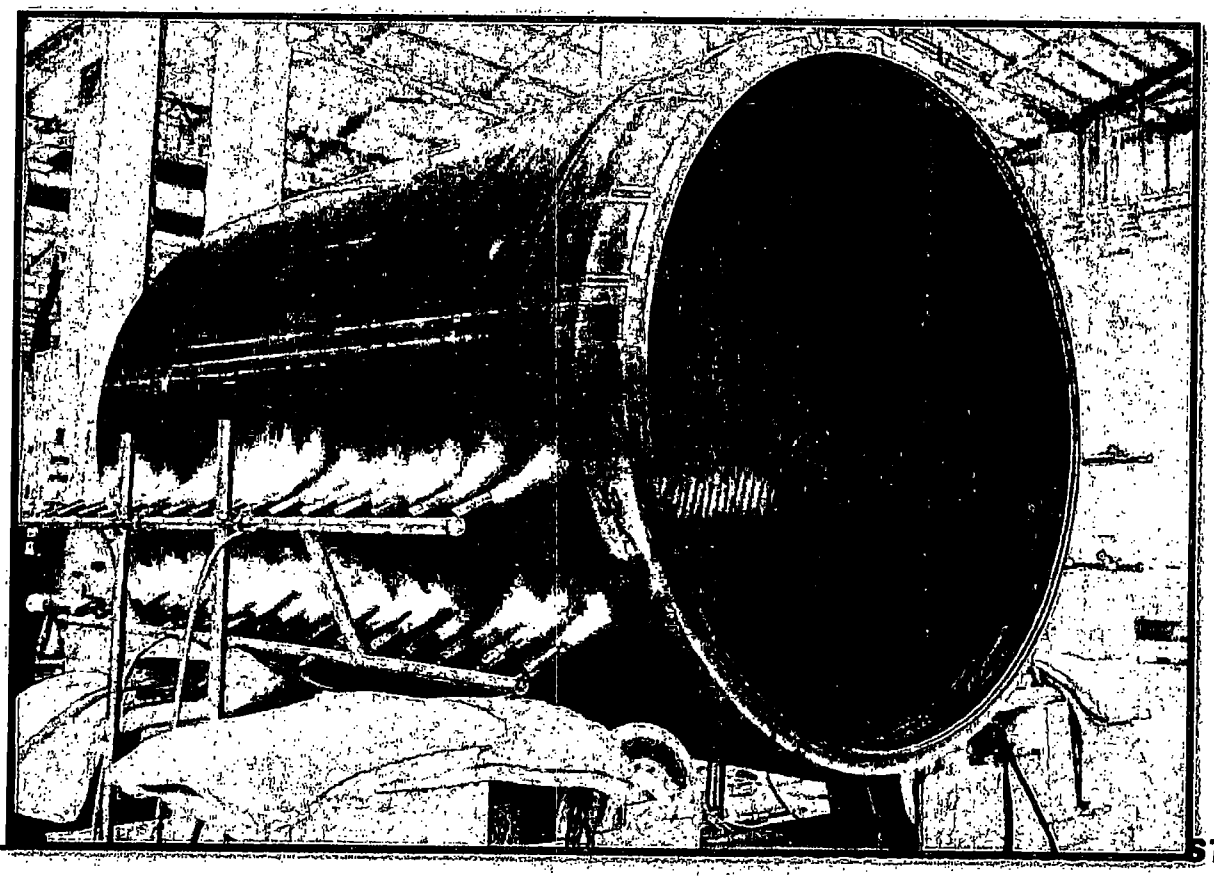
EXHIBIT
10/2/12
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2012-203-E

V.C. SUMMER NUCLEAR STATION



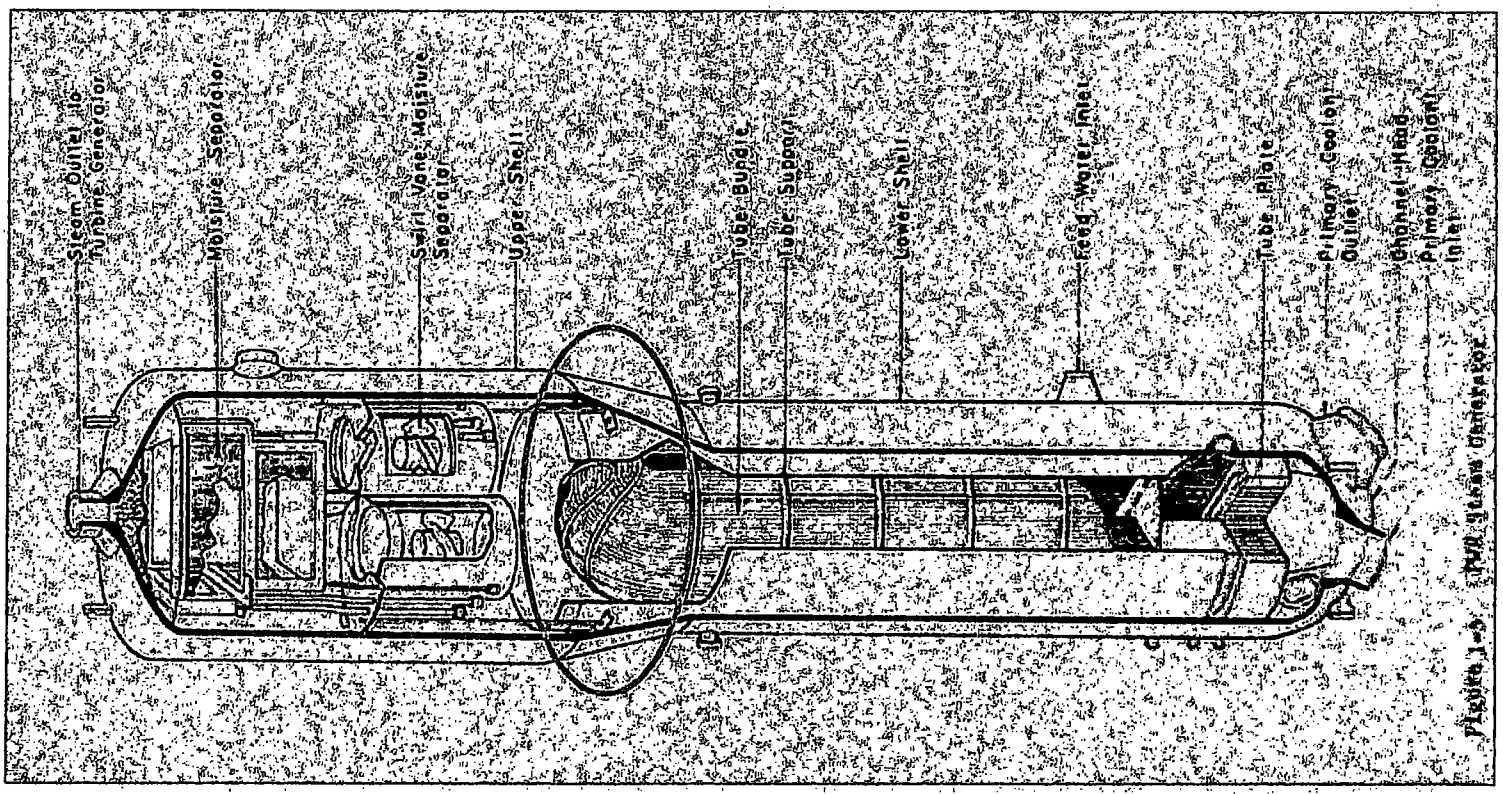
Unit 2 Reactor Vessel Hydrostatic Test - July 2012

Unit 3 Pressurizer Upper Shell Heat Treatment at Mangiarotti in Italy



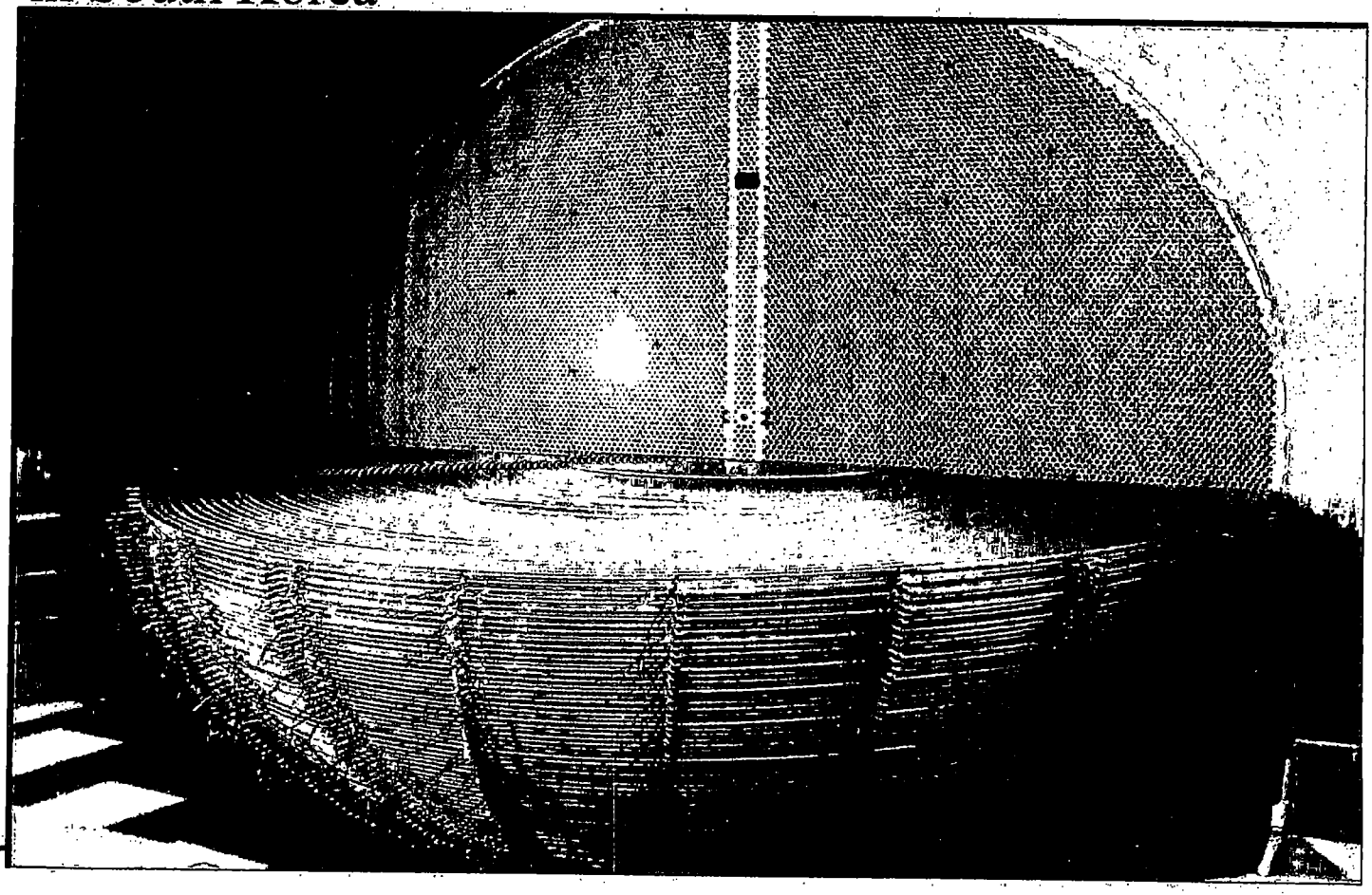
STATION

Steam Generator

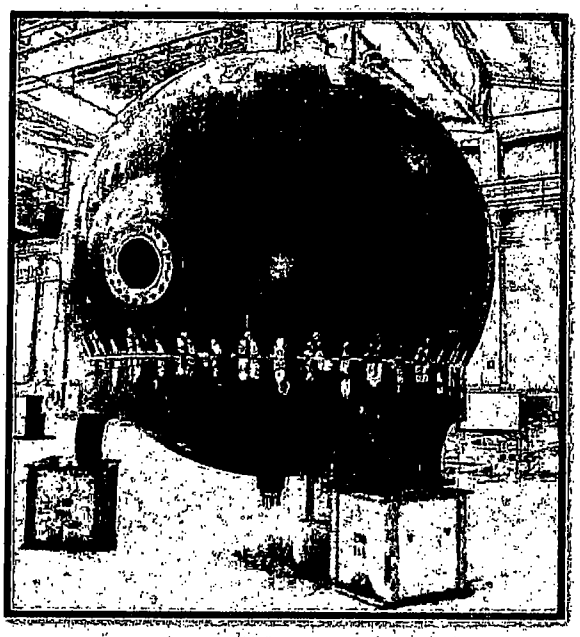


V.C. SUMMER NUCLEAR STATION

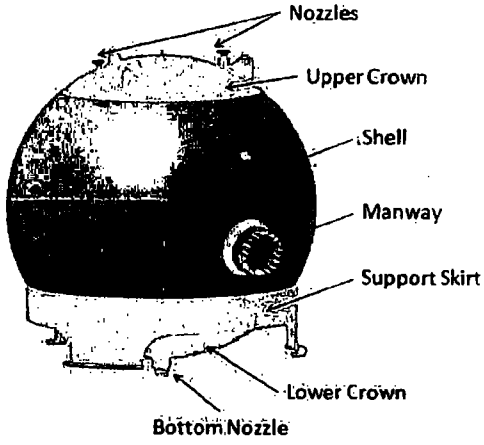
Unit 2 Tubing 2A Steam Generator at Doosan in South Korea

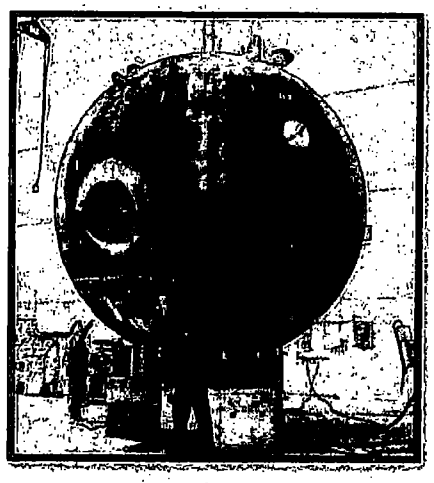


Accumulators, Mangiarotti - Italy

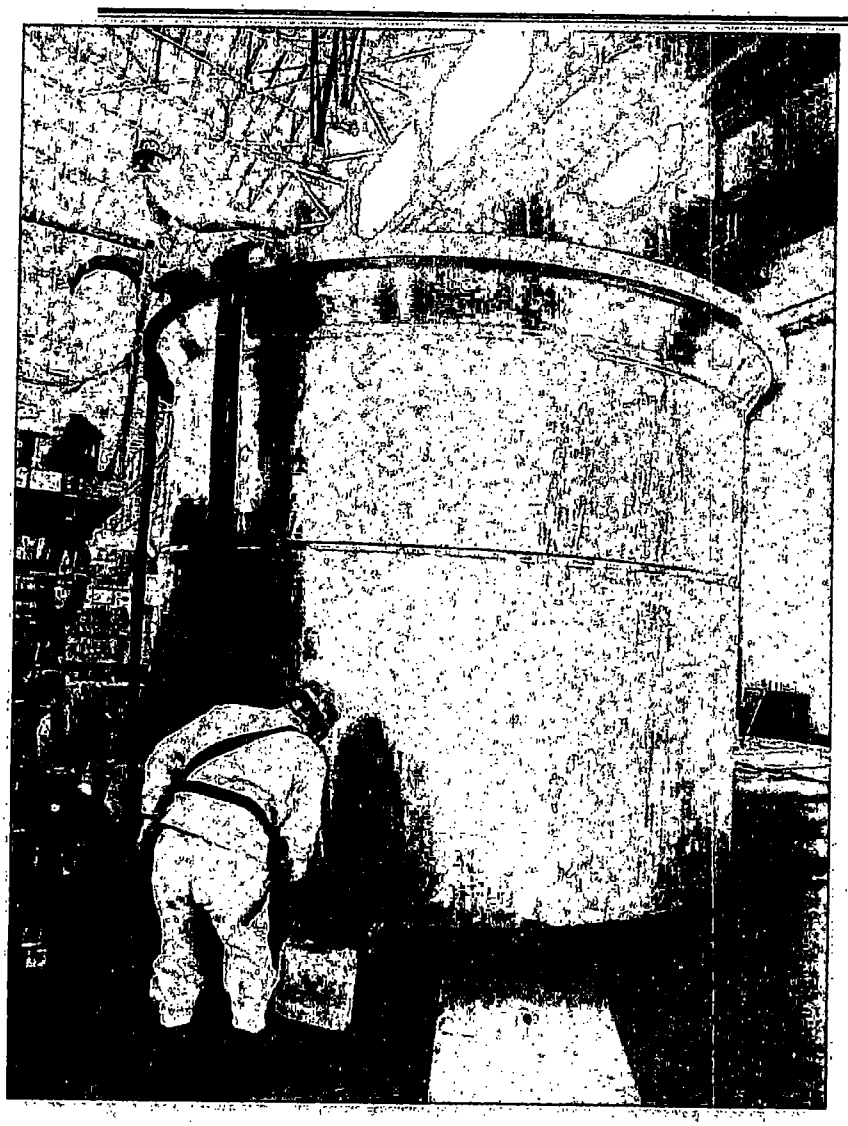


ACT – Tank 1 Welded to Skirt – Unit 2



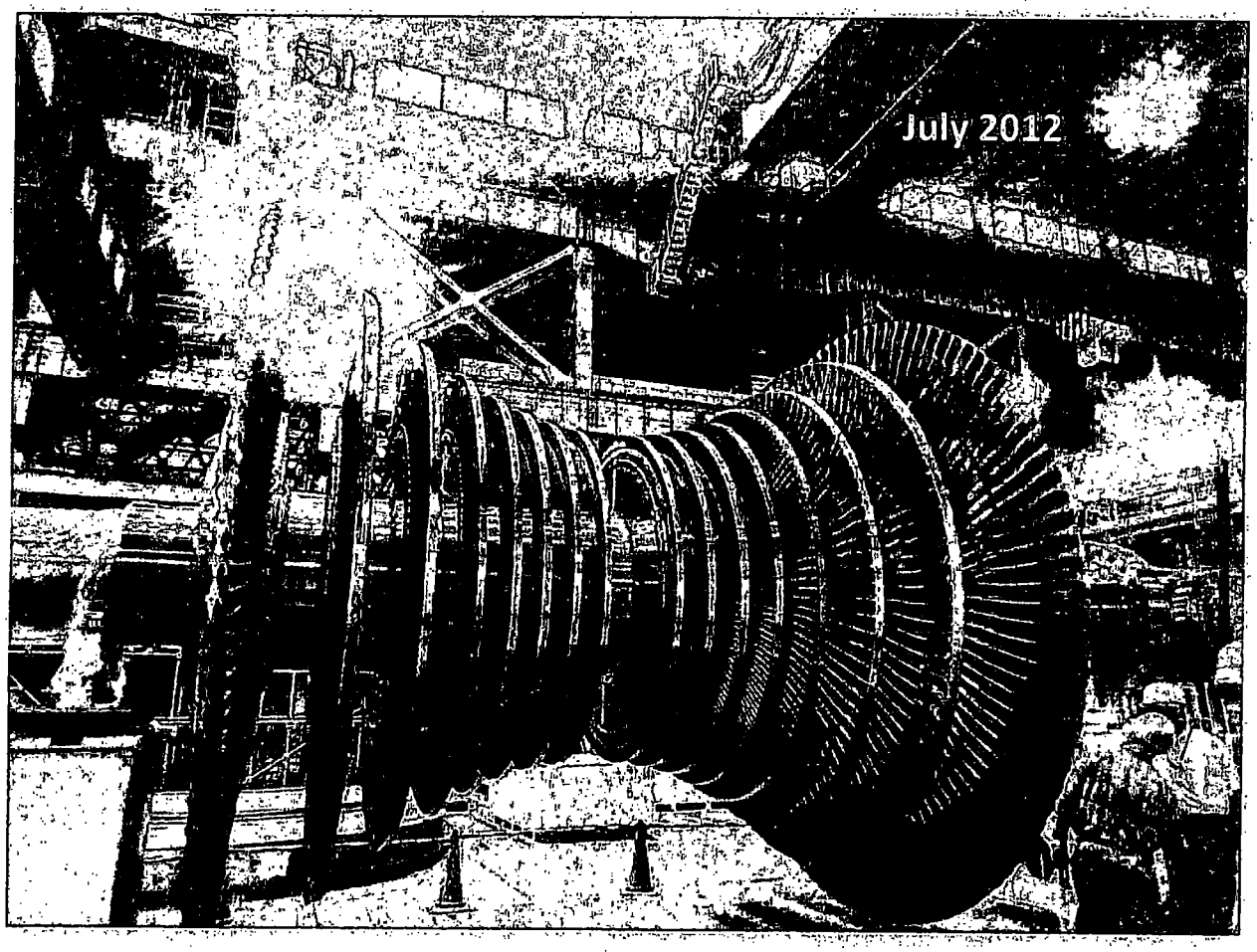


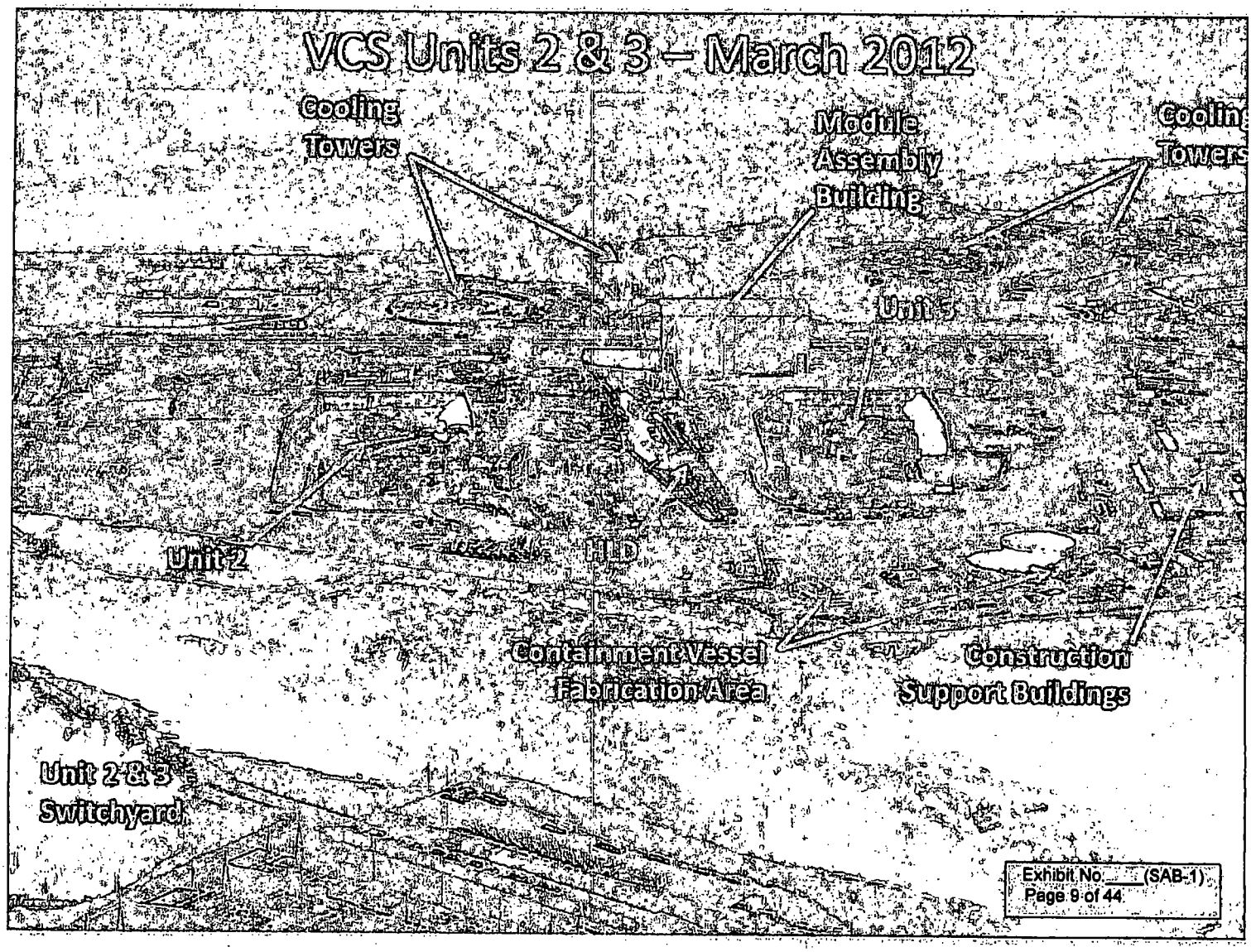
ACT – Tank 2– Unit 2

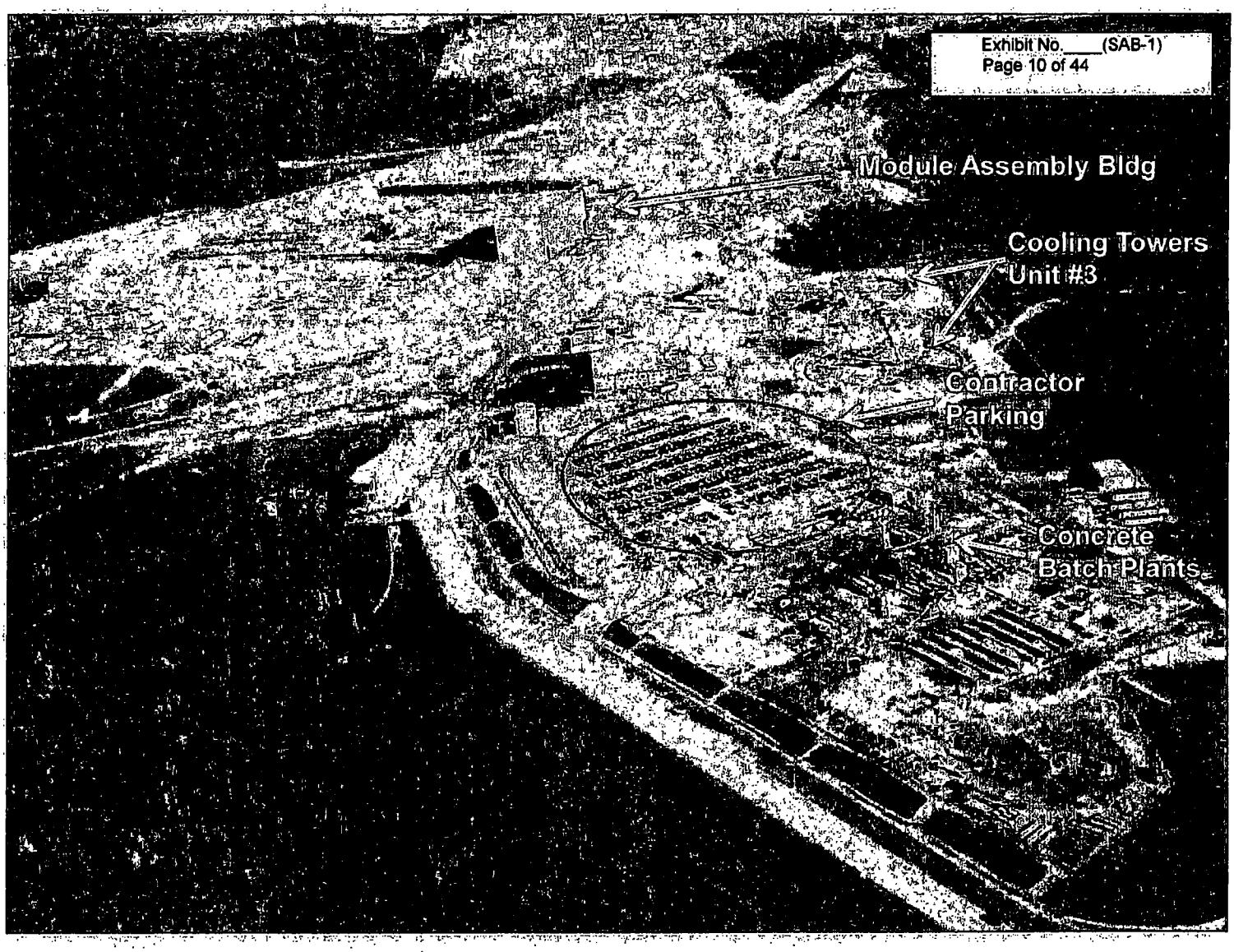


Upper Core Barrel Toshiba – Japan July 2012

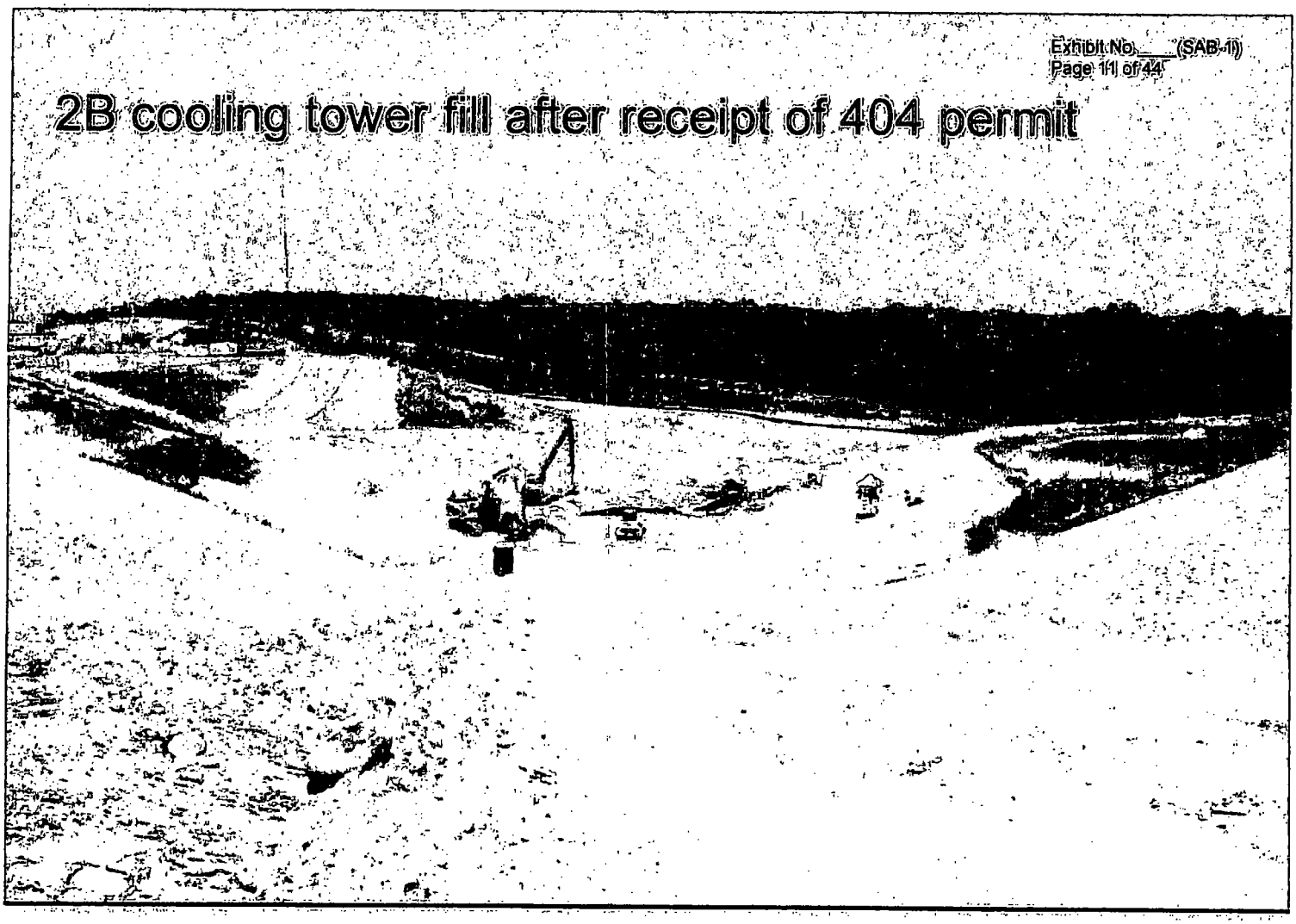
LPA Rotor, Toshiba - Japan

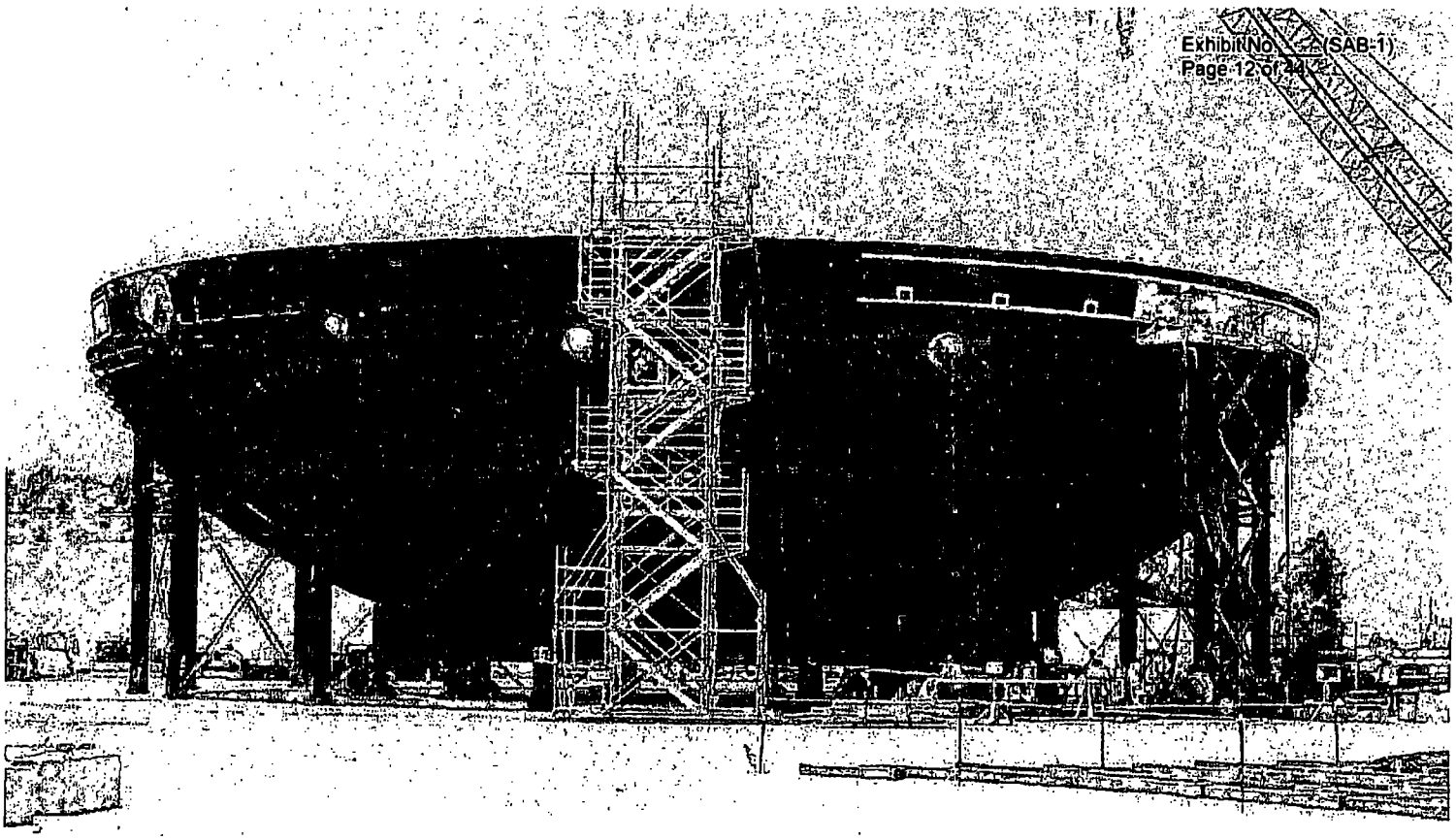



VCS Units 2 & 3 – March 2012
Cooling Towers
Module Assembly Building
Cooling Towers
Unit 3
Unit 2
Containment Vessel Fabrication Area
Construction Support Buildings
Unit 2 & 3 Switchyard
Exhibit No. ___ (SAB-1)
Page 9 of 44

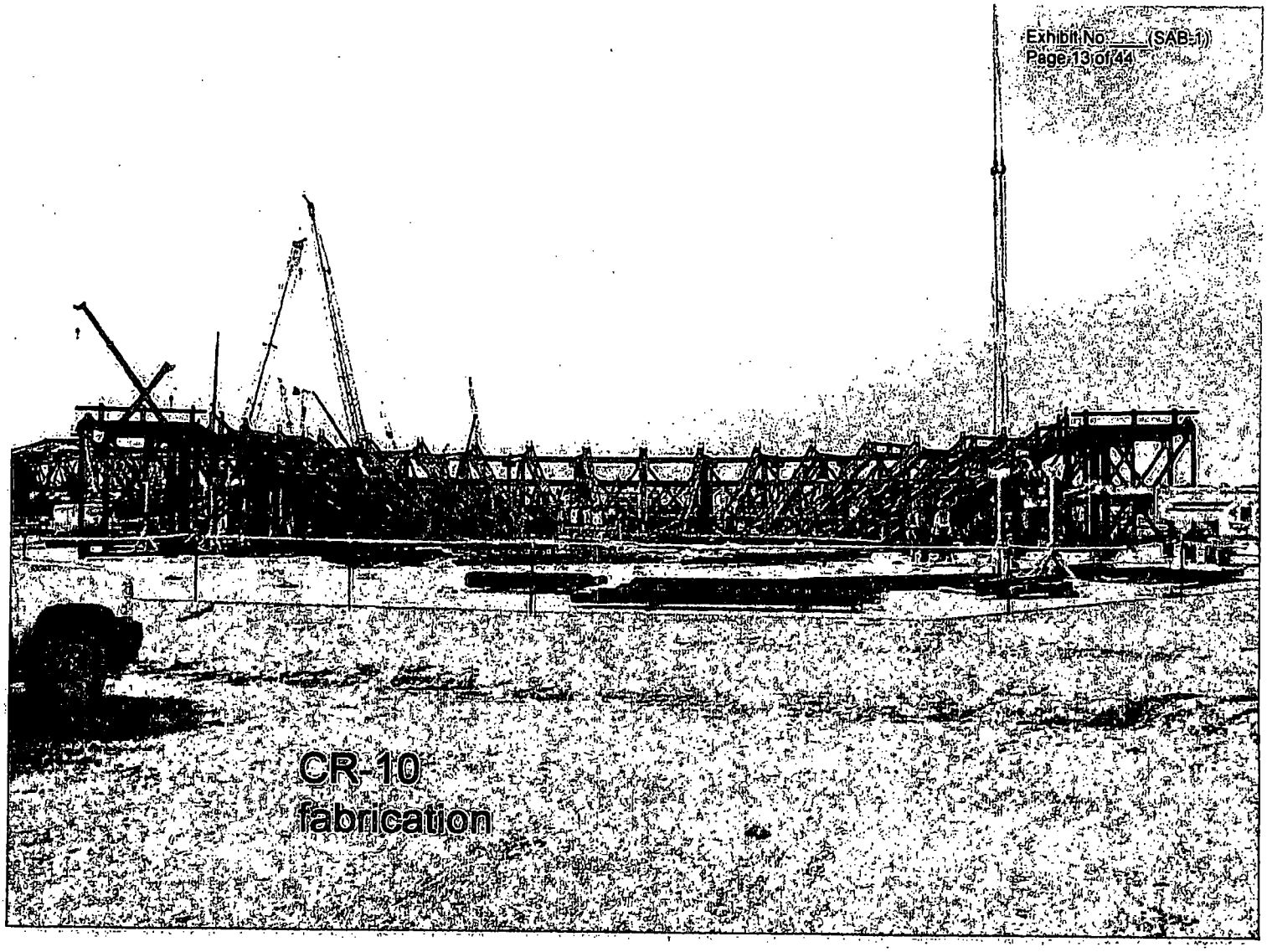

Exhibit No.____(SAB-1)
Page 10 of 44
Module Assembly Bldg
Cooling Towers
Unit #3
Contractor
Parking
Concrete
Batch Plants

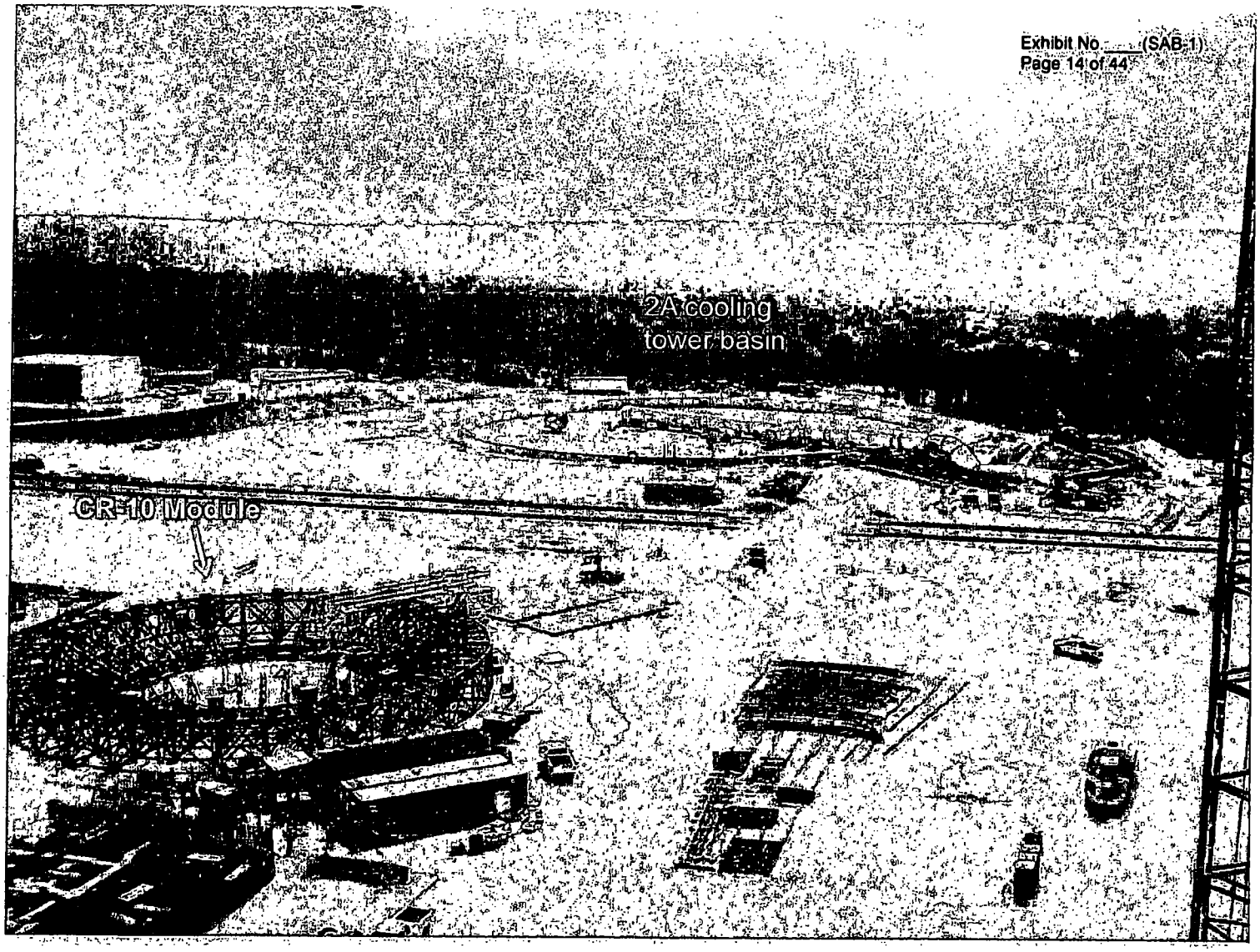
2B cooling tower fill after receipt of 404 permit

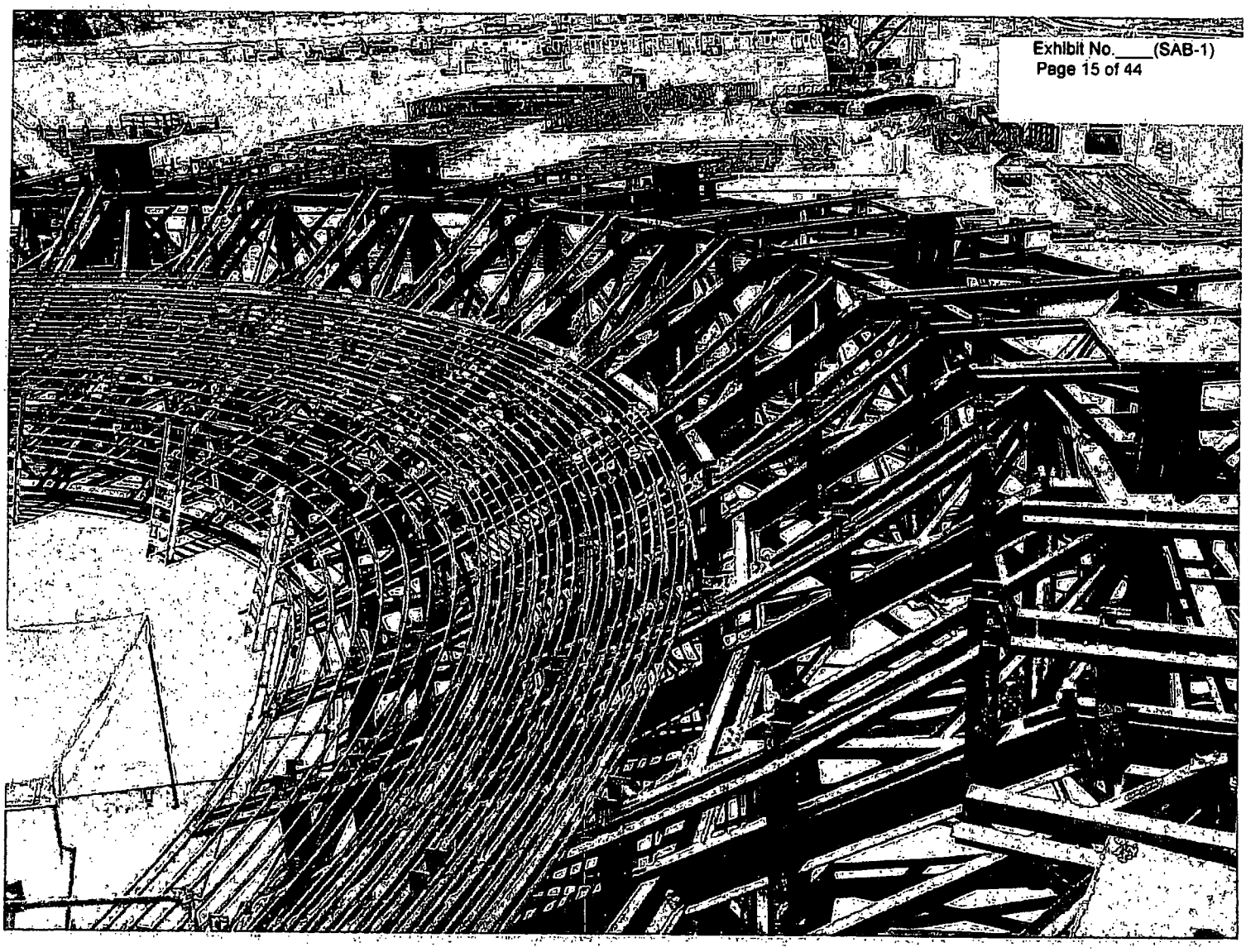


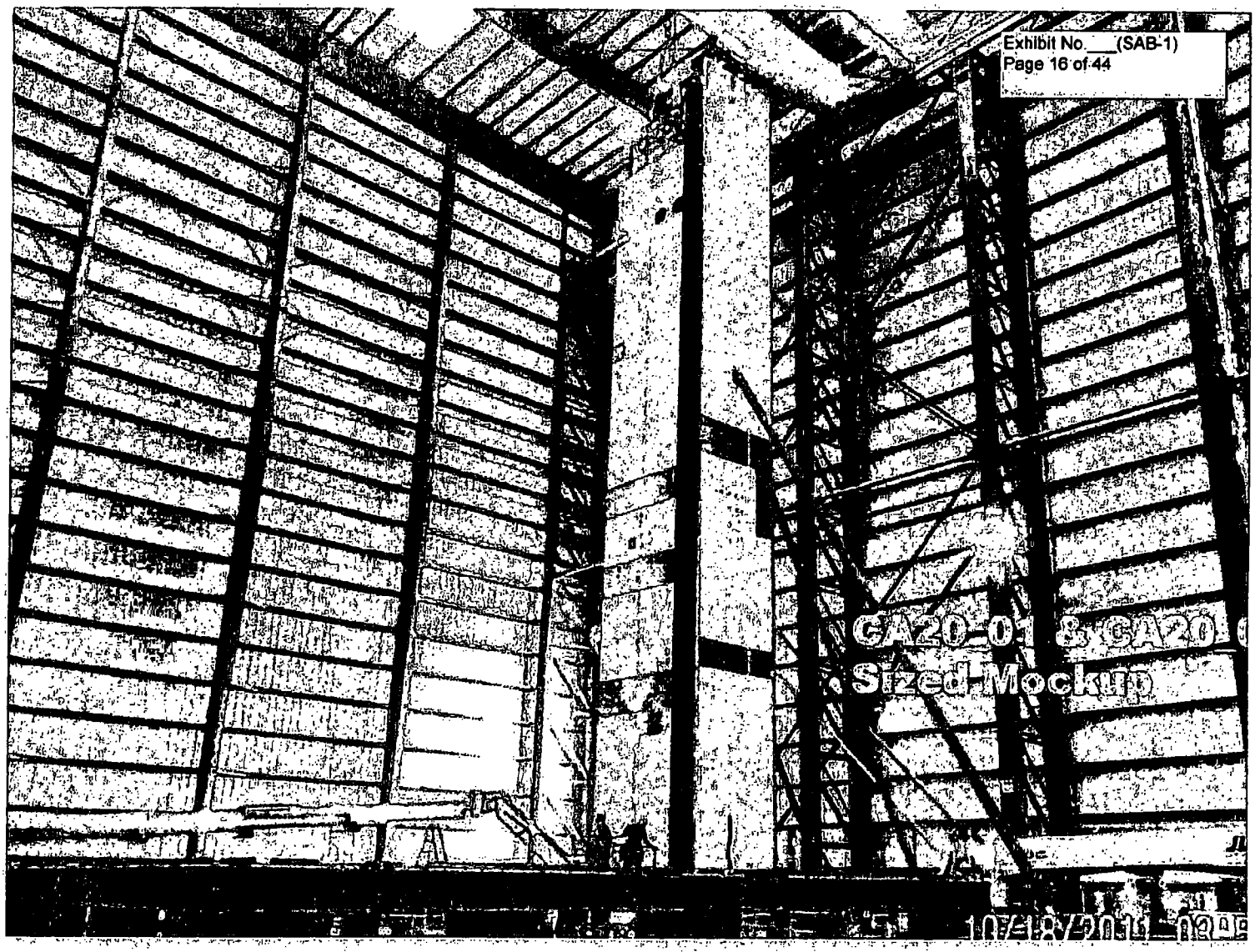


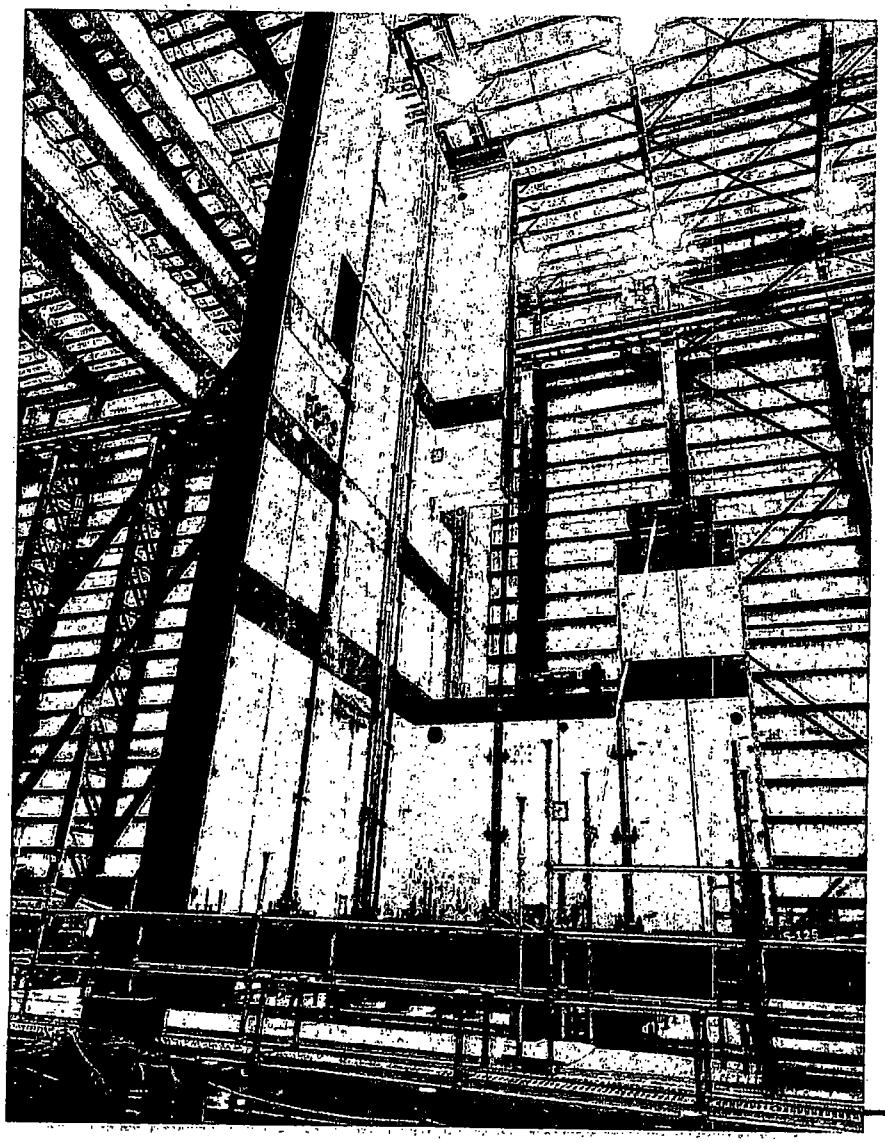
CB&I complete with lower bowl


CR-10
fabrication


2A cooling
tower basin
CR-10 Module





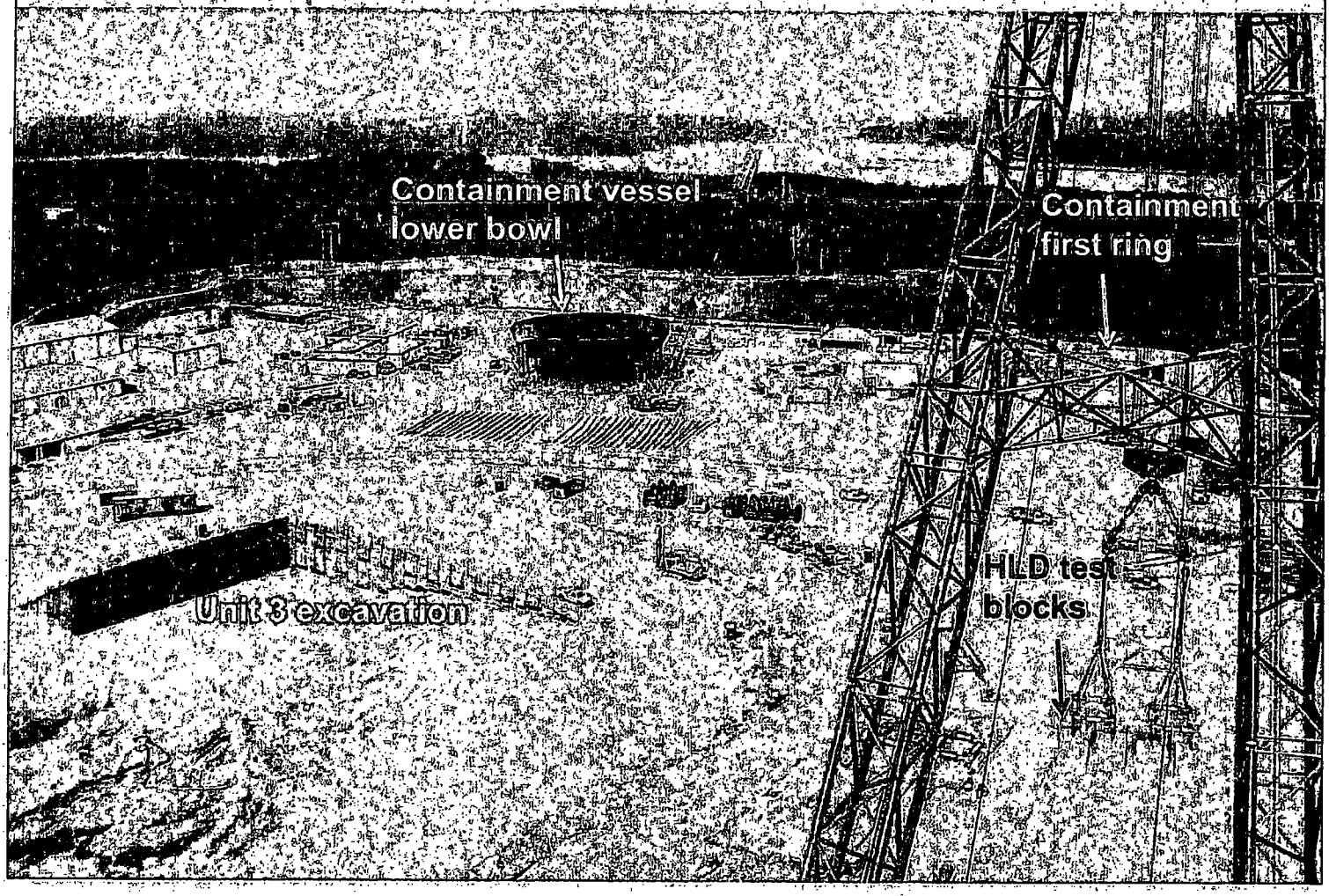


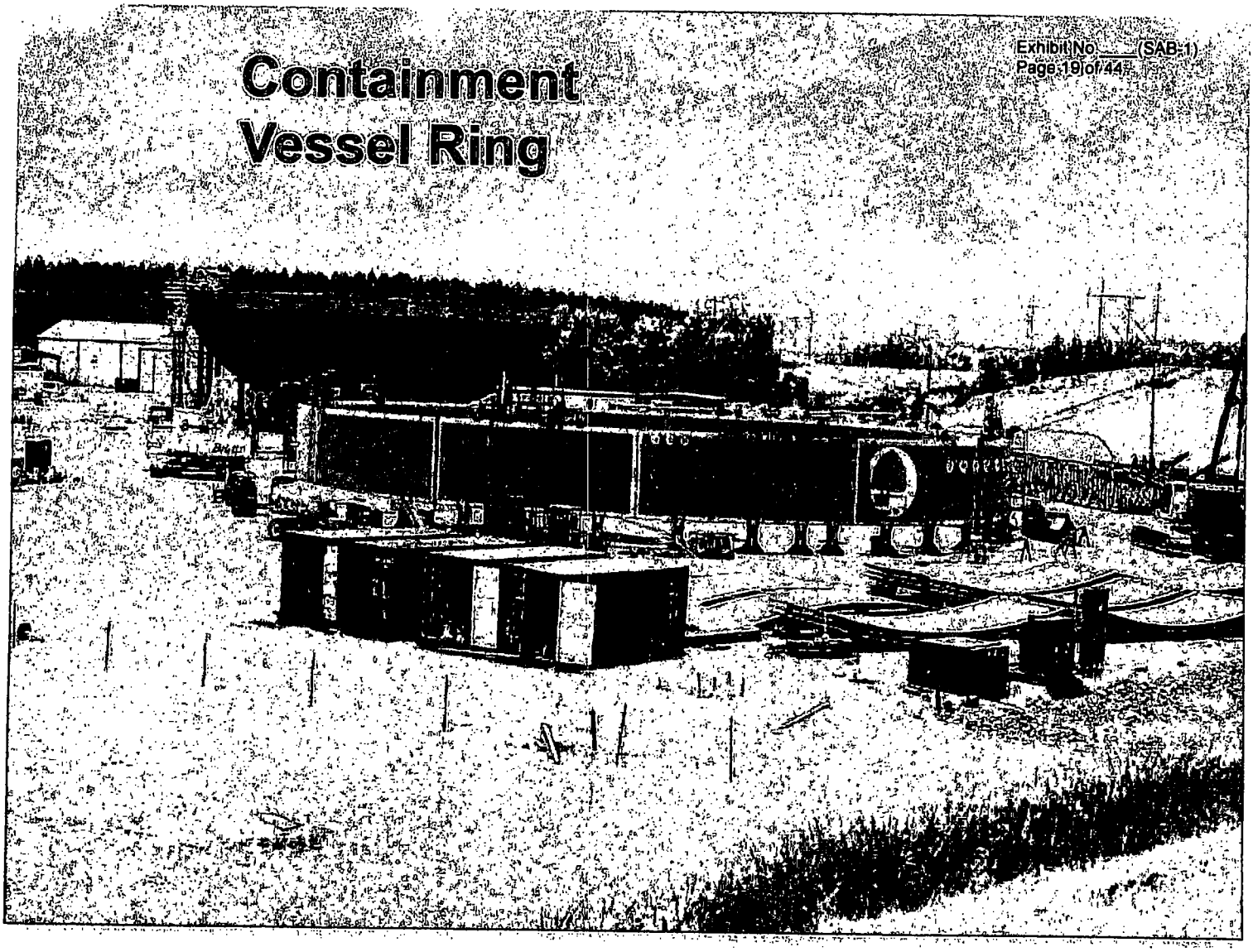
CA-20 sub-modules ready to weld

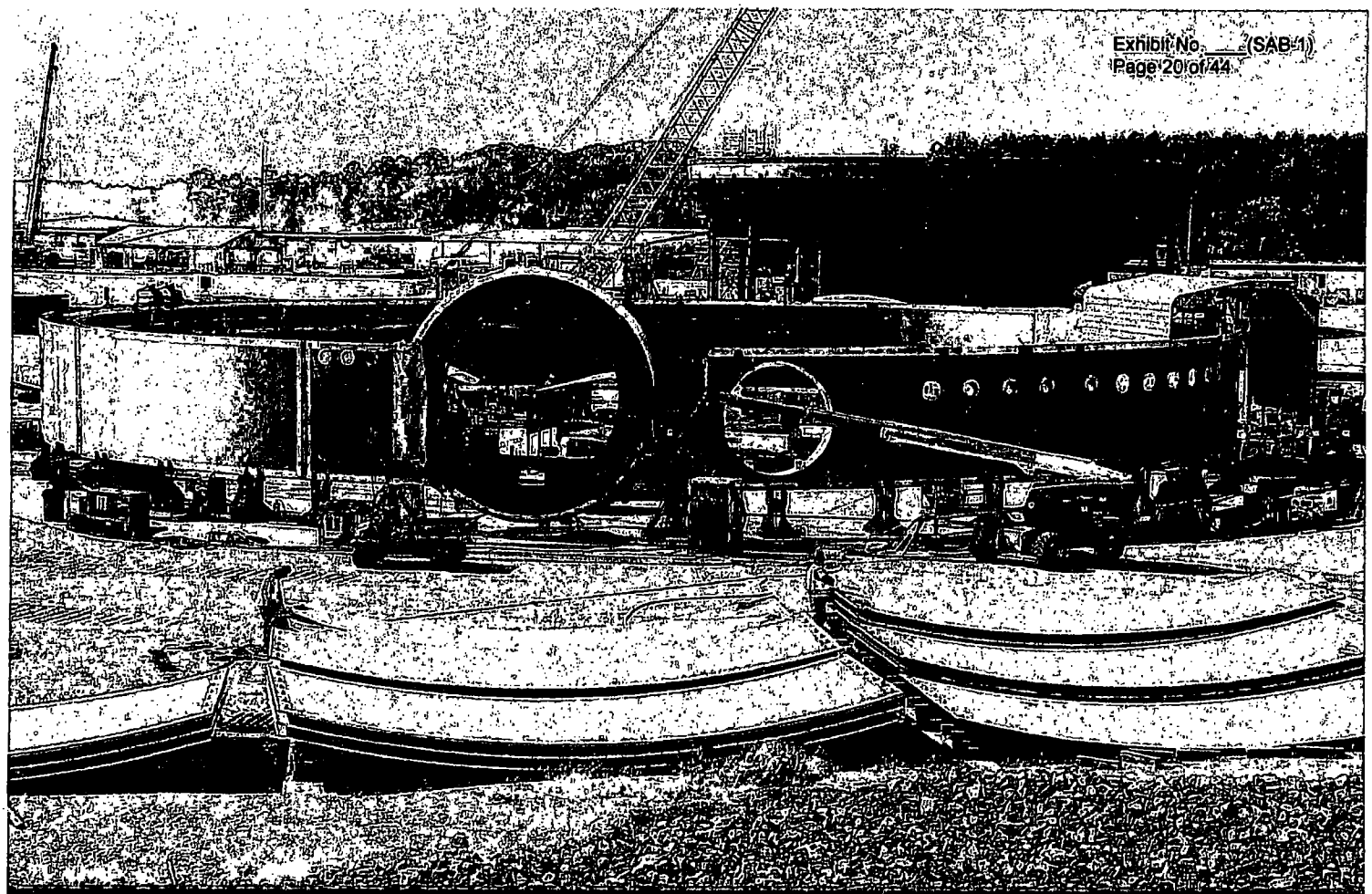
V.C. SUMMER NUCLEAR STATION

Exhibit No. ___ (SAB-1)
Page 8 of 44

Overhead View – Unit 3 Excavation & Containment Vessel

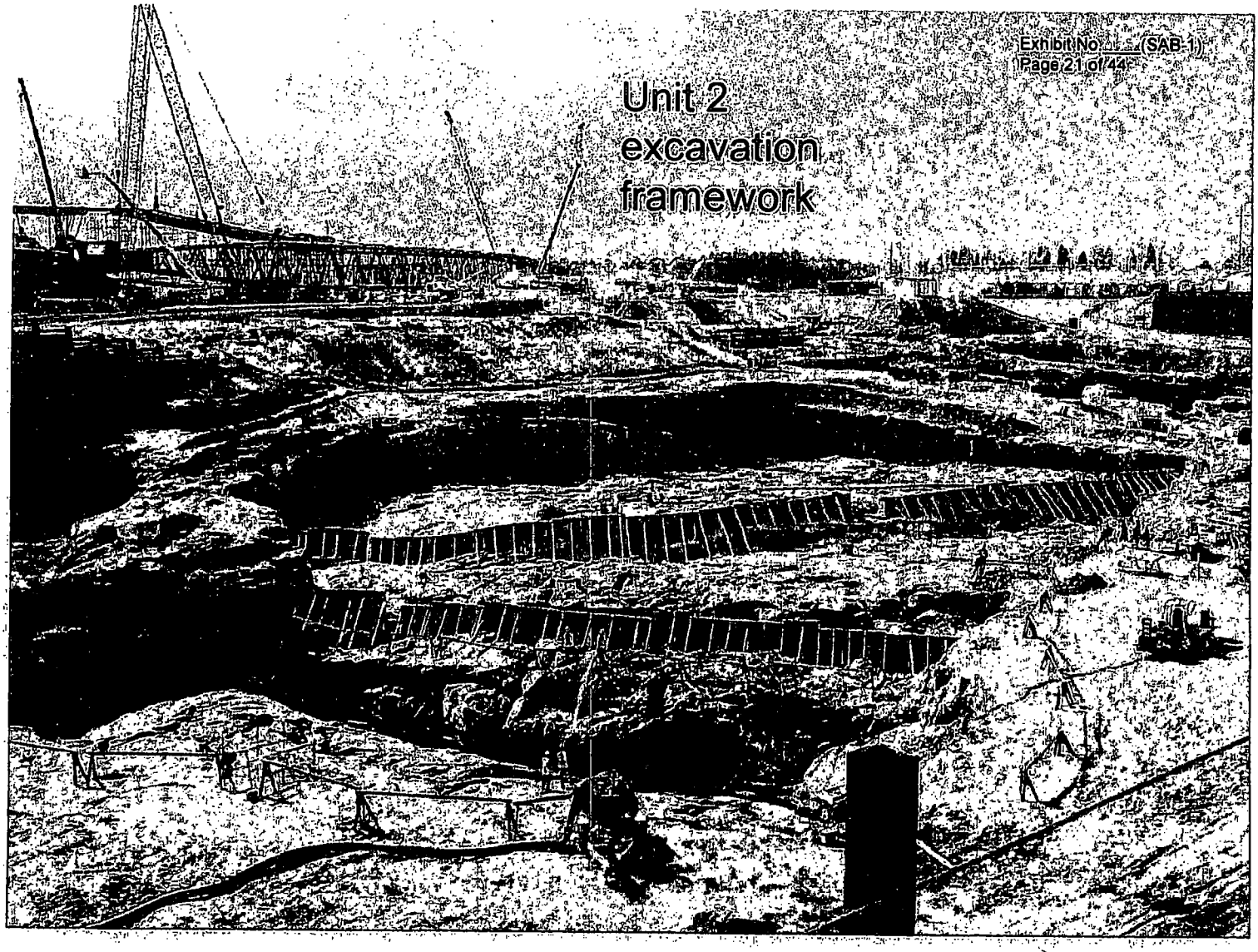



Containment
Vessel Ring

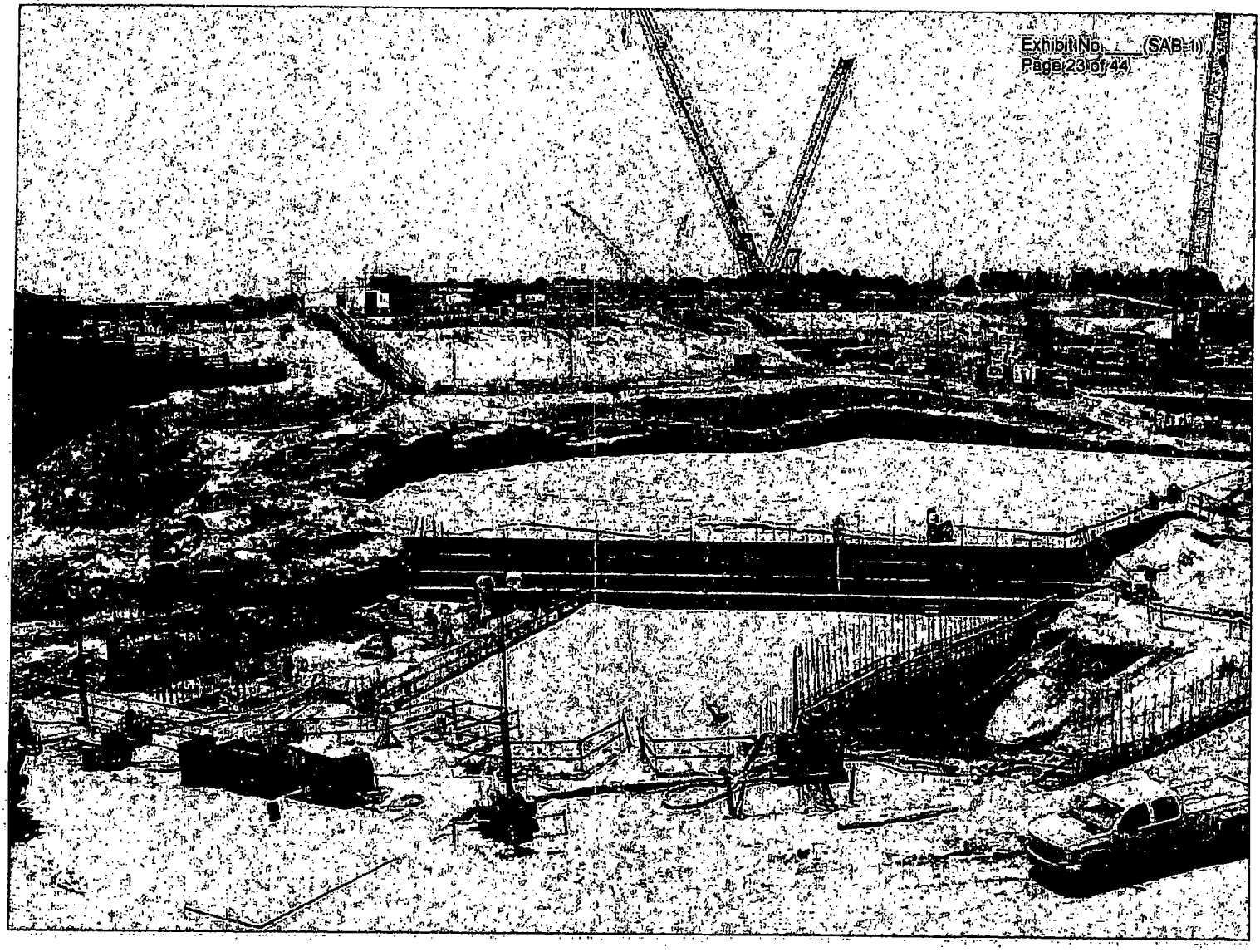


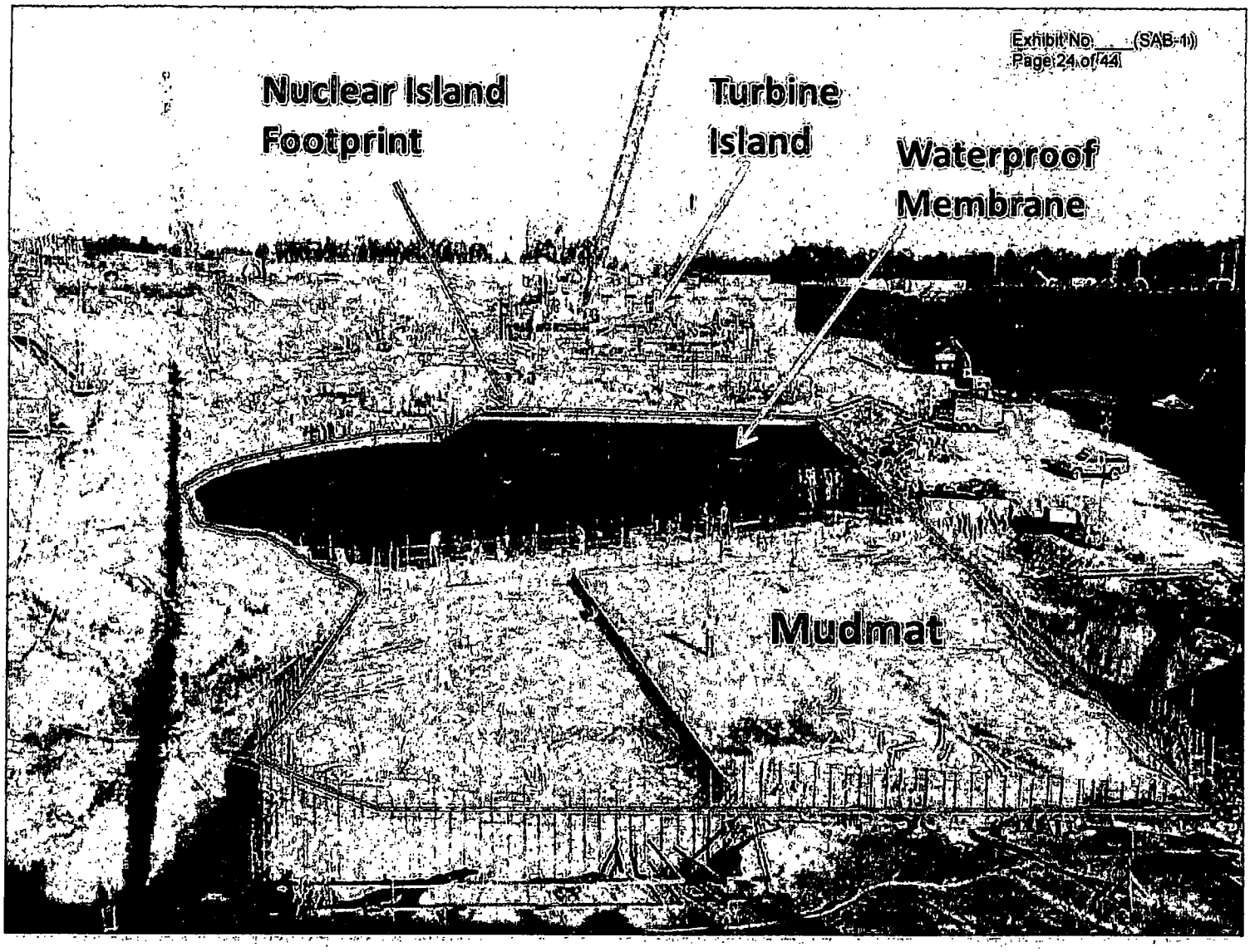
Unit 2 Containment Vessel Ring 1

8-15-2012


Unit 2
excavation
framework

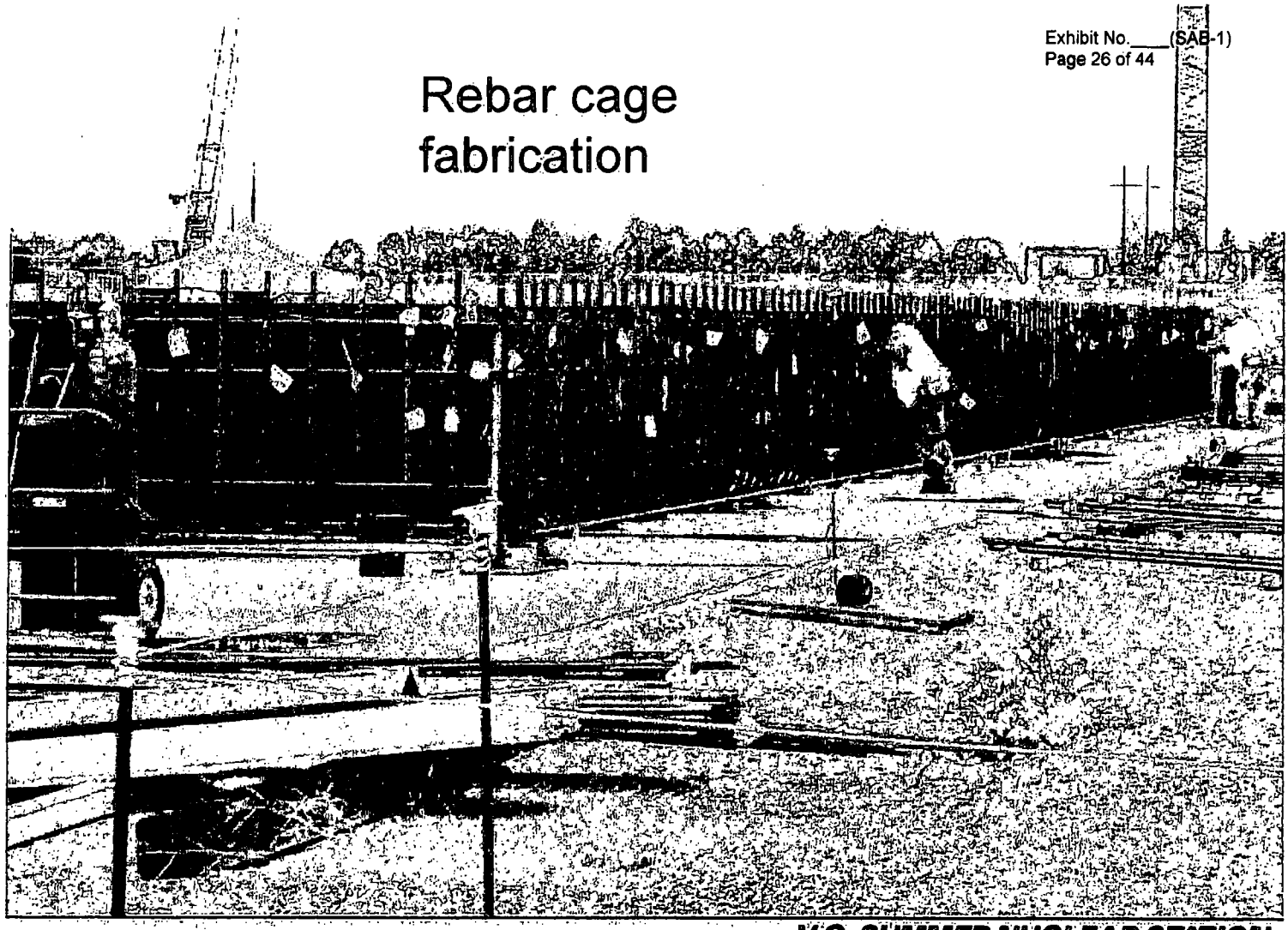

Unit 2 dental
concrete placed

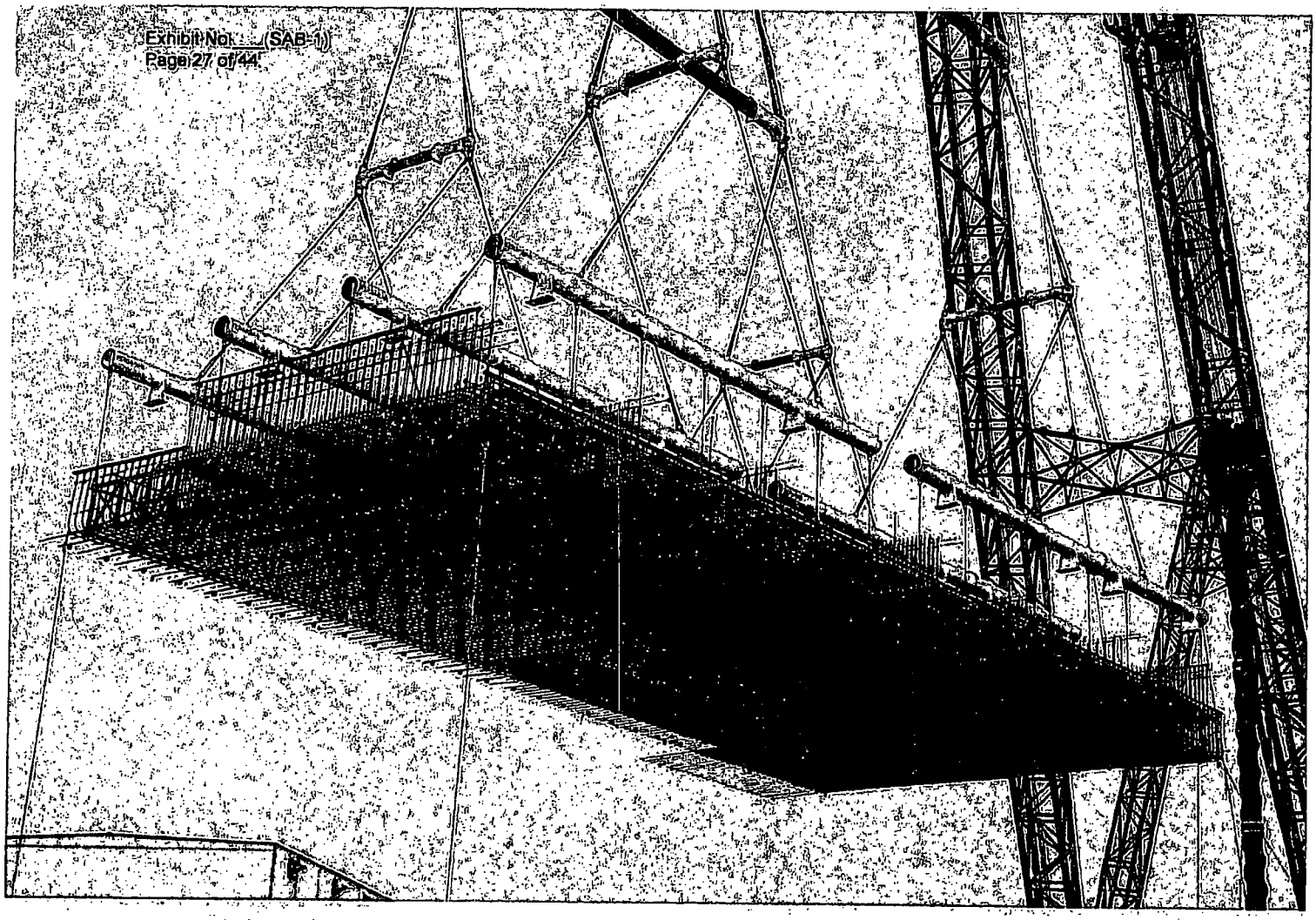



Nuclear Island
Footprint
Turbine
Island
Waterproof
Membrane
Mudmat

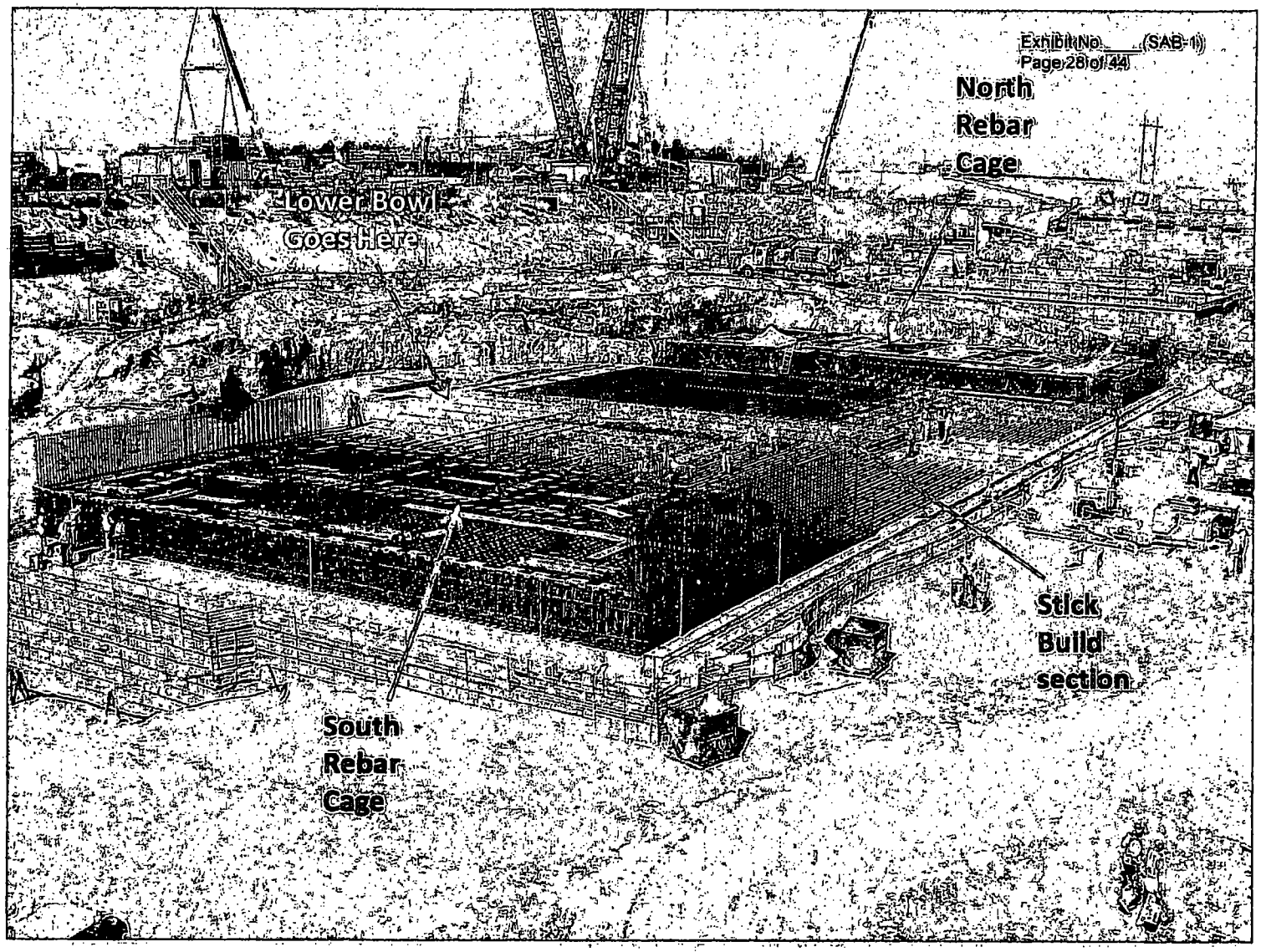

Unit 3 excavation, NI
blasting complete

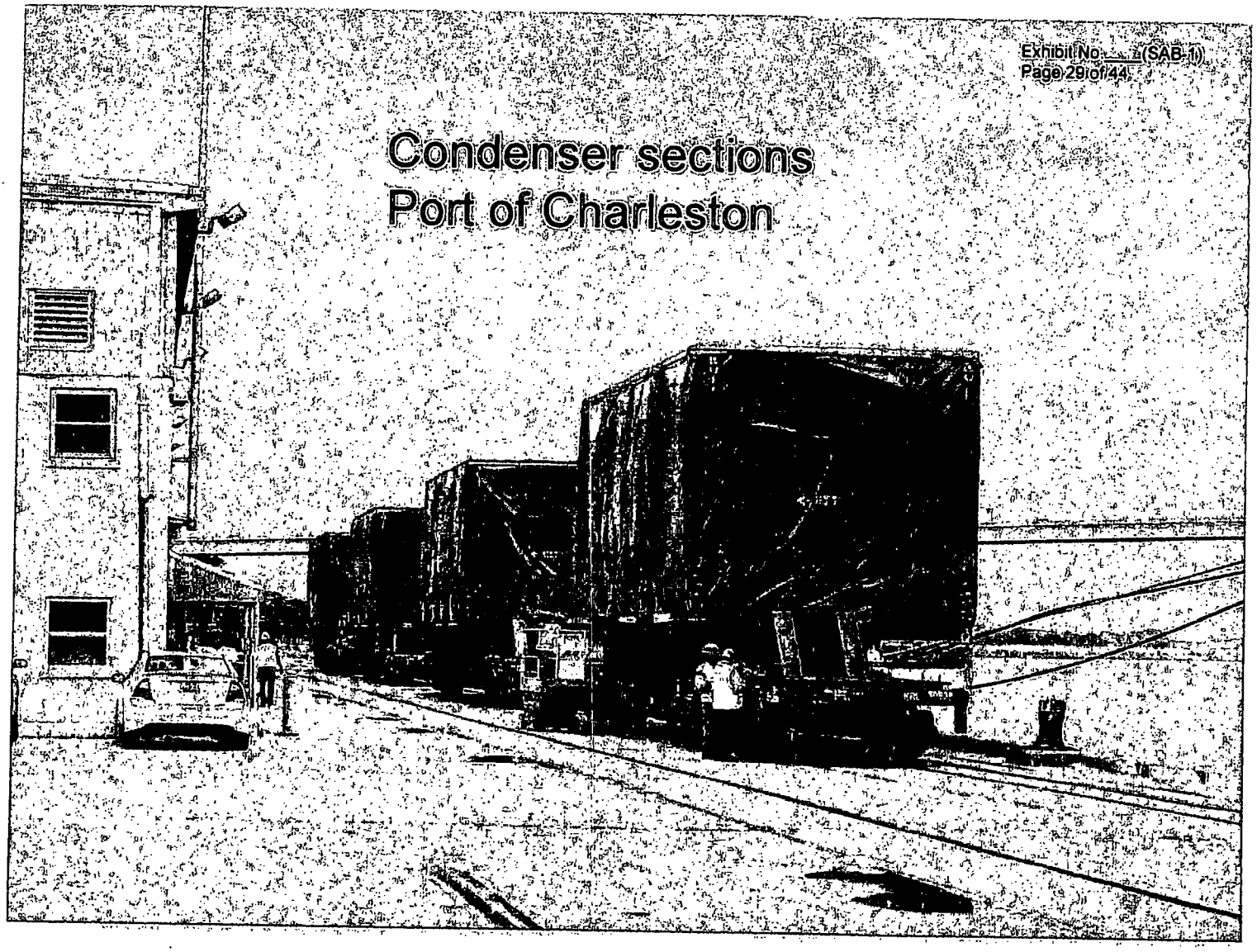
Rebar cage fabrication





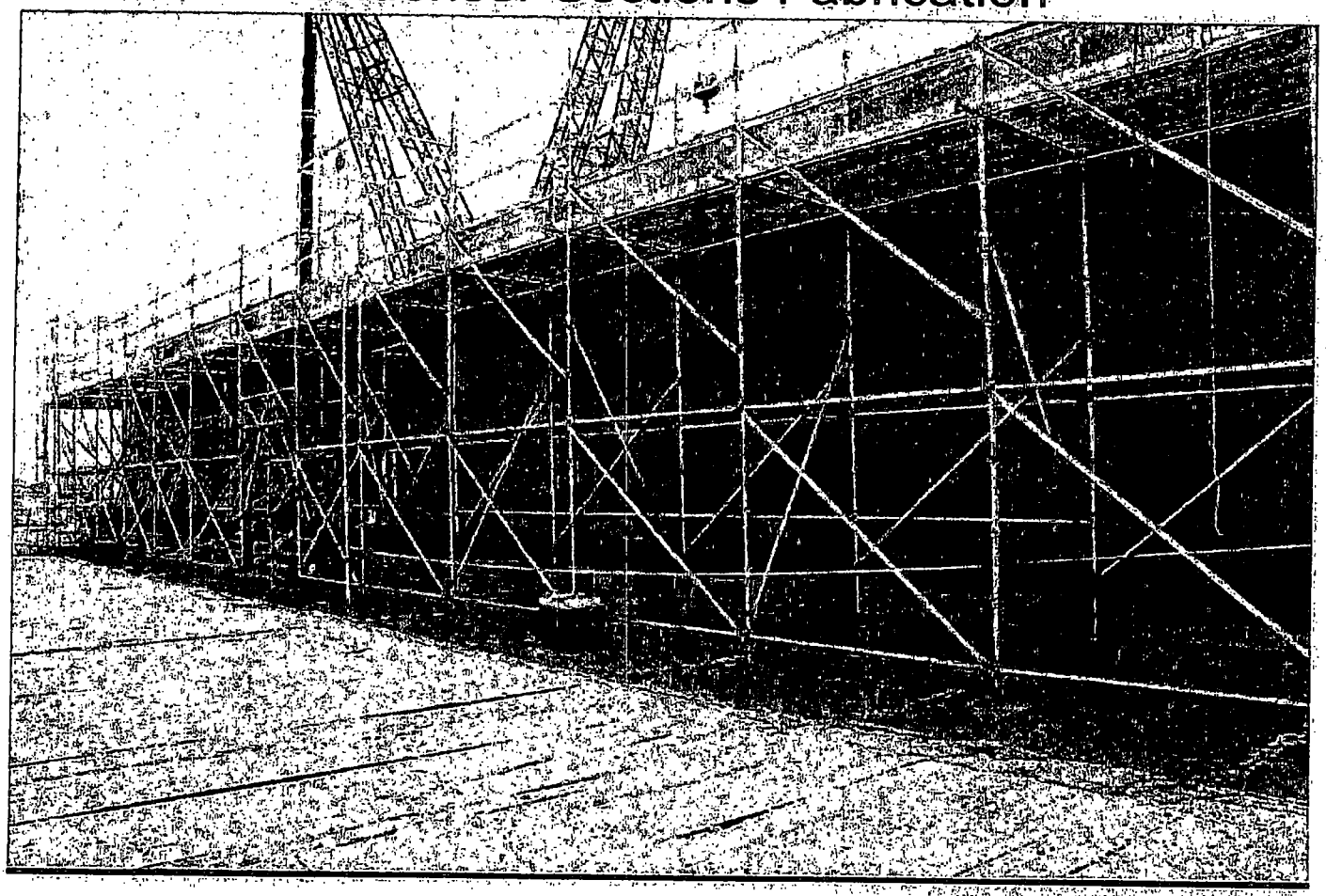
Unit 2 Nuclear Island Basemat Rebar Preassembly

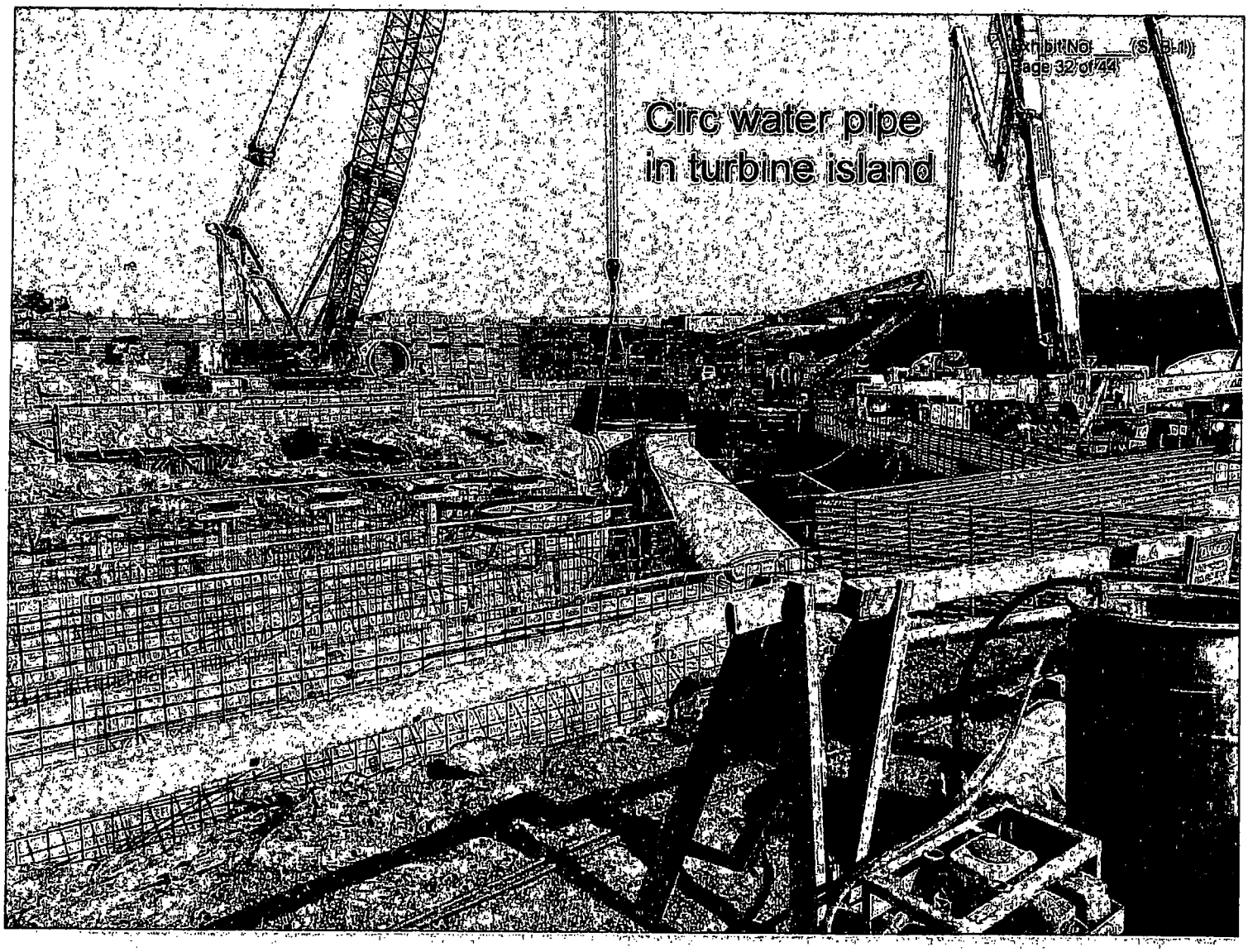

North
Rebar
Cage
Lower Bowl
Goes Here
Stick
Build
section
South
Rebar
Cage


Condenser sections
Port of Charleston

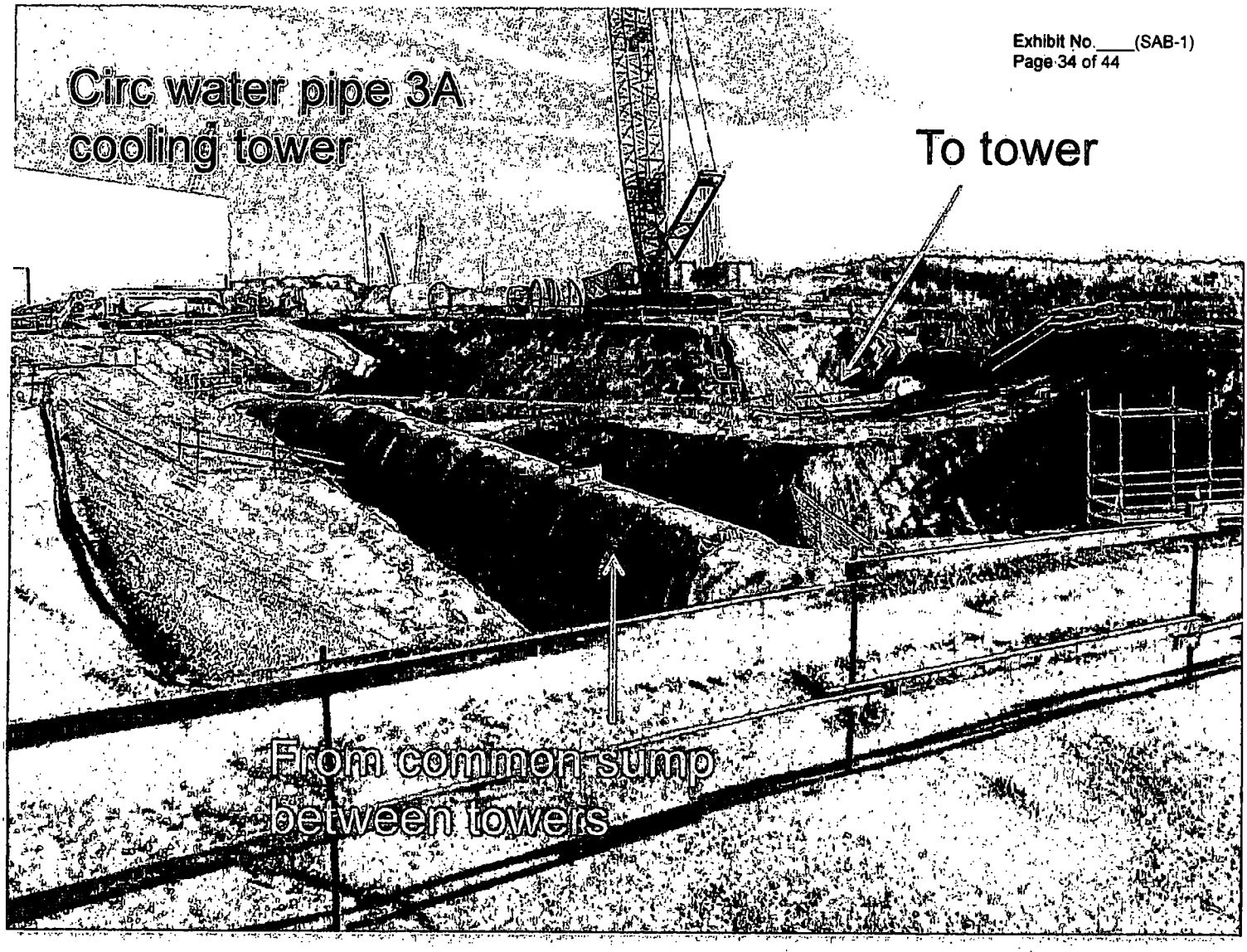

Components
arrive at site
Rebar
staged

Unit 2 Condenser Sections Fabrication

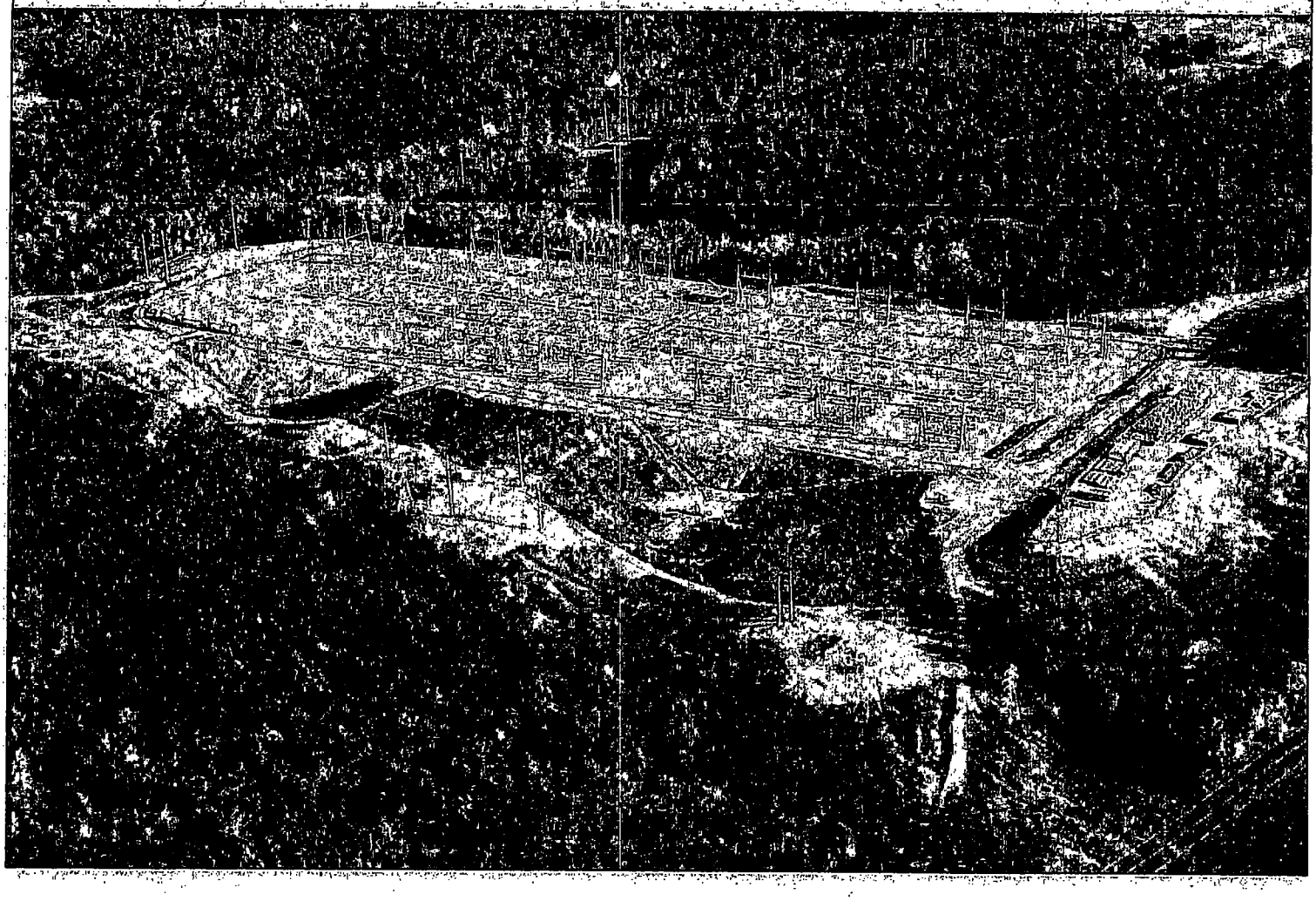


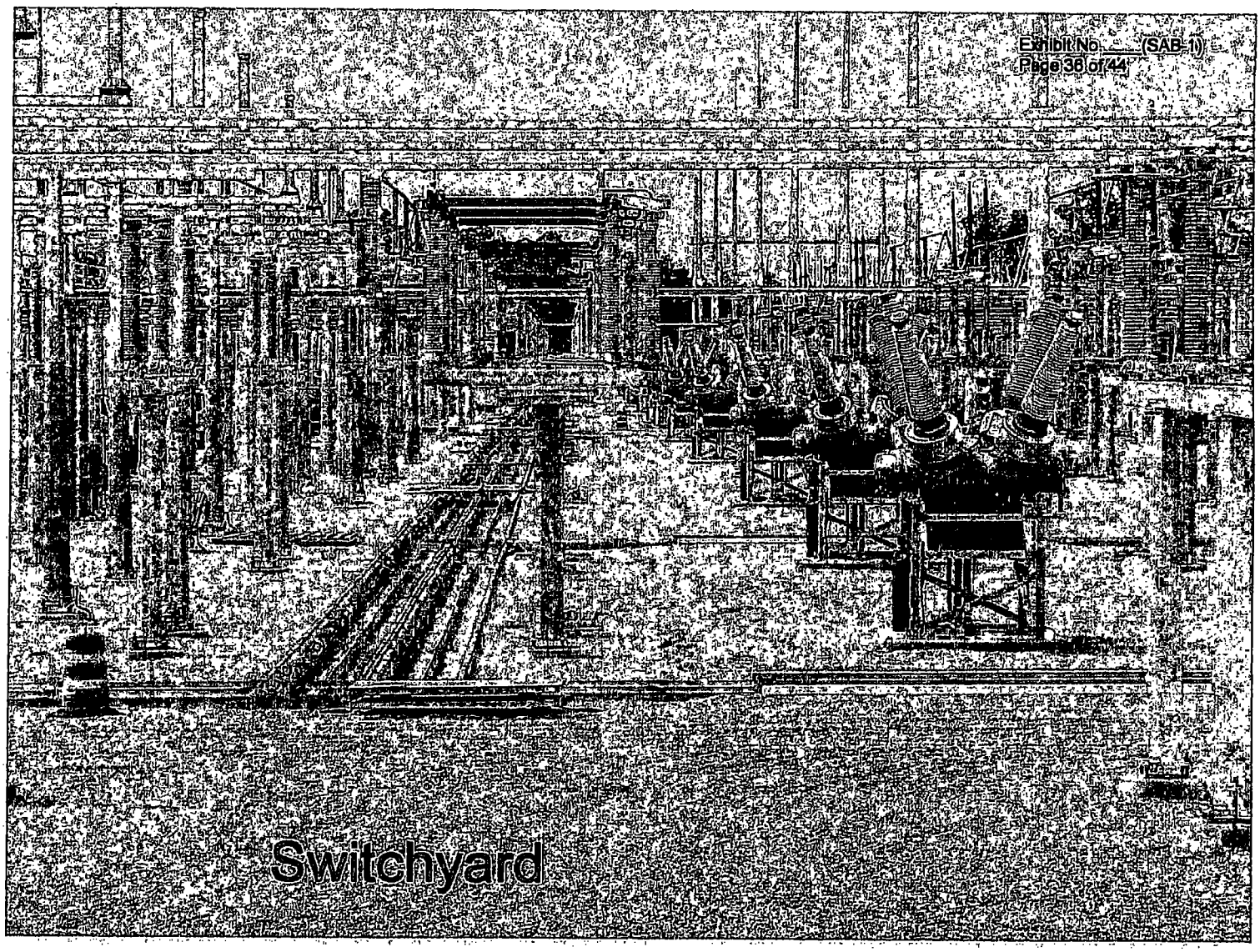

Circ water pipe
in turbine island


Flowable fill & rebar around
circ pipe in turbine island

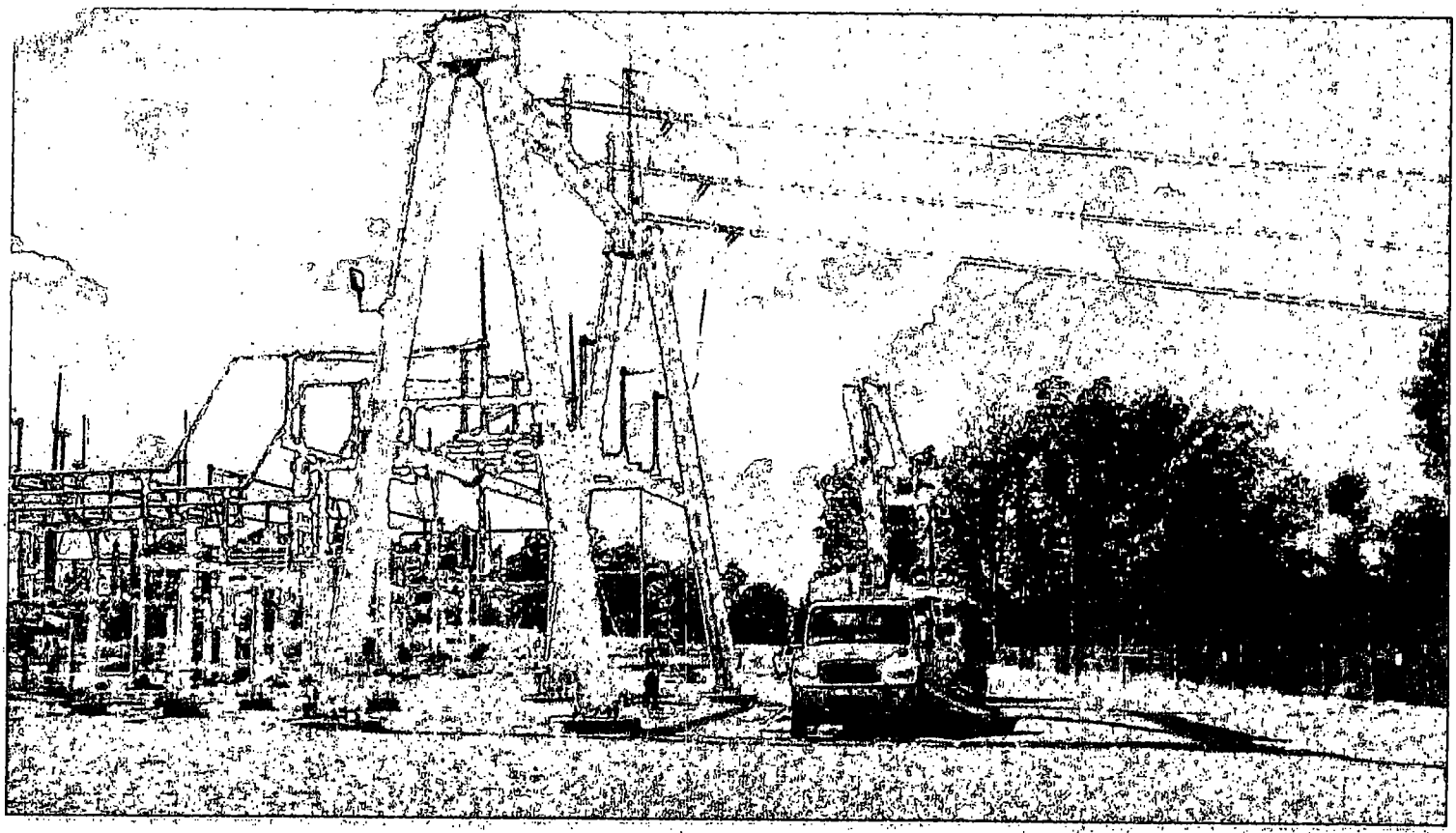

Circ water pipe 3A
cooling tower
To tower
From common sump
between towers

Switchyard

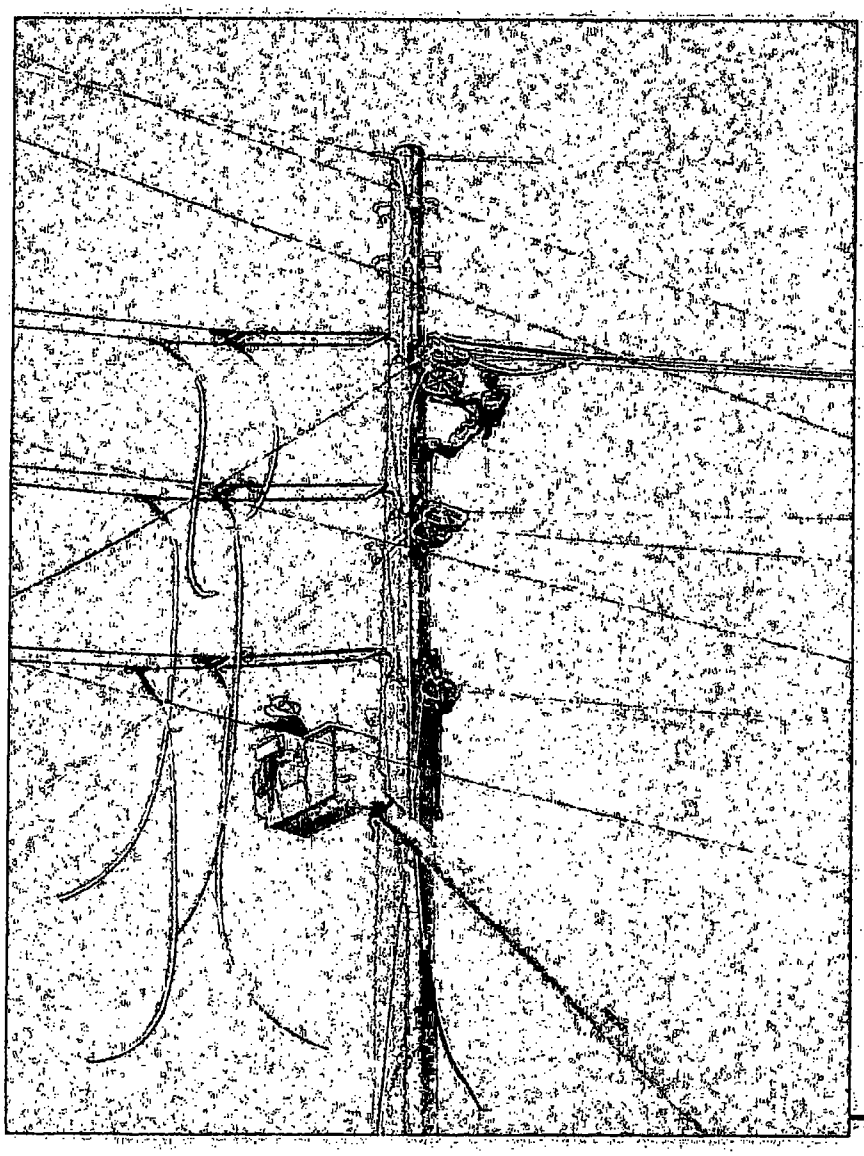



Switchyard

Switchyard 230 KV Connection Offsite

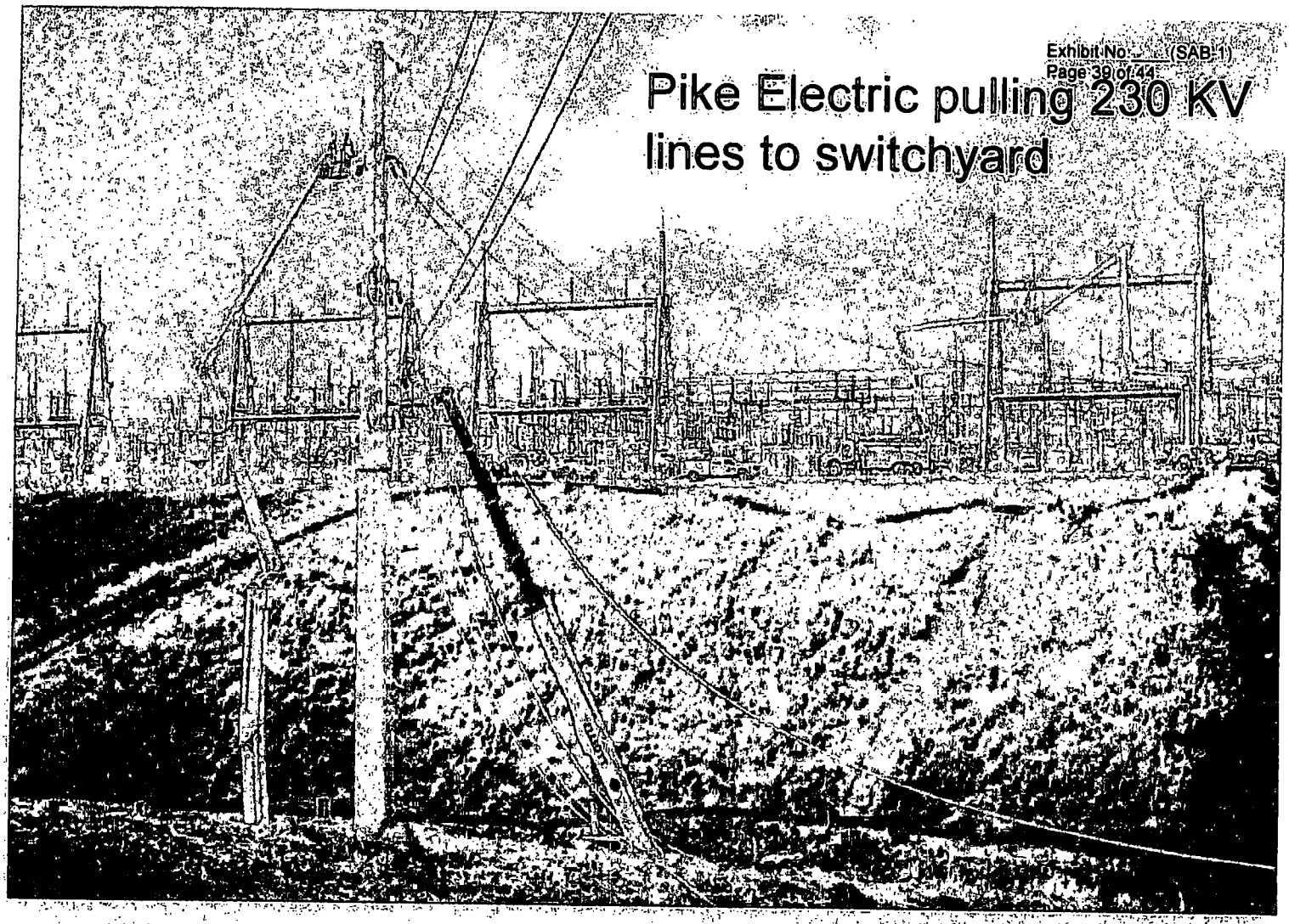


V.C. SUMMER NUCLEAR STATION



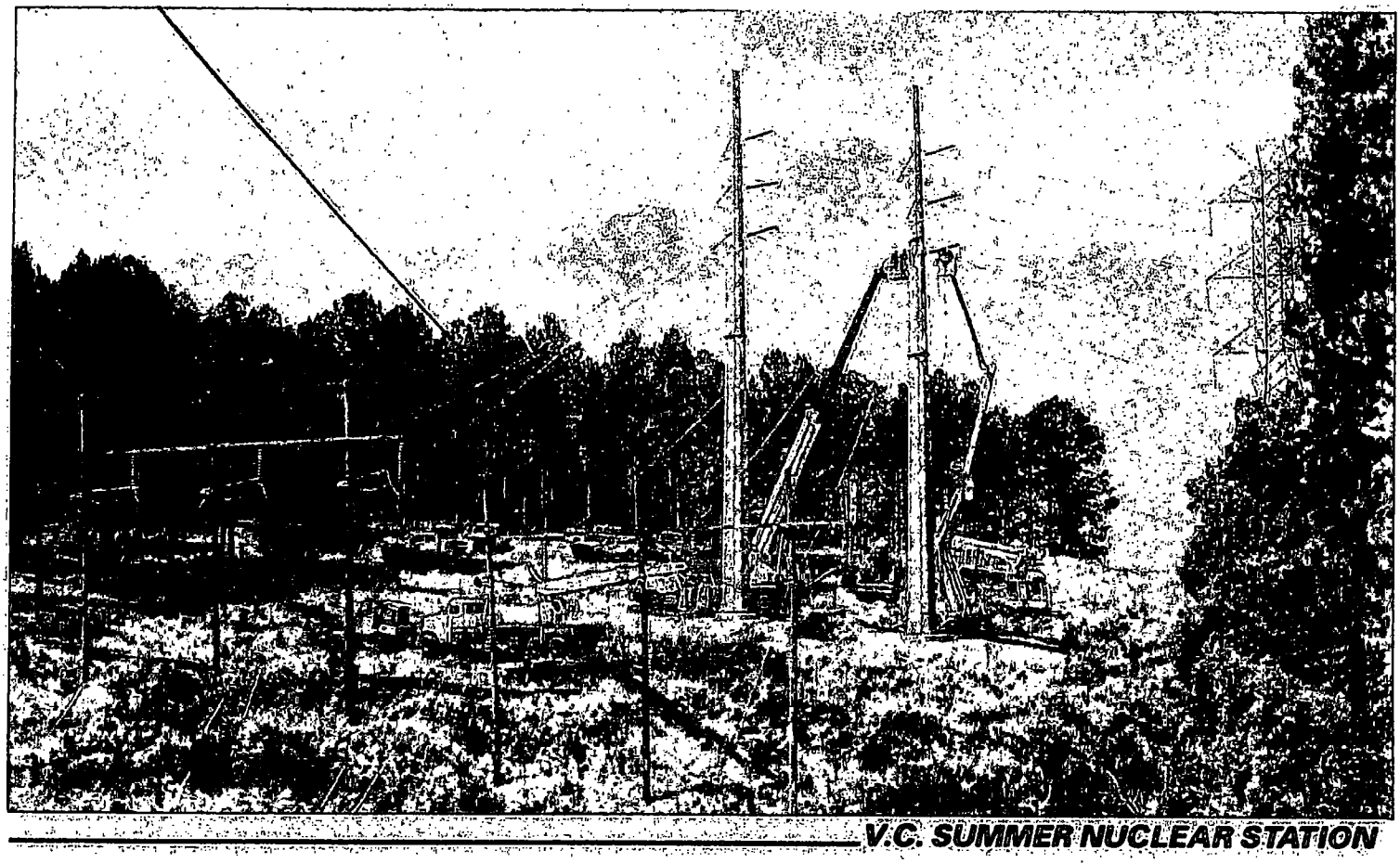
Pike lineman climbs from 105 ft bucket to reach 130 ft

V.C. SUMMER NUCLEAR STATION



V.C. SUMMER NUCLEAR STATION

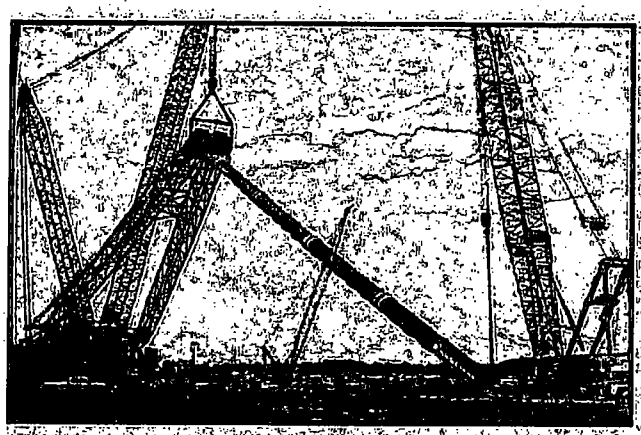
VCS 1-Killian 230 KV line

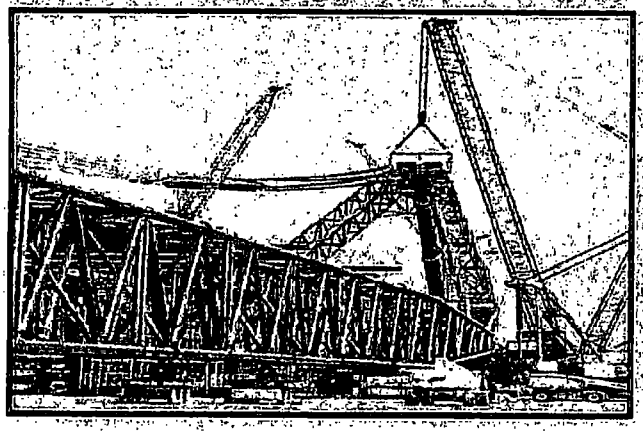


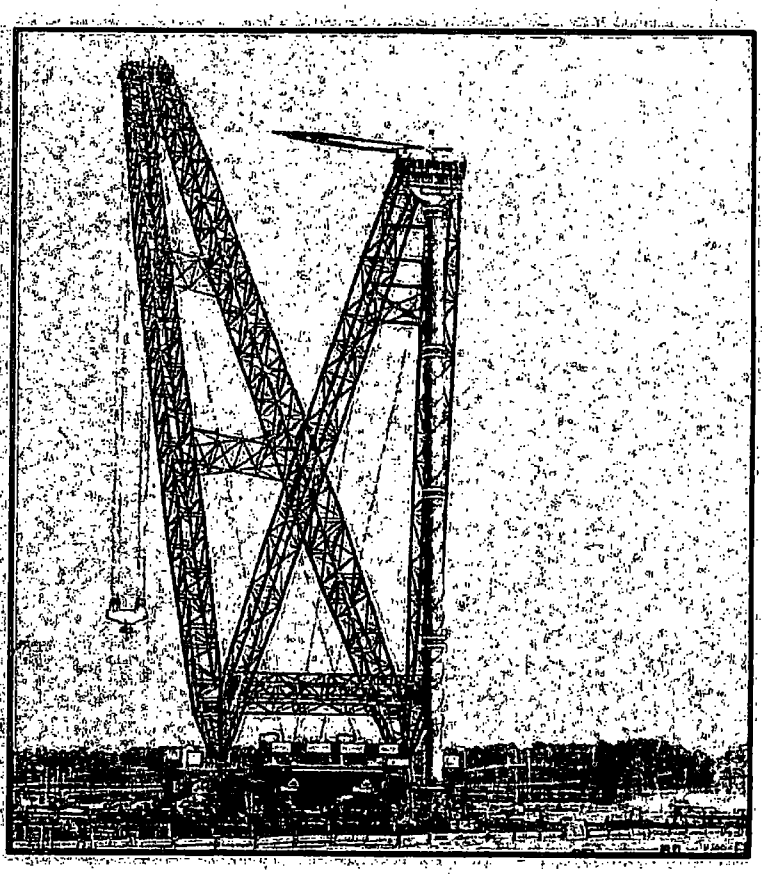
The Simulator



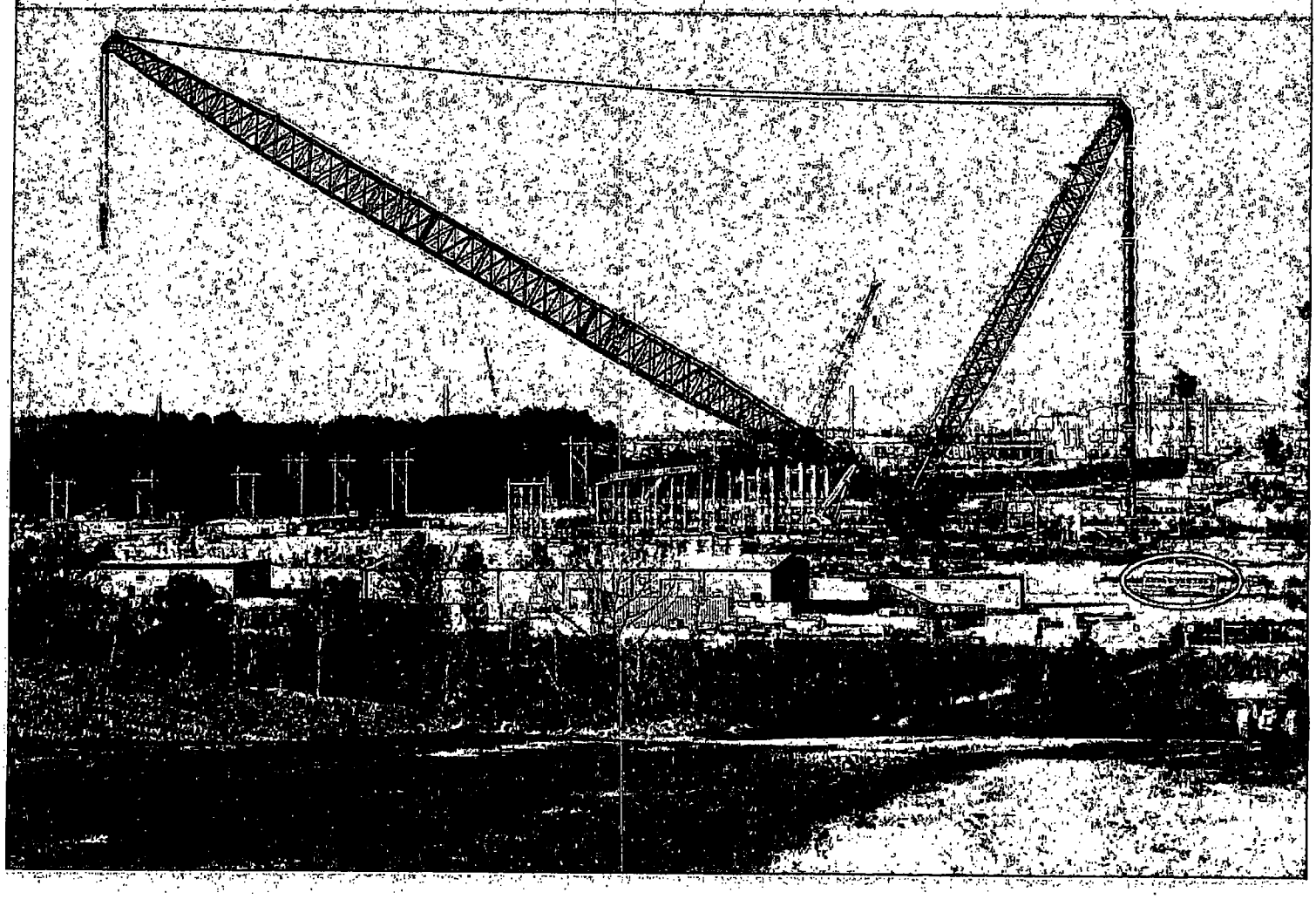
Heavy Lift Derrick

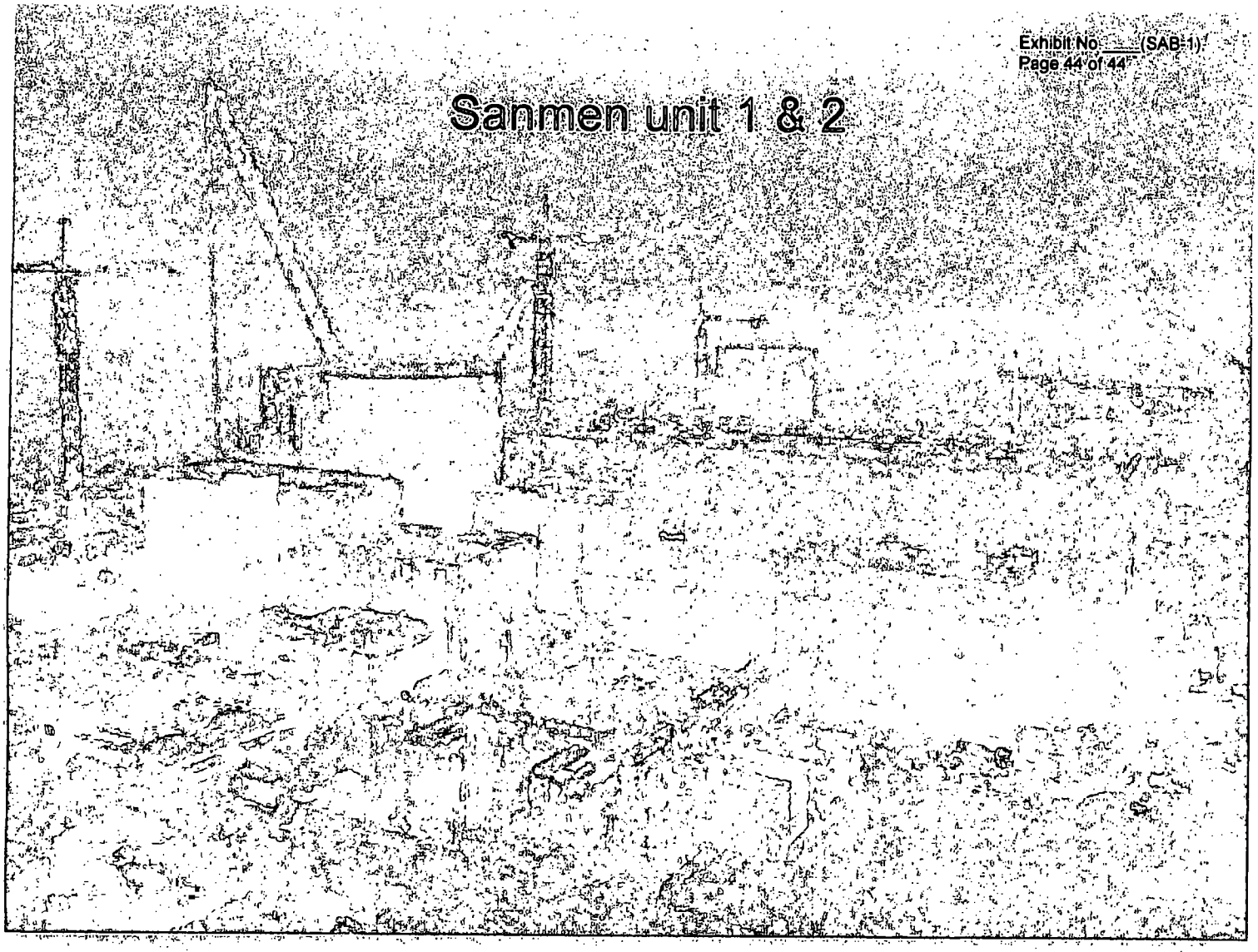






Fabrication – BIGGE Crane & Rigging Company




Sanmen unit 1 & 2

Change Orders 1-11 Public Version			
#	Summary	Cost Categories Involved	SCE&G Portion of Costs (2007 $s)
1	AP1000 SRO Instructor Certification Program	Fixed Price, but applied to T&M work allowance by adding a new category for Simulator Instructor training and reducing Startup Support allowance by commensurate amount	[redacted]
2	Limited Scope Simulators	Firm Price	
3	Repair of Parr Road	Time and Materials Price	
4	Transfer of CA20 Module Erection from WEC to Shaw	Target Price work shifting to Firm Price	
5	Supplements CO #1 - increased training by two weeks	Fixed Price, but applied to T&M work allowance. Uses category for Simulator Instructor training and reduces Startup Support allowance by commensurate amount	
6	Hydraulic Nuts	Fixed Price	
7	St. George Lines 1 & 2	Target Price and Firm Price	
8	Target to Firm/Fixed Shift	Target Price, Firm Price, and Fixed Price	
9	Switchyard Lines Reconfiguration	Target Price and Firm Price	
10	Primavera - enhanced access to Consortium scheduling information	Fixed Price	
11	WEC/Shaw schedule study	Target Price	
Total			**$11,510,470**

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
1	Approve Engineering Procurement and Construction Agreement	Complete	
2	Issue P.O.'s to nuclear component fabricators for Units 2 and 3 Containment Vessels	Complete	
3	Contractor Issue PO to Passive Residual Heat Removal Heat Exchanger Fabricator - First Payment - Unit 2	Complete	
4	Contractor Issue PO to Accumulator Tank Fabricator - Unit 2	Complete	
5	Contractor Issue PO to Core Makeup Tank Fabricator - Units 2 & 3	Complete	
6	Contractor Issue PO to Squib Valve Fabricator - Units 2 & 3	Complete	
7	Contractor Issue PO to Steam Generator Fabricator - Units 2 & 3	Complete	
8	Contractor Issue Long Lead Material PO to Reactor Coolant Pump Fabricator - Units 2 & 3	Complete	
9	Contractor Issue PO to Pressurizer Fabricator - Units 2 & 3	Complete	
10	Contractor Issue PO to Reactor Coolant Loop Pipe Fabricator - First Payment - Units 2 & 3	Complete	
11	Reactor Vessel Internals - Issue Long Lead Material PO to Fabricator - Units 2 and 3	Complete	
12	Contractor Issue Long Lead Material PO to Reactor Vessel Fabricator - Units 2 & 3	Complete	
13	Contractor Issue PO to Integrated Head Package Fabricator - Units 2 & 3	Complete	
14	Control Rod Drive Mechanism Issue PO for Long Lead Material to Fabricator - Units 2 and 3 - first payment	Complete	

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
15	Issue P.O.'s to nuclear component fabricators for Nuclear Island structural CA20 Modules	Complete	
16	Start Site Specific and balance of plant detailed design	Complete	
17	Instrumentation & Control Simulator - Contractor Place Notice to Proceed - Units 2 & 3	Complete	
18	Steam Generator - Issue Final PO to Fabricator for Units 2 and 3	Complete	
19	Reactor Vessel Internals - Contractor Issue PO for Long Lead Material (Heavy Plate and Heavy Forgings) to Fabricator - Units 2 & 3	Complete	
20	Contractor Issue Final PO to Reactor Vessel Fabricator - Units 2 & 3	Complete	
21	Variable Frequency Drive Fabricator Issue Transformer PO - Units 2 & 3	Complete	
22	Start clearing, grubbing and grading	Complete	
23	Core Makeup Tank Fabricator Issue Long Lead Material PO - Units 2 & 3	Complete	
24	Accumulator Tank Fabricator Issue Long Lead Material PO - Units 2 & 3	Complete	
25	Pressurizer Fabricator Issue Long Lead Material PO - Units 2 & 3	Complete	
26	Reactor Coolant Loop Pipe - Contractor Issue PO to Fabricator - Second Payment - Units 2 & 3	Complete	
27	Integrated Head Package - Issue PO to Fabricator - Units 2 and 3 - second payment	Complete	
28	Control Rod Drive Mechanisms - Contractor Issue PO for Long Lead Material to Fabricator - Units 2 & 3	Complete	
29	Contractor Issue PO to Passive Residual Heat Removal Heat Exchanger Fabricator - Second Payment - Units 2 & 3	Complete	

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
30	Start Parr Road intersection work.	Complete	
31	Reactor Coolant Pump - Issue Final PO to Fabricator - Units 2 and 3	Complete	
32	Integrated Heat Packages Fabricator Issue Long Lead Material PO - Units 2 & 3	Complete	
33	Design Finalization Payment 3	Complete	
34	Start site development	Complete	
35	Contractor Issue PO to Turbine Generator Fabricator - Units 2 & 3	Complete	
36	Contractor Issue PO to Main Transformers Fabricator - Units 2 & 3	Complete	
37	Core Makeup Tank Fabricator Notice to Contractor Receipt of Long Lead Material - Units 2 & 3	Complete	
38	Design Finalization Payment 4	Complete	
39	Turbine Generator Fabricator Issue PO for Condenser Material - Unit 2	Complete	
40	Reactor Coolant Pump Fabricator Issue Long Lead Material Lot 2 - Units 2 & 3	Complete	
41	Passive Residual Heat Removal Heat Exchanger Fabricator Receipt of Long Lead Material - Units 2 & 3	Complete	
42	Design Finalization Payment 5	Complete	
43	Start erection of construction buildings, to include craft facilities for personnel, tools, equipment; first aid facilities; field offices for site management and support personnel; temporary warehouses; and construction hiring office.	Complete	
44	Reactor Vessel Fabricator Notice to Contractor of Receipt of Flange Nozzle Shell Forging - Unit 2	Complete	

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
45	Design Finalization Payment 6	Complete	
46	Instrumentation and Control Simulator - Contractor Issue PO to Subcontractor for Radiation Monitor System - Units 2 & 3	Complete	
47	Reactor Vessel Internals - Fabricator Start Fit and Welding of Core Shroud Assembly - Unit 2	Complete	
48	Turbine Generator Fabricator Issue PO for Moisture Separator Reheater/Feedwater Heater Material - Unit 2	Complete	
49	Reactor Coolant Loop Pipe Fabricator Acceptance of Raw Material - Unit 2	Complete	
50	Reactor Vessel Internals - Fabricator Start Weld Neutron Shield Spacer Pads to Assembly - Unit 2	7/31/2012	Unit 2
51	Control Rod Drive Mechanisms - Fabricator to Start Procurement of Long Lead Material - Unit 2	Complete	
52	Contractor Notified that Pressurizer Fabricator Performed Cladding on Bottom Head - Unit 2	Complete	
53	Start excavation and foundation work for the standard plant for Unit 2	Complete	
54	Steam Generator Fabricator Notice to Contractor of Receipt of 2nd Steam Generator Tubesheet Forging - Unit 2	Complete	
55	Reactor Vessel Fabricator Notice to Contractor of Outlet Nozzle Welding to Flange Nozzle Shell Completion - Unit 2	Complete	
56	Turbine Generator Fabricator Notice to Contractor Condenser Fabrication Started - Unit 2	Complete	

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
57	Complete preparations for receiving the first module on site for Unit 2.	Complete	
58	Steam Generator Fabricator Notice to Contractor of Receipt of 1st Steam Generator Transition Cone Forging - Unit 2	Complete	
59	Reactor Coolant Pump Fabricator Notice to Contractor of Manufacturing of Casing Completion - Unit 2	Complete	
60	Reactor Coolant Loop Pipe Fabricator Notice to Contractor of Machining, Heat Treating & Non-Destructive Testing Completion - Unit 2	Complete	
61	Core Makeup Tank Fabricator Notice to Contractor of Satisfactory Completion of Hydrotest - Unit 2	9/30/2012	Unit 2
62	Polar Crane Fabricator Issue PO for Main Hoist Drum and Wire Rope - Units 2 & 3	Complete	
63	Control Rod Drive Mechanisms - Fabricator to Start Procurement of Long Lead Material - Unit 3	Complete	
64	Turbine Generator Fabricator Notice to Contractor Condenser Ready to Ship - Unit 2	Complete	
65	Start placement of mud mat for Unit 2	6/29/2012	Unit 2
66	Steam Generator Fabricator Notice to Contractor of Receipt of 1st Steam Generator Tubing - Unit 2	Complete	
67	Pressurizer Fabricator Notice to Contractor of Welding of Upper and Intermediate Shells Completion - Unit 2	Complete	
68	Reactor Vessel Fabricator Notice to Contractor of Closure Head Cladding Completion - Unit 3	6/30/2012	Unit 3

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
69	Begin Unit 2 first nuclear concrete placement	8/24/2012	Unit 2
70	Reactor Coolant Pump Fabricator Notice to Contractor of Stator Core Completion - Unit 2	Complete	
71	Fabricator Start Fit and Welding of Core Shroud Assembly - Unit 2	Complete	
72	Steam Generator Fabricator Notice to Contractor of Completion of 1st Steam Generator Tubing Installation - Unit 2	Complete	
73	Reactor Coolant Loop Pipe - Shipment of Equipment to Site - Unit 2	12/31/2012	Unit 2
74	Control Rod Drive Mechanism - Ship Remainder of Equipment (Latch Assembly & Rod Travel Housing) to Head Supplier - Unit 2	6/30/2012	Unit 2
75	Pressurizer Fabricator Notice to Contractor of Welding of Lower Shell to Bottom Head Completion - Unit 2	Complete	
76	Steam Generator Fabricator Notice to Contractor of Completion of 2nd Steam Generator Tubing Installation - Unit 2	5/31/2012	Unit 2
77	Design Finalization Payment 14	Complete	
78	Set module CA04 for Unit 2	11/6/2012	Unit 2
79	Passive Residual Heat Removal Heat Exchanger Fabricator Notice to Contractor of Final Post Weld Heat Treatment - Unit 2	Complete	
80	Passive Residual Heat Removal Heat Exchanger Fabricator Notice to Contractor of Completion of Tubing - Unit 2	5/31/2012	Unit 2

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
81	Polar Crane Fabricator Notice to Contractor of Girder Fabrication Completion - Unit 2	10/31/2012	Unit 2
82	Turbine Generator Fabricator Notice to Contractor Condenser Ready to Ship - Unit 3	8/31/2013	Unit 3
83	Set Containment Vessel ring #1 for Unit 2	1/7/2013	Unit 2
84	Reactor Coolant Pump Fabricator Delivery of Casings to Port of Export - Unit 2	7/31/2012	Unit 2
85	Reactor Coolant Pump Fabricator Notice to Contractor of Stator Core Completion - Unit 3	8/31/2013	Unit 3
86	Reactor Vessel Fabricator Notice to Contractor of Receipt of Core Shell Forging - Unit 3	Complete	
87	Contractor Notified that Pressurizer Fabricator Performed Cladding on Bottom Head - Unit 3	Complete	
88	Set Nuclear Island structural module CA03 for Unit 2	6/26/2013	Unit 2
89	Squib Valve Fabricator Notice to Contractor of Completion of Assembly and Test for Squib Valve Hardware - Unit 2	5/31/2012	Unit 2
90	Accumulator Tank Fabricator Notice to Contractor of Satisfactory Completion of Hydrotest - Unit 3	3/31/2013	Unit 3
91	Polar Crane Fabricator Notice to Contractor of Electric Panel Assembly Completion - Unit 2	3/31/2013	Unit 2
92	Start containment large bore pipe supports for Unit 2	6/28/2013	Unit 2

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
93	Integrated Head Package - Shipment of Equipment to Site - Unit 2	3/31/2013	Unit 2
94	Reactor Coolant Pump Fabricator Notice to Contractor of Final Stator Assembly Completion - Unit 2	5/31/2013	Unit 2
95	Steam Generator Fabricator Notice to Contractor of Completion of 2nd Steam Generator Tubing Installation - Unit 3	6/30/2013	Unit 3
96	Steam Generator Fabricator Notice to Contractor of Satisfactory Completion of 1st Steam Generator Hydrotest - Unit 2	1/31/2013	Unit 2
97	Start concrete fill of Nuclear Island structural modules CA01 and CA02 for Unit 2	4/3/2014	Unit 2
98	Passive Residual Heat Removal Heat Exchanger - Delivery of Equipment to Port of Entry - Unit 2	12/31/2012	Unit 2
99	Refueling Machine Fabricator Notice to Contractor of Satisfactory Completion of Factory Acceptance Test - Unit 2	11/30/2013	Unit 2
100	Deliver Reactor Vessel Internals to Port of Export - Unit 2	1/31/2014	Unit 2
101	Set Unit 2 Containment Vessel #3	4/24/2014	Unit 2
102	Steam Generator - Contractor Acceptance of Equipment at Port of Entry - Unit 2	7/31/2013	Unit 2
103	Turbine Generator Fabricator Notice to Contractor Turbine Generator Ready to Ship - Unit 2	4/30/2013	Unit 2
104	Pressurizer Fabricator Notice to Contractor of Satisfactory Completion of Hydrotest - Unit 3	3/31/2014	Unit 3

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
105	Polar Crane - Shipment of Equipment to Site - Unit 2	1/31/2014	Unit 2
106	Receive Unit 2 Reactor Vessel on site from fabricator	5/13/2014	Unit 2
107	Set Unit 2 Reactor Vessel	6/23/2014	Unit 2
108	Steam Generator Fabricator Notice to Contractor of Completion of 2nd Channel Head to Tubesheet Assembly Welding - Unit 3	12/31/2013	Unit 3
109	Reactor Coolant Pump Fabricator Notice to Contractor of Final Stator Assembly Completion - Unit 3	8/31/2014	Unit 3
110	Reactor Coolant Pump - Shipment of Equipment to Site (2 Reactor Coolant Pumps) - Unit 2	10/31/2013	Unit 2
111	Place first nuclear concrete for Unit 3	10/9/2013	Unit 3
112	Set Unit 2 Steam Generator	10/23/2014	Unit 2
113	Main Transformers Ready to Ship - Unit 2	9/30/2013	Unit 2
114	Complete Unit 3 Steam Generator Hydrotest at fabricator	2/28/2014	Unit 3
115	Set Unit 2 Containment Vessel Bottom Head on basemat legs	10/11/2012	Unit 2
116	Set Unit 2 Pressurizer Vessel	5/16/2014	Unit 2

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
117	Reactor Coolant Pump Fabricator Notice to Contractor of Satisfactory Completion of Factory Acceptance Test - Unit 3	2/28/2015	Unit 3
118	Deliver Reactor Vessel Internals to Port of Export - Unit 3	6/30/2015	Unit 3
119	Main Transformers Fabricator Issue PO for Material - Unit 3	2/28/2015	Unit 3
120	Complete welding of Unit 2 Passive Residual Heat Removal System piping	2/5/2015	Unit 2
121	Steam Generator - Contractor Acceptance of Equipment at Port of Entry - Unit 3	4/30/2015	Unit 3
122	Refueling Machine - Shipment of Equipment to Site - Unit 3	2/28/2015	Unit 3
123	Set Unit 2 Polar Crane	1/9/2015	Unit 2
124	Reactor Coolant Pumps - Shipment of Equipment to Site - Unit 3	6/30/2015	Unit 3
125	Main Transformers Ready to Ship - Unit 3	7/31/2015	Unit 3
126	Spent Fuel Storage Rack - Shipment of Last Rack Module - Unit 3	7/31/2014	Unit 3
127	Start electrical cable pulling in Unit 2 Auxiliary Building	8/14/2013	Unit 2
128	Complete Unit 2 Reactor Coolant System cold hydro	1/22/2016	Unit 2

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
129	Activate class 1E DC power in Unit 2 Auxiliary Building.	3/15/2015	Unit 2
130	Complete Unit 2 hot functional test.	5/3/2016	Unit 2
131	Install Unit 3 ring 3 for containment vessel	8/25/2015	Unit 3
132	Load Unit 2 nuclear fuel	9/15/2016	Unit 2
133	Unit 2 Substantial Completion	3/15/2017	Unit 2
134	Set Unit 3 Reactor Vessel	10/22/2015	Unit 3
135	Set Unit 3 Steam Generator #2	2/25/2016	Unit 3
136	Set Unit 3 Pressurizer Vessel	7/16/2015	Unit 3
137	Complete welding of Unit 3 Passive Residual Heat Removal System piping	6/16/2016	Unit 3
138	Set Unit 3 polar crane	5/9/2016	Unit 3
139	Start Unit 3 Shield Building roof slab rebar placement	5/26/2016	Unit 3
140	Start Unit 3 Auxiliary Building electrical cable pulling	11/7/2014	Unit 3

BLRA Revised Milestones
VC Summer Units 2 and 3

Exhibit No. ____ (SAB-3)

Tracking ID	Milestone Description	Revised Completion Date	Unit
141	Activate Unit 3 Auxiliary Building class 1E DC power	5/15/2016	Unit 3
142	Complete Unit 3 Reactor Coolant System cold hydro	3/22/2017	Unit 3
143	Complete Unit 3 hot functional test	7/3/2017	Unit 3
144	Complete Unit 3 nuclear fuel load	11/15/2017	Unit 3
145	Begin Unit 3 full power operation	4/8/2018	Unit 3
146	Unit 3 Substantial Completion	5/15/2018	Unit 3

EXHIBIT 2

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

EXHIBIT J

RISK FACTORS RELATED TO CONSTRUCTION AND OPERATION OF THE FACILITY

Combined Application of South Carolina Electric & Gas Company for a Certificate of Environmental Compatibility and Public Convenience and Necessity and for a Base Load Review Order
Public Service Commission Docket No. 2008-196-E

1. INTRODUCTION

This **Exhibit J** provides an overview of certain of the major risk factors related to the permitting, construction and placing into service of two Westinghouse AP1000 Advanced Passive Safety Power Plants units as V. C. Summer Nuclear Station (VCSNS) Units 2 & 3 (the Units or the Facilities). The attached **Chart A** to this **Exhibit J** provides a list of certain of those risk factors in tabular form.

2. OVERVIEW

The risk factors related to the Facilities fall into several broad categories. Certain of the risk factors are risks that are typical of construction projects of the size and complexity of the Facilities. Others are related to the degree and sensitivity of the regulatory and safety oversight that are involved in nuclear construction. Still others are related to the fact that the Units will be among the first new nuclear units sited and built in the United States since the 1970s and 1980s, and will be among the first of what are anticipated to be a dozen or more new Westinghouse AP1000 units to be constructed in the United States and other countries over the next decade.

The discussion of risks that follows should be balanced by an appreciation of the factors that establish nuclear generation as the most prudent choice for meeting the growing energy needs of SCE&G's customers. Among those factors are the high cost of coal and new coal-fired capacity; the environmental concerns surrounding the construction of additional coal-fired generation; the uncertainty as to future costs or limitations imposed on CO_2 emissions; the uncertainty as to future natural gas prices and supplies; the relatively large amount of gas-fired generation already included in SCE&G's generation mix; the clear need for additional base load capacity, as opposed to intermediate gas-fired capacity, on SCE&G's system; the uncertainty as to the future costs and availability of AP1000 units or other nuclear units as the cost of alternative energy rises and global demand for these units increases; the value of special Federal tax incentives for those companies building nuclear units in the first phase of the present construction cycle; and other factors.

EXHIBIT
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2
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More specifically, the choice of the AP1000 units and Westinghouse/Stone & Webster as suppliers and contractors, are justified by the safety, simplicity, and logic of the AP1000 design; the superior experience and track record of Westinghouse and Stone & Webster in the nuclear power systems and nuclear power plant construction industries; and the wide acceptance of the AP1000 design among the utilities planning to build new nuclear units in the near future. In addition, because the Units will be among the first Westinghouse AP1000 units anticipated to be constructed in the United States, suppliers, contractors and others in the industry are expected to have a strong interest in supporting the success of SCE&G's construction and permitting process.

Nevertheless, there are a number of risk factors related to construction of the Units which SCE&G has taken into account in making the decision to construct Westinghouse AP1000 units at this time.

3. LICENSING AND REGULATORY, POLITICAL AND LEGISLATIVE RISK FACTORS

NRC Licensing – The NRC has stated that it prefers to follow a three-step process for the issuance of Combined Operating Licenses ("COLs") for new nuclear facilities:

1. **Final Design Approval** – The first step for licensing of new nuclear units is the issuance of a final design approval which constitutes an approval of the conceptual design of the principal Nuclear Steam Supply Systems and Balance of Plant systems for a type of unit. The AP1000 nuclear design was approved by the Nuclear Regulatory Commission ("NRC") on September 13, 2004 (the "Final Design Approval"). Since the Final Design Approval was initially granted, Westinghouse has applied for approval for design improvements and refinements for the AP1000 unit. Revisions 1-15 have been approved by the NRC. One additional revision is pending at this time.

2. **Reference Unit Licensing** – The second stage in the NRC review and licensing process is the licensing of a specific plant, including all plant systems, facilities and processes, through the Combined Operating License ("COL") process. The NRC has expressed a preference that the potential owners and builder of each type of unit collaborate in the filing of a single, initial COL Application ("COLA") for the type of unit that they are proposing to build. That initial COLA then can be used as a reference case for all similar units. The NRC approval of systems, facilities and processes can then be referenced in COLA proceedings related to other similar units.

SCE&G is participating in NuStart Energy Development, LLC ("NuStart"), an association of utilities considering constructing nuclear units and of nuclear-systems providers like Westinghouse. In keeping with NRC policy, all Westinghouse AP1000 units are planned to be largely identical except for limited variations required by specific site conditions. The COLA for TVA's Bellefonte Units 3 & 4 has been chosen as the

reference case for the AP1000 units (the "Reference Unit COLA"). It was submitted to the NRC on October 30, 2007. NuStart and the Department of Energy are sharing the cost of the Bellefonte licensing process.

3. **VCSNS Units 2 & 3 COL Application** – SCE&G's application for a COL for VCSNS Units 2 & 3 was filed on March 31, 2008, with the NRC. This application builds on the Final Design Approval granted by the NRC for the Westinghouse AP1000 design, and the Reference Unit COLA for Bellefonte Units 3 & 4, and also includes the specific information necessary to allow licensing of construction of the Units at the Jenkinsville site.

Licensing Risk – SCE&G has carefully reviewed the Final Design Approval issued for the Westinghouse AP1000 and the application and the information contained in the Bellefonte Reference Unit COLA. SCE&G believes that AP1000 design can and should be licensed by the NRC for construction under the Reference Unit COLA. Moreover, as explained more fully in Exhibits A and P to this Application, SCE&G and consultants working on its behalf have conducted extensive environmental and site characterization work related to the Jenkinsville site. SCE&G had already studied and evaluated that site extensively as part of the licensing and license extension process for VCSNS Unit 1. Based on the foregoing, and SCE&G's history of successful nuclear operations at the Jenkinsville site going back over 20 years, SCE&G believes that the risks related to the COLA process for the Units are reasonable and the decision to proceed with licensing and construction of the Units is prudent and in the best interest of its customers and the State of South Carolina.

Nonetheless, the risks related to the COLA process include the fact that many of the NRC regulations, standards and processes under which the licensing of the Units will take place are new and relatively untested; NRC staffing to support the new round of nuclear licensing is still being assembled; and many of the personnel that will be involved in this licensing process have not been part of the licensing of new nuclear units at any other time in their careers. As of mid-May of 2008, there were nine COLAs submitted to the NRC. Furthermore, a significant number of COLAs may be submitted in the next 12 months and these additional filings could make it more difficult for NRC to conduct timely reviews of applications.

There are clear advantages to SCE&G being an early applicant for a COL since personnel and resource issues may become more pronounced as the number of applications increase. Nevertheless, the fact remains that the NRC is in the early stages of the current licensing cycle and potential delays in the NRC licensing process can delay the construction schedule. In addition, the degree of opposition to the COLA from various groups cannot be gauged at this time. While the NRC enforces clear limitations on interventions and on the issues that interveners can raise, the degree of delay and expense that intervener opposition might engender in the licensing process is difficult to predict at this time.

Substantive Design, Licensing or Regulatory Compliance Problems – From a substantive standpoint, SCE&G does not believe it is likely that the NRC's COLA review will uncover material design or process issues related to the Units, or related to their siting at the Jenkinsville location. Alternatively, SCE&G believes that if any such flaws are discovered they will be remedied in a timely and cost-effective manner without unduly affecting the schedule or cost of the Units. However, the emergence of substantive design-related or process-related issues is not beyond possibility and the potential for additional cost and delay as a result of them are a part of the risk profile related to the Units. Also, changes in regulatory requirements during the course of construction could result in the need for redesigns, retrofits or reworking of work already completed.

Integrated Tests, Approvals, and Acceptance Criteria ("ITAACs") – One subset of risks related to NRC licensing is the risk related to the criteria and protocols for testing, approval and acceptance of work on the Units as work is completed. This testing, approval and acceptance is known as ITAAC. Under the current approach to licensing adopted by the NRC, the NRC intends to issue a COL for new units in advance of the design/build team completing all aspects of plant design and engineering and before construction drawings are complete. However, to be allowed to proceed with construction and with plant operation, the plant and its major components and systems must meet stringent performance standards. Those standards are measured through performance testing routines and analysis, *i.e.*, ITAACs, which are conducted as important stages of the work are completed.

The NRC has established the ITAAC criteria which the Units and other new nuclear units must meet to ensure the plants will operate as intended. However, those ITAACs could change during the course of the Units' licensing or construction. It is possible that the NRC could require additional ITAACs or increase the scope or stringency of existing ITAACs during the course of construction and testing of the Units. This could happen for any number of reasons, including pressure from interveners in the COL proceedings or changes in public or political attitudes toward nuclear power. In addition, the NRC is still developing the process for approving the results of the ITAAC tests once they are completed and for resolving disputes or other issues related to the results of those tests. The hearing process which would currently apply to ITAAC issues is untested. Those hearings could add expense and delay to the construction of the Units.

SCE&G does not have any basis at present to believe that the ITAAC process will pose significant risks to the schedule or cost estimates presented in this Application. However, risks related to the ITAAC process are risks to which the construction of the Units is subject.

NRC Licensing Generally – At this time, the most significant risks related to NRC licensing appear to be a) the risk of delay in the issuance of a COL, the resulting disruption of the construction schedule, and the increase in construction costs that such a delay would represent; and b) the risks related to changes or delays in the ITAAC process, particularly as construction

of the Units enters its latter stages. Nonetheless, the information available to SCE&G at this time indicates that SCE&G should be able to obtain a COL and comply with ITAACs on reasonable terms and conditions, without undue expense, and on a schedule that supports the construction schedule set forth elsewhere in this Application.

Federal Energy Regulatory Commission ("FERC") Approval – The Units will take cooling water from the existing Monticello and Parr Reservoirs located on the Jenkinsville site. These reservoirs are part of a FERC-licensed water power development which was put in service in its current form in 1978 to support VCSNS Unit 1. Because VCSNS Units 2 & 3 will take cooling water from the Monticello Reservoirs, the construction and operation of certain aspects of the Units will require FERC approvals. The process for NRC/FERC interaction related to these approvals and the length of time required for FERC review and issuance of approvals is not well defined at present. SCE&G does not foresee any difficulty in obtaining the required FERC approvals, but the FERC approval process could delay the construction schedule and impose additional costs.

Other State and Federal Permits – SCE&G will need to obtain a substantial number of other permits from the State of South Carolina, the Corps of Engineers, and other regulatory bodies to complete the construction of the Units and place them into operation. A list of those permits is attached as **Chart B** to **Exhibit J**.

SCE&G's assessment of the risks related to these permits is similar to its assessment of the risks related to the COL process. SCE&G is not aware of any facts that would indicate that any of the permits would be difficult or impossible to obtain on reasonable terms or schedules. The facts at SCE&G's disposal presently indicate that the permits listed on **Chart B** should be available on reasonable terms and conditions, and on a schedule that supports the timely construction of the Units as set forth in other parts of this Application. However, SCE&G recognizes the risks related to these permits are risks of constructing the Units. Difficulty or delay in obtaining these permits could have an adverse impact on SCE&G's ability to meet its construction schedules, and could increase the cost of the Units either through delay costs or though additional costs required in meeting regulatory requirements.

Political, Legislative, Regulatory or Public Opinion Risks – Concerns about climate change, about America's dependency on imported energy supplies, about the recent volatility of natural gas prices, and about the availability of future natural gas supplies, as well as the U.S. nuclear industry's 20 year track record of safety, efficiency and reliability, have all contributed to a political, legislative, regulatory and public climate that is supportive of nuclear generation. However, events that are hypothetical and difficult to predict could result in a change in the current level of political, legislative, regulatory and public support for nuclear generation in general or for the Units specifically. Such a change could in turn result in additional costs, delays and difficulty in receiving permits, licenses or approvals for the Units, and possibly could place the cost and schedule forecasts for the Units in jeopardy. While such events are difficult to

predict or envision, any major event that casts doubt on the continued safety and reliability of nuclear power, of the Westinghouse AP1000 design, or the suitability of the VCSNS site for additional nuclear units could result in such a reversal.

4. ENGINEERING RISK FACTORS

Final Engineering of the Units – As discussed above, the NRC has issued a Final Design Approval for the Westinghouse AP1000. The Reference Unit COL application has been submitted to the NRC and review of that application is underway. Nevertheless, 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. While SCE&G expects some design changes in the due course of finalizing the design and engineering of the Units, SCE&G is not aware of any specific risks or problems related to the engineering remaining to be done, and does not have information that would lead it to believe that any material or significant change in the design or engineering of the Units will be required as a result of the remaining engineering or construction. Nonetheless, SCE&G considers these sorts of design and engineering-related risks to be risks to which the Units are subject.

Design-Related Vendor Risks – The Units, like other generation plants and other complex industrial facilities, are designed to use plant components that are generally available in the industry. As with all such plants or facilities, there is risk that component manufacturers may exit the business or change the design of their products such that they are no longer suitable to meet the requirements of the Units' design. Were this to occur, alternative components would need to be indentified and included in the design, or the design would need to be otherwise modified to do without the unavailable component. Such events could result delay in the construction schedule or additional cost. SCE&G is not aware of any specific risks in this regard, nor has it identified any components or suppliers likely to pose such risks, but considers this design-related vendor risk as a risk which the Units share with other similar types of facilities.

5. PROCUREMENT AND TRANSPORTATION RELATED RISK FACTORS

Availability of Qualified Suppliers and Manufacturing Capacity – VCSNS Units 2 & 3 are being built at the beginning of a new cycle of nuclear construction. The Units are also likely to be among the first of a dozen or more new Westinghouse AP1000 units to be built in the United States. The supply chain for nuclear-grade plant components has not been supported by new construction for some decades and will need to be significantly expanded to meet the requirements of this new construction cycle.

In this context, it is helpful that Units will be built at the leading edge of the cycle, and should have the first call on the suppliers and manufacturing capacity that exist today. Nonetheless, the volume of anticipated nuclear construction around the world may create shortages in this capacity which may lead to increased costs and schedule delays in obtaining key components. Natural disasters, disruptions in normal industrial operations, material shortages, political unrest and other force majeure-type events could disrupt this supply chain. Such disruptions could in turn delay construction and increase the cost of the Units. SCE&G is not aware of any specific risks or problems related to the component supply chain and the manufacturing capacity that supports it. However, SCE&G does consider supply chain risk to be one of the risks to which the Units are subject.

Manufacturing and Quality Issues – Quality controls and manufacturing standards for components for nuclear plants are very stringent and the processes involved may place unique demands on component manufacturers. 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. Many of the very largest components and forging used in the Units can only be produced at a limited number of foundries or other facilities worldwide. 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. SCE&G is not aware of facts that would indicate that such problems exist or are likely to occur. But if such problems do occur, they could lead to schedule delays for the Units and increased costs and so are properly considered risk factors related to the project.

Shipping Issues – Many of the components and assemblies for Units are quite large and pose unique shipping and delivery challenges. Some of the very largest components and assemblies will be fabricated in the Far East, shipped across the Pacific Ocean to Charleston or other U.S. East Coast ports, off-loaded, and then shipped by rail to the construction site. Certain of these assemblies will be as large as any items that are typically handled by the shippers involved.

In addition, much of the plant will be constructed using advanced modular construction techniques. Many of these modular components will be fabricated off-site at facilities dedicated to supporting construction of the AP1000 units. Those modules will be delivered by truck or rail to the Jenkinsville site for assembly. Regular and timely delivery of these components to the site is an important condition for successfully meeting the schedule and cost projections for construction.

If shipping problems for components and assemblies occur; if loss or damage occurs to unique assemblies during shipping and delivery; if damage or disruption were to occur to ports or rail facilities due to natural disasters, political unrest or other causes; or if rail lines serving the site were to prove to be inadequate, this could cause schedule impacts and additional cost for the

project. SCE&G believes that the shipping issues are manageable, but shipping risk is a risk of construction.

6. CONSTRUCTION RISKS

Benefit of Standardized Designs and Advanced Modular Construction – As indicated above, the construction of the Units will employ standardized designs and advanced modular construction processes. The project schedule and costs are based on efficiencies and economies anticipated from the use of these techniques. The projected benefits and the resulting schedules and cost estimates reflected in this Application appear to be reasonable. 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 designs and advanced modular construction may not prove to be as great as anticipated.

Rework and Repair Risks – Westinghouse has contracted to supply the AP1000 design and selected components for four AP1000 units in China, and as of the time of this application, Westinghouse/Stone & Webster has signed an EPC contract with the Southern Company for the construction of two AP1000 units at the Plant Vogtle site on the Savannah River near Augusta, Georgia. While SCE&G believes the AP1000 to be a superior design, and has full confidence in the ability of Westinghouse and Stone & Webster as suppliers and contractors, it is nonetheless true that no AP1000 units have yet been built. Accordingly, problems may arise during construction that are not anticipated at this time. These problems may require repairs or rework to be corrected. Repairs and rework pose schedule and cost risk resulting both from the repair and rework itself, and from the time and expense required to diagnose the cause of the problem, and to plan, review and approve the work plan before implementation. Westinghouse and Stone & Webster have great experience and expertise in construction of power plants, and should be able to anticipate and avoid, or efficiently correct, construction problems as they become apparent. Nonetheless, repairs and rework represent a construction related risk of the AP1000 units.

Labor Risks – The construction of the Units will require a workforce of several thousand people at its peak. Many of the jobs involved will require workers with specialized construction skills such as specialty welding, pipefitting and electrical skills. In addition, successfully completing the project will require the recruitment and retention of skilled construction managers and supervisors.

- **Cost and Availability Risks** – The availability of the necessary employees, managers and supervisors for constructing the Units will depend on a number of factors, including overall economic and construction-related activity in the region, and the number of nuclear plants under construction in the region at the time the Units are being built. As one of the first nuclear construction projects anticipated

to get underway in the current construction cycle, the SCE&G construction project should have an advantage in attracting the required personnel over projects beginning later. But staffing risks for the Units include both the possible shortage of required workers, which could impact both schedule and costs, and the risk that bidding for the available work force will raise labor costs to levels higher than anticipated. Some inflation in labor costs is built into the cost projections and project pricing. However, actual inflation in labor costs could be higher than expected. Labor price and availability risks are important risks of the projects.

- **Training Risks** – Part of the challenge related to construction staffing will be that of properly training personnel in the skills necessary to successfully complete the project. Training costs can be a significant part of the project costs. If the construction labor force cannot be brought to the proper skill level, or maintained at that level in the face of employee turnover, then there will be a risk of excessive rework, schedule delays and increased costs.
- **Language Issues** – For a large number of construction workers, English may be their second language or they may have limited English skills. Making provisions for a large non-English speaking component of the work force may result in efficiency losses and require incurring additional costs for translation services.
- **Fitness for Duty Regulations** – The NRC has issued fitness for duty regulations for nuclear plant construction workers. Fitness for duty regulations are intended to provide reasonable assurance that nuclear plant personnel, including construction personnel, will perform their tasks in a reliable manner; that they are not under the influence of any substance, legal or illegal, that may impair their ability to perform; and that they are not mentally or physically impaired from any cause, including fatigue, illness or emotional distress, that can adversely affect their ability to competently perform their duties. Requirements under these regulations include pre-employment screening, drug and alcohol testing (with appropriate privacy protections), post-accident testing, and on-the-job behavioral awareness. Non-nuclear personnel are likely to be unfamiliar with the requirements imposed by these regulations. Concerns about the tests, or the failure to meet their requirements, may lead to increased turn-over or difficulty in hiring sufficient numbers of skilled employees, supervisors and managers.
- **Strikes or Walkouts** – While union activity is not as common in South Carolina as in other states, organization of the workforce for the Units is possible and labor disputes could result in strikes or walkouts.

These individual labor-related risks are part of the overall challenge of recruiting, training, retaining and supervising a large, diverse and highly-skilled work force to construct the Units. SCE&G believes these labor-related risks to be manageable, but they do constitute major risks related to the construction of the projects.

Scope Increases – Construction scope increases can result from changes in regulation, design changes, changes in the design and characteristics of components of equipment, and other similar factors. Many of the reasons for scope changes have been discussed in specific contexts above. In general, scope changes involve the cost and delay of redesign work, and of implementing the expanded scope. Scope changes represent an important category of risk to which the project is susceptible.

Transmission Siting and Construction – Transmission-related costs are properly considered as part of the capital cost of a plant for the purposes of Base Load Review Act proceedings. However, the Company does not plan to design and permit off-site transmission facilities for VCSNS Units 2 & 3 until the later stages of plant construction. This delay will allow the transmission lines to be configured to suit the needs of SCE&G's transmission system as they may evolve over the course of the construction period. The actual transmission costs associated with the Units will depend on the final routing and design of the transmission facilities, the cost of right of way along the route chosen, the schedule and cost of the right of way acquisition and siting processes, and the cost of transmission construction at the times the lines are built.

7. OPERATIONAL RISKS

General Operations – SCE&G has successfully operated and maintained a Westinghouse Pressurized Water Reactor, *i.e.*, VCSNS Unit 1, for more than 20 years. SCE&G's operations have consistently received high ratings by the NRC and by Institute of Nuclear Power Operations (INPO) and the availability factors for the plant have been very good. All the resources necessary for supporting the operations of such a unit are in place and functioning well at the Jenkinsville site.

Adding two new AP1000 units to the site will require significant expansion of SCE&G's existing staff and capabilities. Recruiting, training and retaining the required staff is one of the risks related to operation of the plant, but it is a risk SCE&G believes that can be managed without undue difficulty.

Spent Fuel Storage – Each unit of VCSNS Units 2 & 3 will have the capability to store 18 years of fuel discharges from the reactor in its spent fuel storage pool. In the next several years, SCE&G will have to construct and place into operation a secure dry-fuel storage facility at the Jenkinsville site to receive and hold spent fuel from VCSNS Unit 1. This facility will be constructed large enough to facilitate storage of spent fuel from Units 2 & 3. The dry-fuel storage facility will have the capability to hold spent fuel safely until a permanent repository for it is available. SCE&G does not believe that spent-fuel storage is a material risk factor related to operation of the Units.

Fuel Cost Risk – SCE&G believes that nuclear fuel for its reactors will be available in sufficient quantities and at reasonable prices during the course of its operation of the Units. The cost of nuclear fuel has risen recently in response to the resurgence of interest in nuclear generation. However, SCE&G is not aware of any reason to believe that supplies of nuclear fuel or nuclear fuel fabrication capacity will be unduly constrained in the long-term. Moreover, the cost of fuel is a much smaller part of the cost of nuclear generation than it is for generation from fossil fuel sources. Accordingly, the economics of nuclear generation are much less dependent on fuel costs than are the economics of coal- or natural-gas-fired generation.

8. FINANCIAL AND GENERAL INFLATION RISKS

Financial Risk – As other exhibits show, construction of the Units will require the Company to access large amounts of capital on regular intervals to make the required payments to Westinghouse and Stone & Webster, and to fund its own internal costs related to the project. SCE&G believes that it will have access to the required capital on reasonable terms during the construction process. The present Base Load Review Act proceeding and future revised rates filings will play a critical role in the Company's ability to obtain that capital.

Nonetheless, instability in global or U.S. capital markets, future developments which bias capital markets against investments in nuclear power, or developments which call into question the future financial integrity of the Company or its ability to recover its costs of utility operations in a timely way, all could restrict SCE&G's access to capital on reasonable terms. Scope changes or cost increases that result in additional requirements for capital could also present financial challenges to the Company. Anything that might cause the Company to lose the ability to access required capital in a timely way could result in disruption of the construction process and schedule, and represents a potential risk factor for the construction of the Units.

Inflation and Supply Shortage Risks – Inflation related to nuclear construction labor, and to nuclear-plant materials and components has been discussed above. In addition, inflation in the cost of standard construction inputs like cement, steel, copper, nickel, gasoline and diesel fuel, all could result in increased costs for constructing the Units. Increasingly globalized markets have resulted in increased competition for supplies of such standard construction materials. Inflation is often accompanied by supply shortages. SCE&G has built reasonable inflation projections into its cost projections for the project. Nonetheless, supply shortages and unanticipated levels of price inflation for standard construction inputs represent a risk both to cost projections and schedule projections for constructing the Units.

9. SEVERE WEATHER AND NATURAL AND MAN-MADE DISASTERS

Severe Weather and Natural and Man-Made Disasters – The timely and successful construction of the Units depends on a supply chain that is global in scope as well as on conditions localized at the Jenkinsville site. Severe weather and natural and man-made disasters

at any point in that supply chain can interfere with the progress of the construction and affect both price and schedule risks. The problems disasters pose are most acute if they occur at sites which are vital to the manufacture or transport of unique and specialized components, or at the construction site itself. The list of potential natural and man-made disasters that could cause cost increases or schedule delays includes all the disasters commonly cited as examples of force majeure, and include: hurricanes, tornados, earthquakes, floods, landslides, fires, explosions, tsunamis, lightning-strikes, war, riots, sabotage, prolonged rains or cold weather at the site, railway or bridge failures, epidemics, and terrorist attacks. Insurance may provide protection against some of the cost of these events, but insurance may not cover all risks, and schedule delays may be unavoidable.

10. CONCLUSION

For a project of the scope and complexity of the licensing and construction of the Units, any list of potential risk factors compiled at this stage of the process will not be exhaustive. Risks that are difficult to predict or envision may arise during licensing and permitting that disrupt current cost or schedule forecasts. Nevertheless, SCE&G has reviewed the risks related to constructing the Units carefully and over an extended period of time. It has compared those risks to the risks of the other alternatives that are available to meet the energy needs of its customers and the State of South Carolina. SCE&G has also sought to manage the risks of constructing the Units by fixing costs, to the extent commercially reasonable, under the EPC Contract with Westinghouse/Stone & Webster, and by applying reasonable schedule and cost contingencies to the project. Based on the above, SCE&G has concluded that the benefits from constructing the Units and adding them to its system outweigh the risks as it understands them, particularly considering that this energy source involves significant no air emissions, is highly reliable, and is not subject to the fuel price risks or fuel availability risks that affect the fossil generation resources. SCE&G has concluded that constructing the Units is the most prudent and responsible course it can take at this time to meet the base-load generation needs of its customers.

But no project of this scope can expect to be completed without some risks or disruptions. In the end, this project's ability to meet its current schedule and cost projections will depend on the cumulative effect of those risk events that do occur on the schedule and cost projections contained in this Application. SCE&G will monitor these risks and their effects carefully. It will inform the Commission and the public if the effects of risks that do occur begin to fall outside of the cost and schedule contingencies built into this Application.

EXHIBIT J
Chart A
Certain Risks Associated with Construction and Operation of the Facilities

Types of Risk	Schedule Delay	Increase Cost
1. Regulatory Risks		
a. Office of New Reactors		
i. New 10CFR52 licensing process proceeds slowly due to complexity and/or resource issues	Yes	Yes
ii. Intervention results in lengthy NRC hearings	Yes	Yes
iii. New NRC regulations issued causes scope additions	Yes	Yes
iv. ITAACs		
1. Resolution of ITAACs delays fuel load	Yes	Yes
2. New ITAACs causes scope addition	Yes	Yes
b. NRC Region II		
i. Construction Inspection Process proceeds slowly due to complexity and/or resource issues	Yes	Yes
c. FERC license approval process proceeds slowly due to complexity and/or resource issues	Yes	Yes
d. State & local permits process proceeds slowly due to complexity and/or resource issues	Yes	Yes
2. Engineering Risks		
a. Completion of design results in changes to existing design	Yes	Yes
b. Construction problems require design changes	Yes	Yes
c. Equipment vendors go out of business or change products	Yes	Yes
3. Procurement Risks		
a. Inadequate number of qualified suppliers	Yes	Yes
b. Manufacturing problems causes delays	Yes	Yes
c. Shipping problems delay equipment arrival to site	Yes	Yes
4. Construction Risks		
a. Construction duration estimates are too optimistic	Yes	Yes
b. Construction problems requires rework/repair	Yes	Yes
c. Labor issues (strikes/inadequate supply) causes delays	Yes	Yes
d. Lack of proper training results in mistakes	Yes	Yes
e. Large non-English speaking workforce	Yes	Yes
f. Workers do not meet new fitness for duty standards	Yes	Yes
5. Operational Risks		
a. Inability to hire sufficient qualified people to operate plants	Yes	Yes
6. Financial Risks		
a. Cost of money limits ability to raise sufficient capital	No	Yes
b. Rising inflation & competition drives equipment and commodity prices upward	No	Yes
c. Scope increases require additional funding	Yes	Yes
7. Uncontrollable Circumstances		
a. Severe weather	Yes	Yes
b. War/sabotage/terrorist attack	Yes	Yes

EXHIBIT J
Chart B

Major Non-NRC Permits, Licenses, and Authorizations List

1. **Federal Energy Regulatory Commission (FERC) Order for Non-Project Use of Project Land & Waters**

Upon application to the FERC, the FERC will review, and if found not to be inconsistent with the provisions of the FERC Project 1894 (Parr/Monticello Hydroelectric Project) License, it will issue its order approving the construction of the inlet lines for the water treatment plant as well as intake and discharge structures (lines) for the Units 2 & 3 cooling towers crossing Project properties, and such other non-project use of Project resources, including land and water as will be necessitated by construction and operation of Units 2 & 3.

2. **U. S. Army Corps of Engineers (COE) 404 Wetlands Permit**

A permit is needed to disturb land and in some cases to fill areas determined to be wetlands and officially delineated by the COE.

3. **Siting Act Certification for the Transmission Facilities**

As indicated in **Exhibit Q** to this Application, additional transmission facilities will be required to integrate the Units into SCE&G's electric grid. Those transmission projects will be permitted separately from the permitting of the generation facilities with which they are associated.

4. **Section 401 Water Quality Certification**

A Section 401 Water Quality Certification by the South Carolina Department of Health and Environmental Control (DHEC) will be necessitated as a result of the need to secure a Section 404 permit. The review will be conducted in concert with the 404 wetlands permit process.

5. **Part III Construction & Demolition Landfill Permit (Solid Waste Permit)**

A DHEC Solid Waste Permit is needed for an Industrial Landfill for the purpose of disposal of construction, demolition, and land-clearing debris.

6. **NPDES Stormwater Permit for Land Clearing**

A DHEC issued Stormwater Permit is required for any land disturbing activities. This includes all land clearing activities such as grubbing and excavating of soil from the site.

7. SCDHEC/S.C. Fire Marshall Blasting Permit

Permits are required should it become necessary to blast rock that cannot be removed by other means.

8. SCDOT Site Access Road Permit

A permit is needed for enhancing the roadway at the intersection of Parr Rd. and Hwy. 213 to facilitate safer passage of construction traffic.

9. Construction Facilities Building Permit

Permits are needed for construction of buildings in the "construction city area."

10. SCDHEC Concrete Batch Plant Permit

A permit is needed to install a concrete batch plant onsite to produce concrete for the construction project.

11. Concrete Batch Plant NPDES Discharge Permit

A permit is needed to discharge water from the concrete batch plant into "Waters of the State."

12. Dredge and Fill (COE) Permit

A permit is needed for dredging areas in Parr Reservoir when installing a discharge pipe for Units 2 & 3.

13. SCDHEC Bureau of Air Quality (BAQ) Permits

A construction permit exemption is needed from BAQ for emergency generators, boilers (if applicable) and any other stationary sources exhausting emissions into the atmosphere at the water treatment plant/wastewater plant. This also applies to any future equipment on the site that emits to the atmosphere.

14. SCDHEC Construction Permit for Water Treatment Plant

A permit is needed to construct the building/equipment/lines for the Water Treatment Plant.

15. NPDES Water Permit for Water Treatment Plant

A permit is needed to produce water from the Water Treatment Plant.

16. NPDES Wastewater Permit (discharge water coming from Water Treatment Facility)

A permit is needed to discharge water from the Water Treatment Plant into Monticello Reservoir.

17. NPDES Wastewater Permit (discharge water coming from Wastewater Package Plant)

A permit is needed to discharge water from the Wastewater Package Plants (2 plants) into Mayo creek and Parr Reservoir.

18. Construction Permit for Wastewater Package Plant

A permit is needed to install two wastewater package plants (construction city area and on the table top area) into Mayo Creek and Parr Reservoir.

19. Federal Aviation Administration Permit

A permit is required from the FAA for Lampson construction cranes, because they will be over the height of 200 ft.

EXHIBIT 4

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

STRUCTURE AND RESPONSIBILITIES OF THE NND TEAMS

Organizational Reporting Structure of the NND Teams

The NND Teams are comprised of three separate organizations: 1) NND which reports to SCE&G's Vice President of New Nuclear Deployment; 2) NND Operational Readiness and NND Training which reports to SCE&G's Senior Vice President and Chief Nuclear Officer; and 3) NND Finance which reports to SCANA's Vice President for Nuclear Finance. Collectively these organizations constitute the NND Team.

Areas of Responsibility of the NND Team.

1. There are six functional groups within NND that report to the Vice President of New Nuclear Deployment. They include:

a) **NND Nuclear Licensing** – The NND Nuclear Licensing group had 14 employees as of July 2012. This group is responsible for overseeing all aspects of the NRC licensing and non-NRC permits and authorizations that are required for the construction and start-up of the Units. This group also serves as the primary interface with all external regulatory authorities interfacing with new nuclear units.

b) **NND Design Engineering** – NND Design Engineering was comprised of 17 employees as of July 2012. This group is responsible for reviewing and overseeing all aspects of the design of the Units by Westinghouse and Shaw with specific emphasis on site specific aspects of the design and construction designs which are being finalized and updated as construction proceeds.

c) **NND Quality Systems** – NND Quality Systems was comprised of 9 employees as of July 2012. This group is responsible for ensuring that the Units are being designed and constructed in compliance with all applicable NRC regulatory requirements and procedures. This group oversees quality assurance and quality control for on-site construction and assembly activities as well as for equipment fabrication at suppliers' locations worldwide.

d) **NND Organizational Development and Performance (OD&P)**- This group was comprised of 5 personnel as of July 2012 and oversees the Westinghouse and Shaw groups corrective action, human performance and



safety culture programs. In addition, this group also oversees the implementation of these programs within the NND Teams.

e) **NND Construction** – NND Construction was comprised of 21 employees as of July 2012 and is responsible for the overall management of the construction project on site, including the effective implementation of the EPC Contract, the oversight of construction activities and the coordination of contractor activities. This group ensures compliance with the project schedule by Westinghouse/Shaw, as well as compliance with all required permits and regulatory requirements.

f) **NND Business and Finance** – The NND Business and Finance organization was comprised of 4 employees as of July 2012. This group is responsible for overseeing the administration of the EPC Contract to ensure the Company gets the benefit of the business and financial protections it contains. It supports the invoice review process, and oversees the communication with ORS and resolution of concerns with ORS concerning the progress of the project, BLRA milestone completions, and related matters. SCE&G's NND Business and Finance Team and SCANA's NND Finance team work collaboratively on all matters.

2 The two areas of the NND Team that report to SCE&G's Senior Vice President and Chief Nuclear Officer are:

a) **NND Operational Readiness** – The NND Operational Readiness organization was comprised of 85 employees as of July 2012 and is responsible staffing the team that will operate and maintain the Units when complete. This group will also oversee the development of the programs, policies and procedures needed to effect an orderly transition from the construction to operations phase of the units.

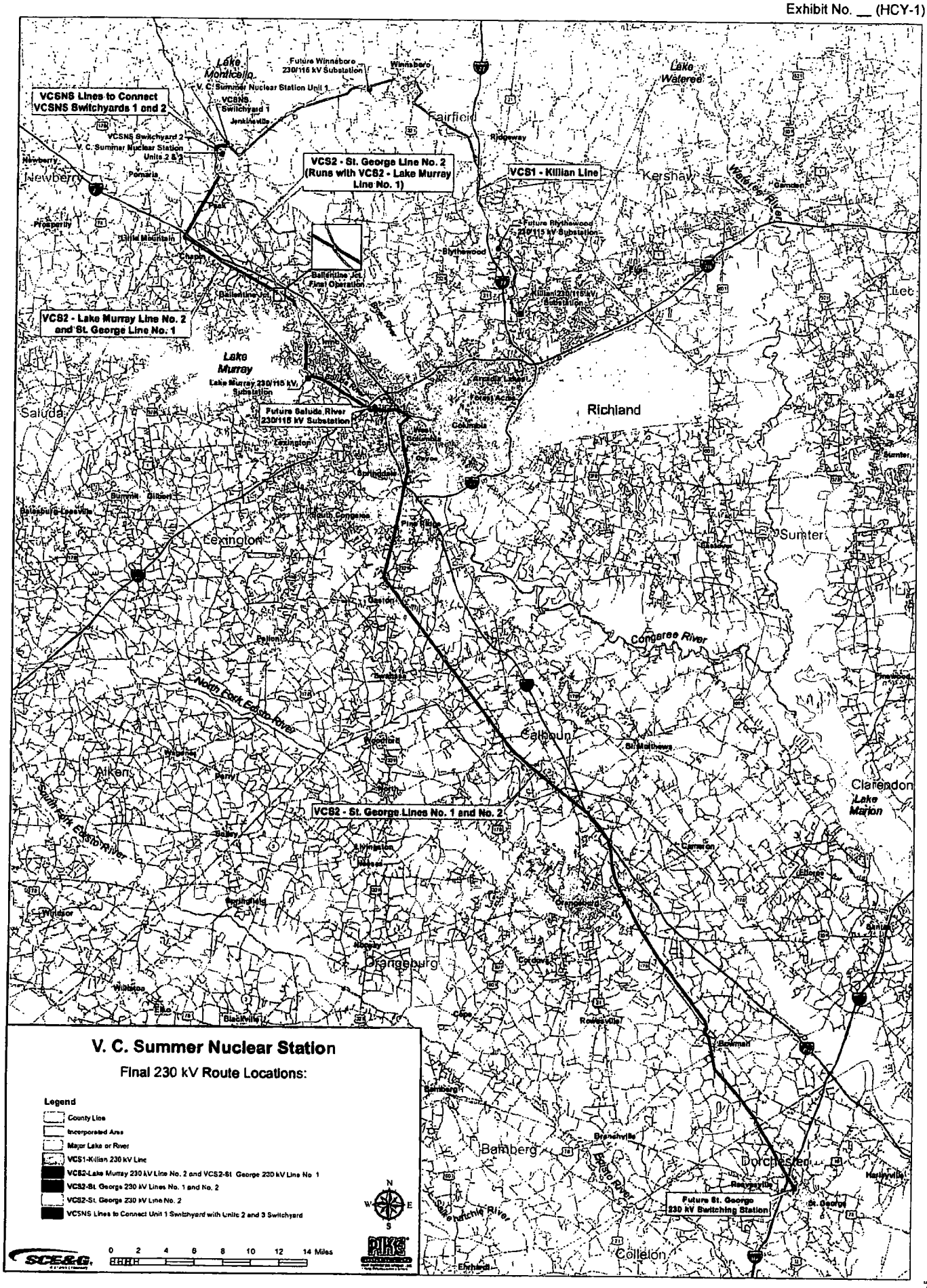
b) **NND Training** – The NND Training team was comprised of 48 employees as of July 2012 and is responsible for the training and qualification of the operations, maintenance and technical staff supporting the new Units.

3 The NND Team that report to SCANA Vice President of Nuclear Finance:

a) **NND Finance** – This group was comprised of 11 employees as of July 2012 and oversees compliance with the EPC Contract, administers the EPC and Non EPC invoice review processes, NND budgeting and systematically tracks and reports the project costs. The group also processes reports for reporting to internal and external agencies.

EXHIBIT 5

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E


VCSNS Lines to Connect VCSNS Switchyards 1 and 2
VCS2 - St. George Line No. 2 (Runs with VCS2 - Lake Murray Line No. 1)
VCS1 - Killian Line
VCS2 - Lake Murray Line No. 2 and St. George Line No. 1
VCS2 - St. George Lines No. 1 and No. 2
Lake Monticello
V. C. Summer Nuclear Station Unit 1
Future Winnsboro 230/115 kV Substation
Winnsboro
VCSNS Switchyard 1
Jenkinsville
VCSNS Switchyard 2
V. C. Summer Nuclear Station Units 2 & 3
Newberry
Pomaria
Peak
Prosperity
Silver Mountain
Chapin
Ballentine Jct.
Ballentine Jct. Final Operation
Broad River
Lake Murray
Lake Murray 230/115 kV Substation
Saluda River
Future Saluda River 230/115 kV Substation
Saluda
Lexington
Columbia
Irmo
Springdale
Gilbert
Batesburg-Leesville
Pine Ridge
Gaston
Pelion
Swansea
North Fork Edisto River
Aiken
Windsor
Williston
Elko
Blackville
Barnwell
Denmark
Orangeburg
Cope
Bowman
Holly Hill
Eutawville
Santee
Lake Marion
Clarendon
Sumter
Lee
Kershaw
Camden
Lake Wateree
Fairfield
Ridgeway
Blythewood
Future Blythewood 230/115 kV Substation
Killian 230/115 kV Substation
Wateree River
Congaree River
Richland
Calhoun
St. Matthews
Cameron
Elloree
Jamestown
Rowesville
Branchville
Bamberg
Ehrhardt
Colleton
Dorchester
Ravenwood
St. George
Harleyville
Future St. George 230 kV Switching Station
Edisto River
Four Hole Swamp
Big Beaver Creek
Arcadia Lakes
Forest Acres
Cayce
West Columbia
Pine Ridge
Gaston
Swansea
Parr
Silverstreet
Monetta
Batesburg-Leesville
Gilbert
Summit
Ridge Spring
Johnston
Trenton
Edgefield
Modoc
Langley
Clearwater
Ellenton
Dunbarton
Windsor
Springfield
Williston
Elko
Blackville
Barnwell
Denmark
Olar
Ehrhardt
Bamberg
Branchville
Rowesville
Cope
Bowman
Holly Hill
Eutawville
Santee
Lake Marion
Clarendon
Sumter
Lee
Kershaw
Camden
Lake Wateree
Fairfield
Ridgeway
Blythewood



Hearing Exhibit 5
pg 2-of-2

EXHIBIT 6

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

Exhibit No. ____ (CLW-1-P) Public

Exhibit 1

RESTATED and UPDATED CONSTRUCTION EXPENDITURES
(Thousands of $)

V.C. Summer Units 2 and 3 - Summary of SCE&G Capital Cost Components

Actual through March 2012* plus Projected

Plant Cost Categories	Total	Actual					Projected						
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fixed with No Adjustment													
Firm with Fixed Adjustment A													
Firm with Fixed Adjustment B													
Firm with Indexed Adjustment													
Actual Craft Wages													
Non-Labor Costs													
Time & Materials													
Owners Costs													
Transmission Costs	326,512	-	26	724	827	11,964	57,208	56,803	57,508	77,990	64,727	1,537	-
Total Base Project Costs(2007 $)	4,553,355	21,723	97,386	316,073	374,810	314,977	814,173	782,238	793,879	648,780	386,637	142,999	58,781
Total Project Escalation	970,829	-	3,519	20,930	23,741	34,084	99,789	186,985	215,848	184,800	134,815	58,409	24,729
Total Revised Project Cash Flow	5,523,984	21,723	100,905	340,003	398,551	349,061	713,961	952,204	1,009,727	833,579	521,351	201,408	81,510
Cumulative Project Cash Flow(Revised)		21,723	122,629	462,632	861,183	1,210,244	1,924,205	2,876,409	3,886,136	4,719,715	5,241,066	5,442,474	5,523,984
AFUDC(Capitalized Interest)	237,926	645	3,497	10,564	17,150	14,218	20,462	38,448	42,934	40,958	27,618	15,391	6,144
Gross Construction	5,761,910	22,368	104,403	350,567	415,701	363,278	734,424	990,649	1,052,661	874,537	548,970	216,798	87,654
Construction Work in Progress		22,368	126,771	477,338	893,039	1,256,317	1,990,741	2,981,390	4,034,051	4,908,588	5,457,458	5,674,257	5,761,910

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*Applicable index escalation rates for 2012 are estimated. Escalation is subject to restatement when actual indices for 2012 are final.

Notes:
Current Period AFUDC rate applied 6.31%

Escalation rates vary from reporting period to reporting period according to the terms of Commission Order 2009-104(A).
These projections reflect current escalation rates. Future changes in escalation rates could substantially change these projections.
The AFUDC rate applied is the current SCE&G rate. AFUDC rates can vary with changes in market interest rates,
SCE&G's embedded cost of capital, capitalization ratios, construction work in process, and SCE&G's short-term debt outstanding.

PUBLIC VERSION

EXHIBIT
10/3/12
6
2012-203-E

Exhibit No. ___(CLW-2)

Exhibit 2

Change from SCPSC Order 2011-345

(Thousands of $)

V.C. Summer Units 2 and 3 - Summary of SCE&G Capital Cost Components

Actual through March 2012* plus Projected

Plant Cost Categories	Total	Actual					Projected						
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fixed with No Adjustment	1	-	-	-	-	(23,391)	13,287	2,703	5,174	2,089	97	42	-
Firm with Fixed Adjustment A	-	-	-	-	-	-	(1,650)	1,650	-	-	-	-	-
Firm with Fixed Adjustment B	24,453	-	-	-	-	(280)	7,638	1,485	734	3,052	10,018	3,188	(1,381)
Firm with Indexed Adjustment	71,557	-	-	-	-	(81,822)	(42,744)	67,903	66,198	51,118	(14,483)	27,664	(2,297)
Actual Craft Wages	59,794	-	-	-	(261)	(11,597)	(7,579)	(19,511)	32,140	53,689	19,100	(6,826)	439
Non-Labor Costs	(12,399)	-	-	-	(1,727)	11,101	(115,762)	(27,125)	110,850	41,280	(14,757)	(15,516)	(743)
Time & Materials	0	-	-	-	(21)	(681)	(2,692)	10,296	22,145	5,850	(3,085)	(2,831)	(28,981)
Owners Costs	131,625	-	-	-	(449)	(23,667)	18,151	30,974	45,815	10,180	44,703	16,035	(10,118)
Transmission Costs	7,921	-	-	-	49	4,712	49,431	44,608	27,686	42,754	21,692	(72,141)	(111,064)
Total Base Project Costs(2007 $)	282,951	-	-	-	(2,415)	(125,628)	(81,921)	113,183	310,742	210,012	89,305	(50,185)	(154,145)
Total Project Escalation	(290,226)	-	-	-	2,414	(23,307)	(61,111)	(32,727)	34,225	(4,037)	(36,455)	(59,083)	(118,144)
Total Revised Project Cash Flow	(7,275)	-	-	-	(1)	(148,933)	(143,032)	80,455	344,967	205,975	26,850	(103,268)	(270,289)
Cumulative Project Cash Flow(Revised)		-	-	-	(1)	(148,934)	(291,965)	(211,510)	133,457	339,432	366,282	263,015	(7,275)
AFUDC(Capitalized Interest)	(17,758)	-	-	-	-	(9,970)	(11,635)	(4,113)	5,349	10,227	5,978	(2,171)	(11,421)
Gross Construction	(25,032)	-	-	-	(1)	(158,903)	(154,667)	76,343	350,316	216,202	32,828	(105,439)	(281,710)
Construction Work in Progress		-	-	-	(1)	(158,904)	(313,571)	(237,228)	113,088	329,290	362,118	256,678	(25,032)

*Applicable index escalation rates for 2012 are estimated. Escalation is subject to restatement when actual indices for 2012 are final. These projections reflect current escalation rates. Future changes in escalation rates could substantially change these projections.

V.C. Summer Units 2 and 3 - Summary of SCE&G Itemized Capital Costs
Dollars Reflect SCE&G 55% share ($000)

	Description of Item	Actual Costs Incurred as of 3/31/12	Projected Costs	Total (Actual + Projection)	Fixed with No Adjustment	Firm with Fixed Adjustment A	Firm with Fixed Adjustment B	Firm with Indexed Adjustment Handy Whitman	Actual Craft Wages	Non-Labor Costs	Time & Materials	Owners Costs	Transmission
1	CO #12 Health Care Reform												
2	CO # 14 Cyber Security (Phase 1)												
3	Cyber Security (Phase 2)												
4	CO #16 Waste Water Discharge												
5	Removal of Community Support												
6	CO #18 Shield Bldg. Modules, Delay, Rock												
7	EPC Adjustment*												
8	Transmission Costs	1,678	6,245	7,923									
9	Transmission Adjustment	1,678	6,245	7,923									
10	Owners' Adjustment	-	131,625	131,625									
11	Project Adjustment			292,933									

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* Includes Rounding Adjustment

EXHIBIT 7

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

Matthew W. Gissendanner
Assistant General Counsel

matthew.gissendanner@scana.com

October 8, 2012

VIA ELECTRONIC DELIVERY

The Honorable Jocelyn Boyd
Chief Clerk and Administrator
Public Service Commission of South Carolina
101 Executive Center Drive
Columbia, South Carolina 29210

RE: Petition of South Carolina Electric & Gas Company for Updates and Revisions to Schedules Related to the Construction of a Nuclear Base Load Generation Facility at Jenkinsville, South Carolina
Docket No. 2012-203-E

Dear Ms. Boyd:

During the hearing in the above-referenced docket, the Public Service Commission of South Carolina ("Commission") directed South Carolina Electric & Gas Company ("SCE&G") to submit a late-filed exhibit reporting the total actual expenditures to date on the new nuclear construction project at the V.C. Summer Nuclear Station site in Jenkinsville, South Carolina. The Commission further requested that this figure be reported in current year dollars.

Pursuant to the Commission's request, please accept the attached document into the hearing record for this proceeding as a late-filed exhibit to be identified, per the court reporter, as Hearing Exhibit No. 7.

If you have any questions, please advise.

Respectfully submitted,

Matthew W. Gissendanner

Matthew W. Gissendanner

Late-Filed

EXHIBIT
7
2012-203-E

MWG/mcs
Enclosure

cc: John W. Flitter
Jeffrey M. Nelson, Esquire
Shannon Bowyer Hudson, Esquire
Courtney Dare Edwards, Esquire
Robert Guild, Esquire
Scott Elliott, Esquire
Pamela Greenlaw
(all via electronic mail and U.S. First Class Mail w/enclosure)

BEFORE

THE PUBLIC SERVICE COMMISSION

OF SOUTH CAROLINA

DOCKET NO. 2012-203-E

IN RE:	)	
	)	
Petition of South Carolina Electric & Gas Company for Updates and Revisions to Schedules Related to the Construction of a Nuclear Base Load Generation Facility at Jenkinsville, South Carolina	)	**HEARING EXHIBIT NO. 7**

South Carolina Electric & Gas Company ("SCE&G") was asked to provide, in current year dollars, the total actual expenditures to date for the construction of the two new nuclear units at Jenkinsville, South Carolina. SCE&G's monthly accounting closeout process takes several weeks to complete. Thus, final numbers for September 2012 expenditures are not available at this time. To provide a timely response, SCE&G is providing the total actual project expenditures as of the end of August 2012.

Through August 31, 2012, SCE&G has spent approximately $1,639,481,000 in current year dollars on the new nuclear construction project. This figure includes expenditures related to EPC Contract costs, Owners costs, Transmission costs, and associated AFUDC.

EXHIBIT 8

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

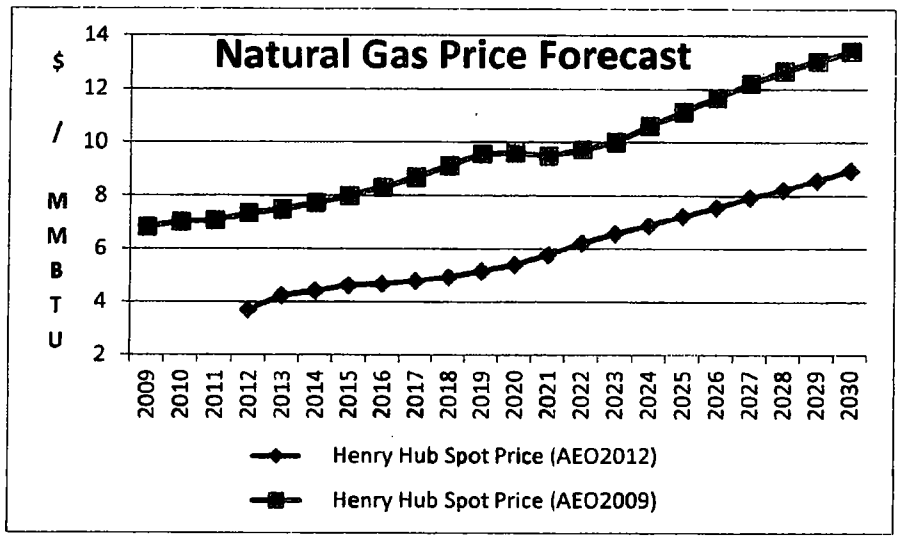


EXHIBIT
10/3/12
8
2012-203-E

EXHIBIT NO. __ (JML-2)

Projected vs. actual (percent difference)

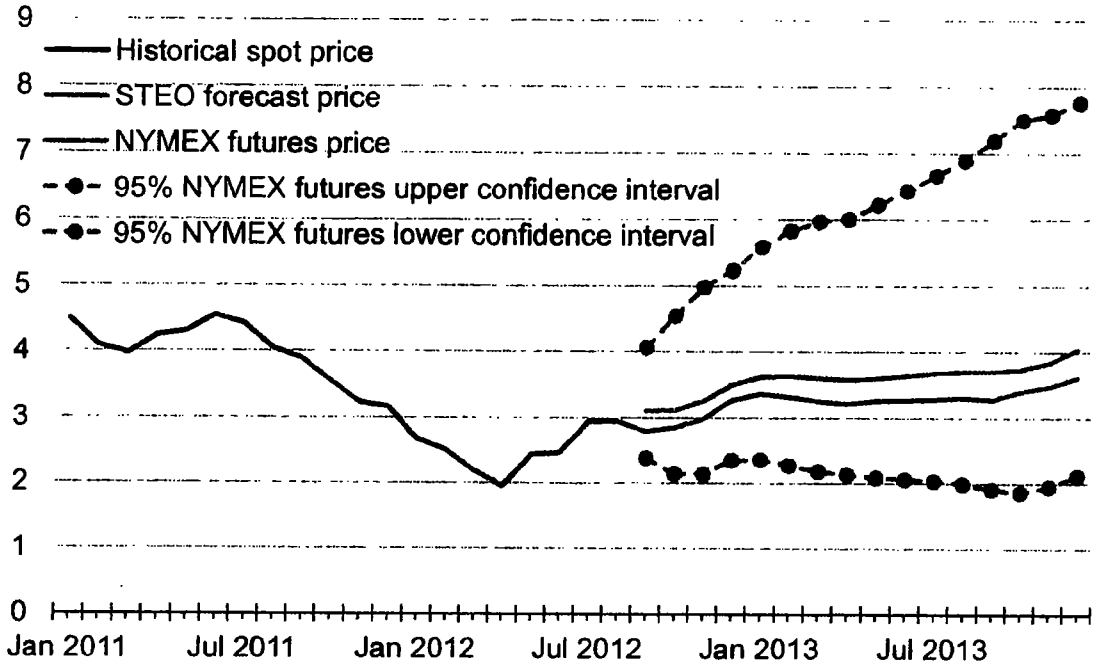
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AEO 1994	-19.0	-21.5	13.4	-26.4	-29.5	-42.9	-29.4	-21.4	-33.6	51.5	43.3
AEO 1995	-30.2	-27.6	7.1	-27.1	-29.1	-41.8	-28.6	-22.4	-35.3	47.5	36.1
AEO 1996	-40.4	-42.8	-19.4	-49.3	-52.6	-62.9	-55.6	-52.5	-60.9	-10.2	-16.2
AEO 1997	-43.9	-46.6	-25.0	-52.5	-55.5	-65.3	-58.5	-55.7	-63.9	-18.3	-25.2
AEO 1998	-37.2	-40.5	-17.1	-48.4	-52.5	-63.3	-56.3	-53.2	-61.6	-12.7	-19.5
AEO 1999	-40.1	-42.1	-17.8	-48.1	-51.8	-62.4	-54.6	-51.7	-60.8	-11.9	-19.5
AEO 2000	-39.3	-43.3	-21.4	-50.9	-54.0	-63.7	-56.0	-52.5	-61.1	-12.9	-21.0
AEO 2001	-7.8	-12.9	0.8	-43.9	-50.5	-61.4	-53.9	-51.0	-60.2	-11.3	-19.4
AEO 2002		0.6	-30.1	-48.1	-47.9	-59.0	-51.0	-48.3	-57.4	-4.2	-12.3
AEO 2003			-5.6	-33.2	-42.8	-57.1	-50.8	-47.1	-56.0	0.9	-5.0
AEO 2004				1.9	-26.8	-49.3	-41.7	-38.2	-48.9	8.2	-4.0
AEO 2005					-1.4	-24.7	-22.6	-26.9	-46.9	14.8	0.5
AEO 2006						6.5	12.1	4.4	-21.3	61.4	36.7
AEO 2007							7.5	12.1	-11.3	80.2	53.8
AEO 2008								1.9	-13.8	95.5	64.5
AEO 2009									1.1	12.2	15.7
AEO 2010										-7.9	0.2
AEO 2011											-1.0
Average Absolute Percent Difference	32.2	30.9	15.8	39.1	41.2	50.8	41.3	36.0	43.4	27.2	21.9

Sources: Projections: *Annual Energy Outlook*, Reference Case Projections, Various Editions.

Historical Data: U.S. Energy Information Administration, Annual Energy Review 2010, DOE/EIA-0384(2010) (Washington, DC, October 2011) Table 6.7.

Henry Hub Natural Gas Price

dollars per million btu



Source: Short-Term Energy Outlook, August 2012

eia

EXHIBIT 9

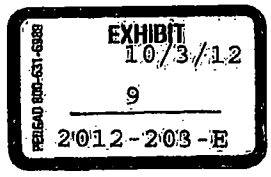
Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

Exhibit No. __(JML-4)

Comparative Economic Analysis of Completing Nuclear Construction or Pursuing a Gas Resource Strategy

September 27, 2012

SCE&G®
A SCANA COMPANY



Introduction

The purpose of this study is to determine if abandoning SCE&G's ongoing nuclear construction program and pursuing a natural gas generation strategy for base load generation needs would benefit retail customers in terms of long-run revenue requirements. This study is prepared in response to testimony filed on September 6, 2012, on behalf of the Sierra Club by Dr. Mark Cooper in Public Service Commission of South Carolina (Commission) Docket No. 2012-203-E. In that testimony, Dr. Cooper rejected an analysis prepared by SCE&G's Resource Planning Department. That analysis was presented to the Commission in the rebuttal testimony of Dr. Joseph Lynch. It demonstrated on a comparative cost basis that the forecasts of reduced future natural gas prices identified by Dr. Cooper were more than fully offset by the reduced cost to complete the Units going forward. Those reduced costs were due both to lower escalation rates since the inception of the project and the effect of funds already committed to the construction. Dr. Cooper does not dispute that the reduced cost to complete the Units is a relevant factor in such an analysis. However, he insists that only a full recalculation of the relative costs of the gas and nuclear strategies can provide an acceptable basis for answering his concerns.

SCE&G does not accept Dr. Cooper's position that a full study is needed and believes that Dr. Lynch's rebuttal testimony fully answers Dr. Cooper's concerns. Nonetheless, in the interest of demonstrating that Dr. Cooper's concerns are without merit, during the week of September 17, 2012, SCE&G's management directed the Resource Planning Department to use current data to prepare generation cost studies comparable to those performed in 2008 that supported the original decision to construct the Units.

SCE&G has undertaken this exercise expressly reaffirming its position that no single analysis of comparative costs underlies its choice of nuclear generation over gas fired generation alternatives. The goal of base load generation planning is to create a diverse and flexible portfolio of generation units that can perform effectively in multiple sets of conditions over 40 years or more. No single study or series of studies is an effective substitute for informed business judgment exercised with this goal in mind.

This study calculates the incremental revenue requirements on a comparative basis for two strategies. The first is the base case which involves completing the two nuclear units (the Units) which are presently under construction and scheduled to go into service in 2017 and 2018. When completed, the Units together will provide SCE&G with 1,229 MW. The second strategy is the natural gas resource strategy in which the Units are cancelled at the effective date of December 31, 2012. The Units are replaced by two combined cycle units rated at 614 MWs each which come into service in 2017 and 2018 also.

The principal components of the study and conclusion are set forth below. The inputs to the study have been updated to reflect the most current values available.

Load Forecast and Resource Plans

To compute the revenue requirements of the two strategies over a 40-year planning horizon, the study relies on the load forecast data that were reported in summary form in SCE&G's 2012 Integrated Resource Plan. These load forecasts are updated versions of those

that were used in the 2008 planning studies (the 2008 Studies) on which the original Base Load Review Act (BLRA) order was based. Both the nuclear and gas resource strategies are measured against identical load forecasts.

Appendix 1 shows the forecast and the base case scenario resource plan reported in the IRP. Both the nuclear capacity and the natural gas combined-cycle capacity are shown on the alternative versions of the resource plan as "base load" capacity entered on line 10 in the table shown in Appendix 1. As was the case with the 2008 Studies, the resource plans for each of the two strategies assumed that, after the base load capacity was added, additional simple-cycle natural gas-fired generation was added to meet subsequent load growth. Comparable amounts of simple cycle generation with comparable capital cost and operating costs were added under each strategy.

Abandoning Nuclear Construction

As of December 31, 2012, SCE&G expects to have spent $1.990 billion on construction of the Units. Appendix 2 is taken from SCE&G's petition in Docket No. 2012-203-E and shows the status of construction spending year to year. In addition, as Mr. Byrne testifies in his rebuttal testimony in Docket No. 2012-203-E, if SCE&G were to decide to cancel the nuclear construction project, it would be subject to contractual cancellation charges, site decommissioning and stabilization expenses and other abandonment expenses in addition to the $1.990 billion that would already have been spent. SCE&G's best assessment of the amount of those cancellation expenses would be $988 million for a cancellation effective December 31, 2012. This is the cost on a 100% basis (i.e., including Santee Cooper's 45% share in expenses).

Upon cancellation of the project, SCE&G could scrap, sell or salvage certain materials, equipment and work in progress and could use the proceeds to off-set some part of the abandonment expenses. A large component of the spending to date, however, has been for site work, construction of roads, building and bridges on site, the hiring and training of personnel, design and procurement work, and other activities that do not produce salvageable materials. SCE&G estimates that of the amounts spent to date, the salvage value of materials, equipment and work in progress would be approximately $290 million on a 100% basis. This $290 million would be netted against the gross cancellation cost of $988 million to produce an estimate of the net cancellation cost, not considering the $1.990 billion already spent, of $698 million, again on a 100% basis. SCE&G's customers would be responsible for 55% of this cost or $384 million.

Thus, adding the $1.990 billion spent as of December 31, 2012, and the $384 million in net cancellation costs, the total abandonment cost is estimated to be $2.374 billion.

The model used for comparing the costs of these two strategies computes a levelized cost for capital invested that includes all relevant parameters given the nature of the asset involved. This combination of costs spent to date and additional cost to abandon the project represent a cost that must be borne by the gas resource strategy.

Benefit of a Balanced Capacity Portfolio

A significant advantage of continuing construction of the two nuclear units is that once added to SCE&G's generation fleet, the Units will produce a well balanced capacity portfolio. The following charts show the percent distribution of capacity under a plan of continuing nuclear construction and the alternative of replacing it with natural gas fired capacity.

CHART A

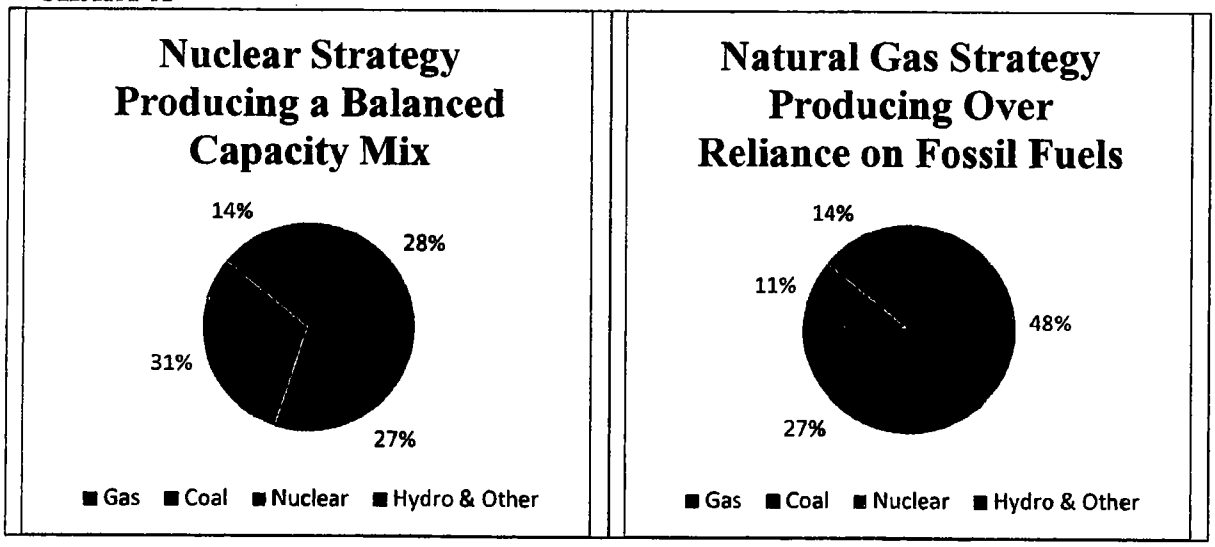


Chart A shows that the Natural Gas Strategy produces a generation system that in 2019 relies on fossil fuels for 75% (27% + 48%) of its generating capacity. The Nuclear Strategy creates a more balanced portfolio. Such a portfolio better protects customers from unexpectedly high costs in any one fuel source while allowing the utility to take advantage of opportunities in others.

Price of Natural Gas

Chart B shows two forecasts of natural gas prices at the Henry Hub. One is the current Energy Information Administration (EIA) natural gas forecast reported in their 2012 Annual Energy Outlook (AEO). This is the gas price forecast used by Dr. Cooper. The second is the proprietary natural gas forecast that SCE&G uses for planning purposes. To develop this forecast, SCE&G uses the forward prices reported for the NYMEX futures contracts over the next three years (i.e., through the end of 2015) and then applies an escalation factor projected by the economic forecasting firm IHS Global Insight Inc. to forecast prices beyond three years in the future. This is a methodology that SCE&G has used for a number of years to produce gas forecasts for planning studies. The value of this methodology is that it is simple and objective. However, because all forecasts of future gas prices are subject to error, SCE&G typically tests the results of these studies done using these forecasts through sensitivity analyses that model variations in gas prices.

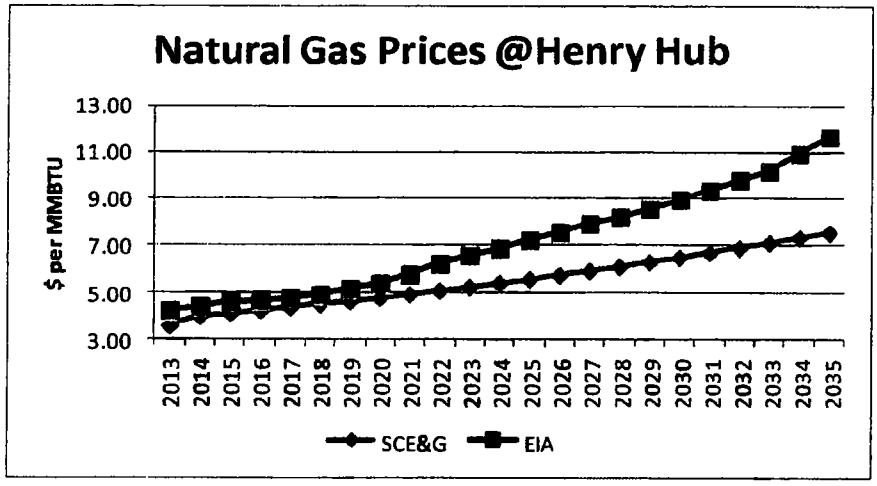
The SCE&G natural gas price forecast is the lowest of the forecasts reported on Charts B and G. It is the forecast used in these studies as the base case value for future gas prices. Charts B and C compare SCE&G baseline natural gas price forecast to the EIA's forecast that was provided in their 2012 Annual Energy Outlook. SCE&G's forecast is lower than the EIA forecast especially in the years beyond 2020.

CHART B

	Natural Gas Price Forecasts @Henry Hub ($ per MMBTU)						
	2013	**2014**	**2015**	**2017**	**2020**	**2030**	**2035**
SCEG Baseline	$3.61	$4.01	$4.13	$4.39	$4.81	$6.51	$7.58
EIA 2012 Forecast	$4.24	$4.41	$4.62	$4.79	$5.39	$8.95	$11.67

Chart C graph compares SCE&G's baseline forecast to that of the EIA.

CHART C



Social Cost of Carbon

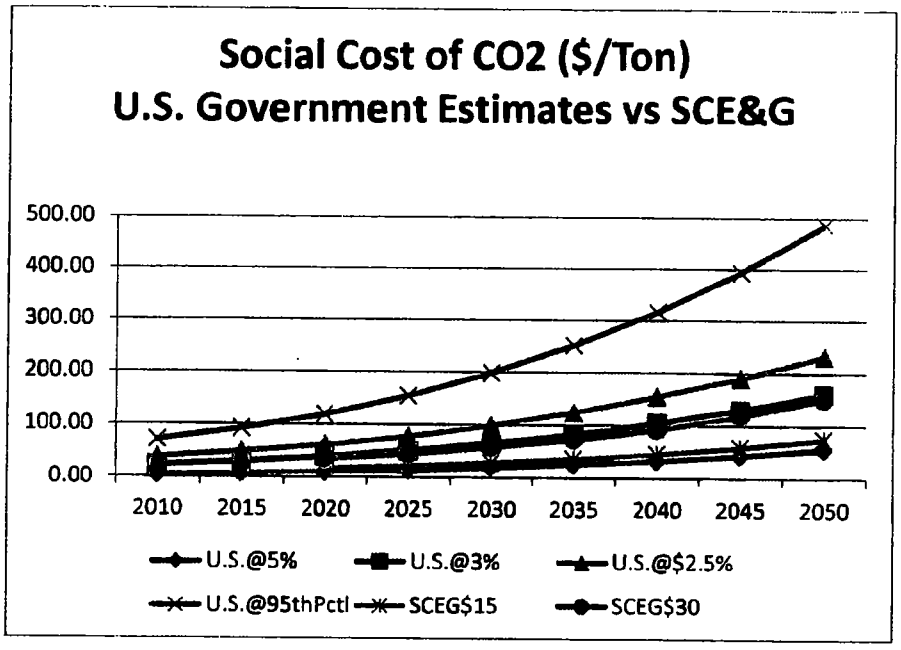
Since there is not a national cap and trade program for CO_2 nor a carbon tax, SCE&G does not face a direct cost related to its CO_2 emissions yet. However, SCE&G feels it would be unreasonable not to incorporate the risk of these direct costs on gas-fired generation in its studies and planning. In 2009, the Obama Administration convened a group of federal agencies to establish a social cost for CO_2 to be used in future rulemaking by federal agencies. In 2010, this interagency committee published its first "social cost of carbon," a monetized value associated with the cost of emitting a ton of CO_2. Chart D shows the Committee's estimates:

CHART D

Table 15A.1.1 Social Cost of CO_2, 2010 - 2050 (in 2007 dollars)				
	Discount Rate			
	5%	3%	2.50%	3%
Year	Average	Average	Average	95th
2010	4.7	21.4	35.1	64.9
2015	5.7	23.8	38.4	72.8
2020	6.8	26.3	41.7	80.7
2025	8.2	29.6	45.9	90.4
2030	9.7	32.8	50	100
2035	11.2	36	54.2	109.7
2040	12.7	39.2	58.4	119.3
2045	14.2	42.1	61.7	127.8
2050	15.7	44.9	65	136.2

As the mid-range estimate, the Committee recommended using the "3% Average" column of estimates as a baseline and the other estimates for sensitivity analysis. Since all the estimates are in 2007 dollars, it is necessary to inflate them to a particular year to compare them with SCE&G's study values of $15 and $30 in 2017. Using the 3% Average figure, the estimate of carbon costs by the federal government in 2017 is $33.29. The following graph compares the four government estimates with SCE&G's two estimates.

CHART E



SCE&G's estimates based on a $15 per ton cost are seen to be comparable with the government's lowest estimated social costs of carbon while the cost series based on SCE&G's

$30 estimate falls just below the government's base line projections. In other words, both of SCE&G carbon cost forecasts fall on the low side of the government's range of estimated CO_2 costs.

Capital Costs and Operating Costs of Natural Gas Capacity

The gas resource strategy relies on combined cycle plants for additional base load generation. As mentioned above, both the nuclear and natural gas resource strategies add simple cycle combustion turbines to meet additional capacity needs. Chart F contains the costs and heat rates assumed for these units. These inputs are based on SCE&G's ongoing monitoring of equipment and construction prices and are verified through reviews of published prices, vendor discussions and interaction with peers in resource planning departments at utilities across the country. They reflect current costs to engineer, procure and construct the assets in question including land costs, pipeline connection costs, transmission costs and permitting costs.

CHART F

Gas Technology	Capacity Rating MW	Construction Cost 2012$/KW	Heat Rate BTU/KWH	Fixed O&M Per Year	Variable O&M Per MWH
Simple Cycle	93	$697	9,169	$50,000	$3.95
Combined Cycle	614	$1,000	6,842	$8,000,000	$1.19

Miscellaneous Inputs

In this study, all carrying costs on capital investments are calculated including taxes, depreciation, insurance and cost of capital as applicable to the type of asset in question. Fixed and variable O&M are based on current estimates of turbine maintenance costs for combined cycle units. Nuclear production tax credits have been updated. Nuclear fuel costs are based on current forecasts of uranium prices and prices of new fuel assembly fabrication.

Scenario Analysis

In this study, the nuclear strategy and the natural gas resource strategies were studied under 27 different scenarios: three different natural gas prices, three different costs per ton of CO_2 emitted and three different levels of load on SCE&G's system.

a. Natural Gas Price Scenarios - The natural gas scenarios included the base line forecast of future natural gas prices as previously discussed as well as prices reflecting a 50% and 100% increase in the base line forecast. These three gas scenarios quantify the sensitivity of the analysis to variable natural gas prices. Chart G shows the natural gas price for each scenario for several years in the forecast period, as well as EIA's projection for reference.

CHART G

Natural Gas Price Forecasts @Henry Hub ($ per MMBTU)							
	2013	**2014**	**2015**	**2017**	**2020**	**2030**	**2035**
SCEG Baseline	$3.61	$4.01	$4.13	$4.39	$4.81	$6.51	$7.58
50% Higher Scenario	$5.41	$6.01	$6.20	$6.58	$7.21	$9.77	$11.37
100% Higher Scenario	$7.21	$8.02	$8.26	$8.78	$9.62	$13.02	$15.16
EIA 2012 Forecast	$4.24	$4.41	$4.62	$4.79	$5.39	$8.95	$11.67

The first combined cycle plant under the gas resource scenario would go on line in 2017. Under the 50% Higher Scenario for gas prices, the natural gas price would be about $6.58 per MMBTU in 2017, a price which is well within the historical range of natural gas prices. In 2035, the gas price shown in the 50% Higher Scenario is almost identical to the EIA forecast.

The 100% Higher Scenario for gas prices produces prices which reflect how the gas resource strategy will perform if current gas price forecasts underestimate future gas prices by a wide margin.

b. CO_2 Cost Scenarios - The CO_2 cost scenarios were $0, $15 and $30 per ton beginning in 2017 and escalating at 5%.

In light of current national environmental policies, CO_2 costs at $0 per ton are not a realistic expectation for the long term. However, the $0 per ton CO_2 scenario provides a useful lower bound to test the sensitivity of the study to this input.

CO_2 costs at $15 per ton are also unlikely. For CO_2 costs to be useful in limiting emissions, they must be set high enough to change behavior on a broad scale. Otherwise, CO_2 emitting parties will choose to pay the CO_2 cost as they would any other tax and continue to discharge CO_2 at current levels. A CO_2 cost of $15 per ton appears to be too low to change behavior on a broad enough scale for such a charge to meet its goals of reducing emissions in a meaningful or comprehensive way. The $15 per ton scenario is modeled here only because it was modeled in the 2008 Study and formed a basis for Dr. Cooper's calculation based on that study.

SCE&G believes that a $30 per ton CO_2 cost is the lowest reasonable CO_2 cost that should be considered in this context. In the exhibits to his testimony, Dr. Cooper reproduces charts indicating a $40 per ton CO_2 cost to be a reasonable assumption as to the future level of such a cost.

For a CO_2 charge to result in progressive decline in CO_2 discharges, it must rise at a regular and meaningful rate. CO_2 legislation proposed before the recent recession included escalation rates applicable to the charge imposed in the range of 5%. Escalation at that rate would serve the purpose of ratcheting up the costs of CO_2 emissions and progressively discouraging them. CO_2 costs are not effective unless they accomplish this result. For that reason, the study assumes that CO_2 costs escalate at that rate after they are imposed.

c. **Load Forecasts Scenarios** - Three scenarios representing variations of the base case load forecast scenarios were modeled. They included the base case forecast and load forecast scenarios where the load was 5% higher and 5% lower than the base case. These higher and lower load scenarios were modeled to test the sensitivity of the analysis to variability in load due to factors such as increased economic activity or increased rates of energy conservation The 5% plus or minus load scenarios provide for a reasonable assessment of possible variation in load on the system.

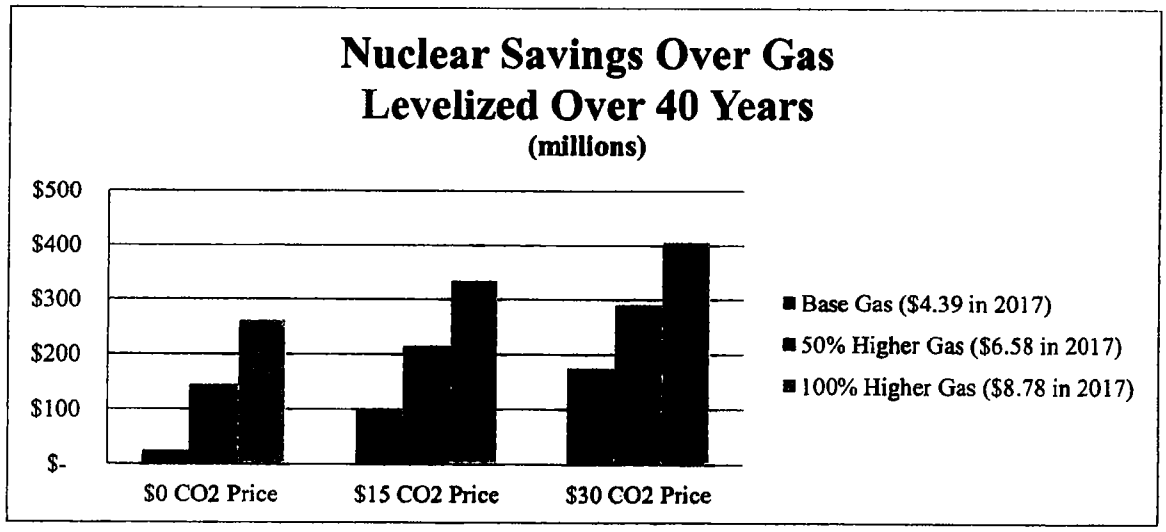
Dispatch Modeling

For each of the 54 combinations of 27 scenarios and 2 generation strategies, a simulation of the generation system dispatch was run using the PROSYM dispatch model. The PROSYM model is licensed from Ventyx and is widely used in the utility industry. This model determined how each generation resource on the system would be dispatched under each scenario over the 40 year planning horizon. Modeling the dispatch of the system using the PROSYM model produced both fuel cost and variable O&M costs for each scenario for each of the 40 years of the planning period. These fuel costs and variable O&M costs generated by the PROSYM model were then combined with the capital costs and other fixed costs for each scenario to determine a levelized annual cost for each of the 27 scenarios over the 40 year planning horizon.

Scenario Results

The results of the modeling are set forth below in Chart H. This chart shows the savings from continuing to construct the Units based on three sets of assumptions as to future gas prices, and based on CO_2 costs of $0, $15 and $30 evaluated against SCE&G's base case scenario for future load. SCE&G believes that the most reasonable scenario for planning purposes is the scenario that models a $30 CO_2 cost and gas prices that are 50% higher than the current SCE&G gas forecast, which is lower than the EIA forecast. That analysis shows that the nuclear strategy is less costly than gas by a levelized amount of $290 million per year for 40 years.

CHART H



The numerical results of the scenarios shown in Chart H are set forth in Chart I below:

CHART I
Base Load Scenario

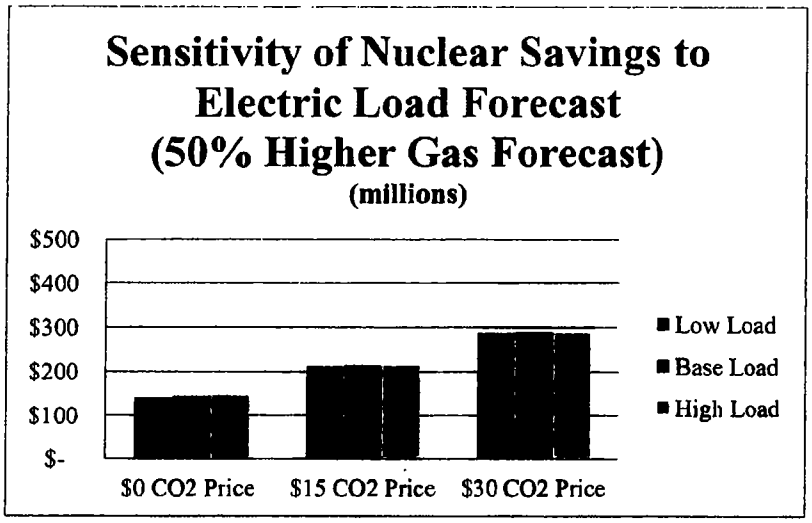
Benefit of Nuclear Strategy over the Gas Strategy Levelized Present Worth of Change in Revenue Requirements Over 40 Years ($MM)			
	Base Gas	50% Higher Gas	100% Higher Gas
$0 CO2 Price	$26	$144	$262
$15 CO2 Price	$102	$215	$335
$30 CO2 Price	$175	$290	$407

This Chart highlights several critical points. First, completing the nuclear construction program is more economical than switching to a gas resource strategy across all scenarios modeled. In not one case is gas less costly than nuclear. The lowest level of nuclear advantage is a levelized annual advantage of approximately $26 million. This occurs using base gas price assumptions and CO_2 prices at $0 per ton. In the 2008 Studies, the $0 per ton CO_2 scenario with low gas prices resulted in nuclear being more costly than gas by $44 million.

In this series of scenarios, the nuclear strategy had the highest cost advantage over gas in the 100% Higher Gas scenario with a $30 per ton CO_2 price. In that scenario, the nuclear strategy was more cost effective than the gas resource strategy by a levelized amount of $407 million per year. As mentioned above, the scenario with the set of assumptions that SCE&G believes to be most reasonable for planning purposes is 50% higher gas prices with $30 per ton CO_2 where nuclear has a cost advantage over gas of $290 million per year.

Studies were run at different assumptions as to future levels of system load to determine whether the studies' results were sensitive to changes in future electric load forecasts. Chart J shows results calculated using the base load forecast side by side with result calculated using load forecasts that have been increased by 5% and decreased by 5%. The chart shows very little variability in results based on changes in the load forecast.

CHART J



The scenario results reported on Chart J are for the 50% Higher Gas scenario. The Base Gas and 100% Higher Gas scenarios were modeled in the same way. The resulting charts are attached as Appendix 3 and the underlying data is attached as Appendix 4. They show a similar alignment of results. Collectively, these charts show that the cost advantage of the nuclear strategy over the natural gas resource strategy is consistent whether electric loads are greater or less than anticipated in the future.

There are several other inferences that can be drawn from these results of testing the nuclear and the gas resource strategies across these 27 scenarios. First, the advantage that the nuclear strategy has over the gas strategy is not dependent on load growth forecasts. Forecasts for load growth are currently very low. But even if the current load growth projections turn out to be high because of DSM, energy efficiency or distributed or alternative generation, the nuclear advantage is not materially reduced.

Second, the study shows that the comparative economics of the nuclear and natural gas resource strategies swing widely based on gas price forecasts and future CO_2 cost assumptions. This shows that the economics of the gas resource strategy are very sensitive to swings in natural gas prices and CO_2 costs. This confirms that a resource strategy dependent of natural gas generation significantly increases SCE&G's exposure to fossil-fuel volatility and environmental cost increases.

Conclusion

The results of this study demonstrate the analysis that Dr. Lynch presented to the Commission in his rebuttal testimony in Docket No. 2012-203-E was entirely correct. A full system dispatch model, run over a 40 year planning cycle, and using updated information on relevant parameters shows that the forecasts of reduced future natural gas prices identified by Dr. Cooper are more than fully offset by the reduced cost to complete the Units and other factors. The most reasonable estimate of the cost advantage of completing the Units is $290 million per

year for 40 years. This study confirms that the nuclear strategy remains the strategy best able to provide favorable results over a broad range of future operating conditions.

SCE&G Forecast of Summer Loads and Resources - 2012 IRP (Reference Scenario)

	YEAR	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Load Forecast																
1	Baseline Trend	4989	5030	5156	5268	5411	5531	5624	5725	5842	5946	6058	6177	6299	6419	6540
2	EE Impact	-21	-37	-79	-111	-144	-177	-211	-247	-288	-334	-365	-400	-437	-476	-518
3	Gross Territorial Peak	4968	4993	5077	5157	5267	5354	5413	5478	5554	5612	5693	5777	5862	5943	6022
4	Demand Response	-218	-221	-225	-228	-232	-235	-237	-239	-241	-244	-246	-248	-250	-252	-254
5	Net Territorial Peak	4750	4772	4852	4929	5035	5119	5176	5239	5313	5368	5447	5529	5612	5691	5768
6	Firm Contract Sales	250														
7	Total Firm Obligation	5000	4772	4852	4929	5035	5119	5176	5239	5313	5368	5447	5529	5612	5691	5768
System Capacity																
8	Existing	5689	5689	5599	5599	5599	5599	5918	6187	6187	6187	6187	6280	6373	6466	6559
	Additions															
9	Peaking/Intermediate											93	93	93	93	93
10	Baseload						614	614								
11	Other		-90				-295	-345								
12	Total System Capacity	5689	5599	5599	5599	5599	5918	6187	6187	6187	6187	6280	6373	6466	6559	6652
13	Firm Annual Purchase				25	150										
14	Total Production Capability	5689	5599	5599	5624	5749	5918	6187	6187	6187	6187	6280	6373	6466	6559	6652
Reserves																
15	Margin (L14-L7)	689	827	747	695	714	799	1011	948	874	819	833	844	854	868	884
16	% Reserve Margin (L15/L7)	13.8%	17.3%	15.4%	14.1%	14.2%	15.6%	19.5%	18.1%	16.5%	15.3%	15.3%	15.3%	15.2%	15.3%	15.3%
17	% NERC Res.Mrgn L15/(L7-L4)	13.2%	16.6%	14.7%	13.5%	13.6%	14.9%	18.7%	17.3%	15.7%	14.6%	14.6%	14.6%	14.6%	14.6%	14.7%

Note: L17 shows the reserve margin calculated according to NERC's new definition. See the following link for details:
http://www.nerc.com/docs/pc/ris/RIS_Report_on_Reserve_Margin_Treatment_of_CCDR_%2006.01.10.pdf

Exhibit 1

RESTATED and UPDATED CONSTRUCTION EXPENDITURES
(Thousands of $)

V.C. Summer Units 2 and 3 - Summary of SCE&G Capital Cost Components

Actual through March 2012* plus Projected

Plant Cost Categories	Total	Actual 2007	2008	2009	2010	2011	Projected 2012	2013	2014	2015	2016	2017	2018
Fixed with No Adjustment													
Firm with Fixed Adjustment A													
Firm with Fixed Adjustment B													
Firm with Indexed Adjustment													
Actual Craft Wages													
Non-Labor Costs													
Time & Materials													
Owners Costs													
Transmission Costs	329,519	-	26	724	937	11,884	57,205	56,903	57,508	77,900	84,727	1,537	-
Total Base Project Costs(2007 $)	4,553,355	21,723	97,366	319,079	374,510	314,077	816,173	782,338	790,879	948,780	380,637	142,099	66,761
Total Project Escalation	976,829	-	5,510	20,930	23,741	54,084	99,789	169,985	215,846	184,800	134,815	59,408	24,729
Total Revised Project Cash Flow	5,530,184	21,723	102,905	340,009	398,551	349,061	713,981	952,204	1,006,727	933,579	621,351	201,506	91,510
Cumulative Project Cash Flow(Revised)		21,723	122,628	462,632	861,183	1,210,244	1,924,205	2,876,409	3,886,136	4,719,715	5,341,066	5,442,474	5,533,984
AFUDC(Capitalized Interest)	237,926	645	3,497	10,864	17,150	16,218	20,452	38,446	42,934	40,856	27,518	18,291	8,644
Gross Construction	5,761,910	22,368	104,403	350,567	415,701	365,278	734,424	990,649	1,052,861	974,537	648,870	219,798	97,834
Construction Work in Progress		22,368	126,771	477,338	893,039	1,258,317	1,999,741	2,991,380	4,034,851	4,998,588	5,657,458	5,874,257	5,769,990

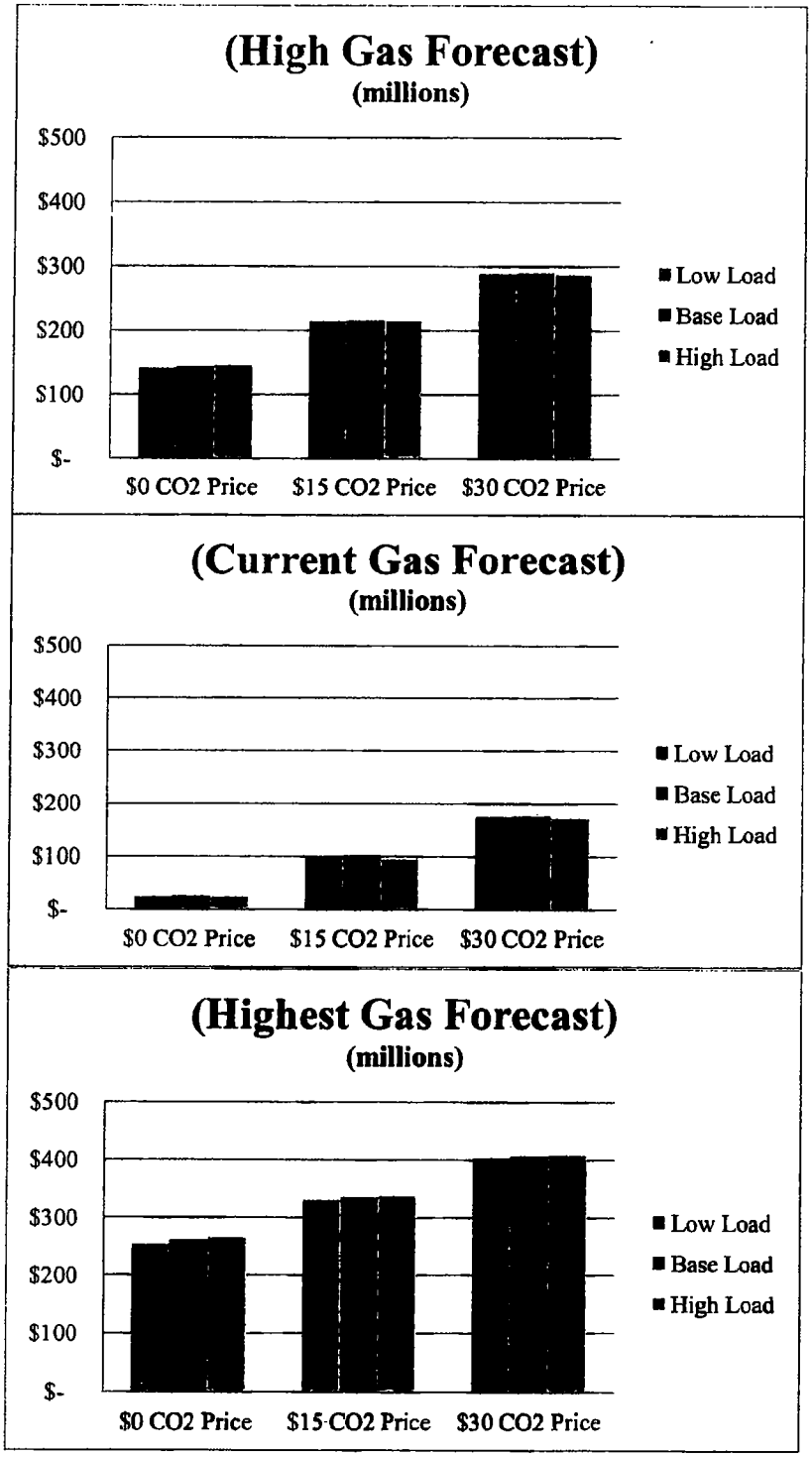
CONFIDENTIAL

*Applicable index escalation rates for 2012 are estimated. Escalation is subject to reassessment when actual indices for 2012 are final.

Note:
Current Period AFUDC rate applied [redacted]

Escalation rates vary from reporting period to reporting period according to the terms of Commission Order 2009-104(A).
These projections reflect current escalation rates. Future changes in escalation rates could substantially change these projections.
The AFUDC rate applied is the current SCE&G rate. AFUDC rates can vary with changes in capital interest rates,
SCE&G's embedded cost of capital, capitalization ratios, construction work in process, and SCE&G's short-term debt outstanding.

Sensitivity of Nuclear Savings to Electric Load Forecast



Benefit of Nuclear Strategy over the Gas Strategy Levelized Present Worth of Change in Revenue Requirements Over 40 Years

($MM)

Base Load Scenario

	Base Gas	50% Higher Gas	100% Higher Gas
$0 CO2 Price	$26	$144	$262
$15 CO2 Price	$102	$215	$335
$30 CO2 Price	$175	$290	$407

High Load Scenario

	Base Gas	50% Higher Gas	100% Higher Gas
$0 CO2 Price	$25	$146	$267
$15 CO2 Price	$97	$215	$338
$30 CO2 Price	$172	$288	$409

Low Load Scenario

	Base Gas	50% Higher Gas	100% Higher Gas
$0 CO2 Price	$25	$142	$254
$15 CO2 Price	$101	$214	$331
$30 CO2 Price	$175	$289	$404

EXHIBIT 10

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

EXHIBIT MNC-1

CV OF MARK COOPER

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City College of New York, B.A., 1968, English

PROFESSIONAL EXPERIENCE:

President, Citizens Research, 1983 - present

Research Director, Consumer Federation of America, 1983-present

Associated Fellow, Columbia Institute on Tele-Information, 2003-present

Fellow, Donald McGannon Communications Research Center, Fordham University, 2005-present

Senior Fellow for Economic Analysis, Institute for Energy and the Environment, Vermont Law School, 2009-present

Fellow, Stanford Center on Internet and Society, 2000-2010

Fellow, Silicon Flatirons, University of Colorado, 2009-present

Principle Investigator, Consumer Energy Council of America, Electricity Forum, 1985-1994

Director of Energy, Consumer Federation of America, 1984-1986

Director of Research, Consumer Energy Council of America, 1980-1983

Consultant, Office of Policy Planning and Evaluation, Food and Nutrition Service, United States Department of Agriculture, 1981-1984

Consultant, Advanced Technology, Inc., 1981

Technical Manager, Economic Analysis and Social Experimentation Division, Applied Management Sciences, 1979

Research Associate, American Research Center in Egypt, 1976-1977

Research Fellow, American University in Cairo, 1976

Staff Associate, Checchi and Company, Washington, D.C., 1974-1976

Consultant, Division of Architectural Research, National Bureau of Standards, 1974

Consultant, Voice of America, 1974

Research Assistant, University of Maryland, 1972-1974

TEACHING EXPERIENCE:

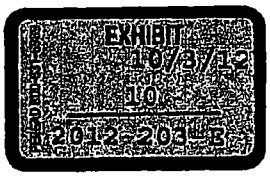
Lecturer, Washington College of Law, American University, Spring, 1984 - 1986, Seminar in Public Utility Regulation

Guest Lecturer, University of Maryland, 1981-82, Energy and the Consumer, American University, 1982, Energy Policy Analysis

Assistant Professor, Northeastern University, Department of Sociology, 1978-1979, Sociology of Business and Industry, Political Economy of Underdevelopment, Introductory Sociology, Contemporary Sociological Theory; College of Business Administration, 1979, Business and Society

Assistant Instructor, Yale University, Department of Sociology, 1977, Class, Status and Power

Teaching Assistant, Yale University, Department of Sociology, 1975-1976, Methods of Sociological Research, The Individual and Society



Instructor, University of Maryland, Department of Sociology, 1974, Social Change and Modernization, Ethnic Minorities
Instructor, U.S. Army Interrogator/Linguist Training School, Fort Hood, Texas, 1970-1971

PROFESSIONAL ACTIVITIES:

Member, Advisory Committee on Appliance Efficiency Standards, U.S. Department of Energy, 1996 - 1998

Member, Energy Conservation Advisory Panel, Office of Technology Assessment, 1990-1991

Fellow, Council on Economic Regulation, 1989-1990

Member, Increased Competition in the Electric Power Industry Advisory Panel, Office of Technology Assessment, 1989

Participant, National Regulatory Conference, The Duty to Serve in a Changing Regulatory Environment, William and Mary, May 26, 1988

Member, Subcommittee on Finance, Tennessee Valley Authority Advisory Panel of the Southern States Energy Board, 1986-1987

Member, Electric Utility Generation Technology Advisory Panel, Office of Technology Assessment, 1984 - 1985

Member, Natural Gas Availability Advisor Panel, Office of Technology Assessment, 1983-1984

Participant, Workshop on Energy and the Consumer, University of Virginia, November 1983

Participant, Workshop on Unconventional Natural Gas, Office of Technology Assessment, July 1983

Participant, Seminar on Alaskan Oil Exports, Congressional Research Service, June 1983

Member, Thermal Insulation Subcommittee, National Institute of Building Sciences, 1981-1982

Round Table Discussion Leader, The Energy Situation: An Open Field For Sociological Analysis, 51st Annual Meeting of the Eastern Sociological Society, New York, March, 1981

Member, Building Energy Performance Standards Project Committee, Implementation Regulations Subcommittee, National Institute of Building Sciences, 1980-1981

Participant, Summer Study on Energy Efficient Buildings, American Council for an Energy Efficient Economy, August 1980

Member, University Committee on International Student Policy, Northeastern University, 1978-1979

Chairman, Session on Dissent and Societal Reaction, 45th Annual Meeting of the Eastern Sociological Society, April, 1975

Member, Papers Committee, 45th Annual Meeting of the Eastern Sociological Society, 1975

Student Representative, Programs, Curricula and Courses Committee, Division of Behavioral and Social Sciences, University of Maryland, 1973-1974

President, Graduate Student Organization, Department of Sociology, University of Maryland, 1973-1974

HONORS AND AWARDS:

Ester Peterson Award for Consumer Service, 2010

American Sociological Association, Travel Grant, Uppsala, Sweden, 1978

Fulbright-Hayes Doctoral Research Abroad Fellowship, Egypt, 1976-1977

Council on West European Studies Fellowship, University of Grenoble, France, 1975

Yale University Fellowship, 1974-1978

Alpha Kappa Delta, Sociological Honorary Society, 1973

Phi Delta Kappa, International Honorary Society, 1973

Graduate Student Paper Award, District of Columbia Sociological Society, 1973

Science Fiction Short Story Award, University of Maryland, 1973

Maxwell D. Taylor Award for Academic Excellence, Arabic, United States Defense Language Institute, 1971

Theodore Goodman Memorial Award for Creative Writing, City College of New York, 1968

New York State Regents Scholarship, 1963-1968

National Merit Scholarship, Honorable Mention, 1963

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"Regulators Should Regain Control to Prevent Abuses During Scarcity," Natural Gas, August 2003

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"Let's Go Back," Public Power, November-December 2002

"Conceptualizing and Measuring the Burden of High Energy Prices," in Hans Landsberg (Ed.), High Energy Costs: Assessing the Burden (Washington, D.C.: Resources For the Future, 1982)

"Energy Efficiency Investments in Single Family Residences: A Conceptualization of Market Inhibitors," in Jeffrey Harris and Jack Hollander (Eds.), *Improving Energy Efficiency in Buildings: Progress and Problems* (American Council for An Energy Efficient Economy, 1982)

"Policy Packaging for Energy Conservation: Creating and Assessing Policy Packages," in Jeffrey Harris and Jack Hollander (Eds.), *Improving Energy Efficiency in Buildings: Progress and Problems* (American Council for An Energy Efficient Economy, 1982)

"The Role of Consumer Assurance in the Adoption of Solar Technologies," *International Conference on Consumer Behavior and Energy Policy,* August, 1982

"Energy and the Poor," *Third International Forum on the Human Side of Energy,* August, 1982

"Energy Price Policy and the Elderly," *Annual Conference, National Council on the Aging,* April, 1982

"Energy and Jobs: The Conservation Path to Fuller Employment," *Conference on Energy and Jobs conducted by the Industrial Union Department of the AFL-CIO*, May 1980

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Summary of Market Inhibitors, February 1981

Program Models and Program Management Procedures for the Department of Energy's Solar Consumer Assurance Network Project: A Rapid Feedback Evaluation, February 1981

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Energy Conservation in New Buildings: A Critique and Alternative Approach to the Department of Energy's Building Energy Performance Standards, April, 1980

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"When Counting Counts: Marrying Advocacy and Academics in the Media Ownership Research Wars at the FCC," forthcoming in Lynn M. Harter, Mohan J. Dutta, and Courtney Cole, Eds., *Communicating for Social Impact: Engaging Communication Theory, Research, and Pedagogy,* Hampton Press.

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Open Architecture as Communications Policy (Stanford Law School, Center for Internet and Society: 2004)

Media Ownership and Democracy in the Digital Information Age: Promoting Diversity with First Amendment Principles and Rigorous Market Structure Analysis (Stanford Law School, Center for Internet and Society: 2003)

Cable Mergers and Monopolies: Market Power In Digital Media and Communications Networks (Washington, D.C.: Economic Policy Institute, 2002)

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"The Importance of Open Networks in Sustaining the Digital Revolution," in Thomas M. Lenard and Randolph J. May (Eds.) *Net Neutrality or Net Neutering* (New York, Springer, 2006)

"Reclaiming The First Amendment: Legal, Factual And Analytic Support For Limits On Media Ownership," Robert McChesney and Benn Scott (Eds), *The Future of Media* (Seven Stories Press, 2005)

"Building A Progressive Media And Communications Sector," Elliot Cohen (Ed.), News Incorporated: Corporate Media Ownership And Its Threat To Democracy (Prometheus Books, 2005)

"Hyper-Commercialism In The Media: The Threat To Journalism And Democratic Discourse," Snyder-Gasher-Compton-(Eds), *Converging Media, Diverging Politics: A Political Economy Of News In The United States And Canada* (Lexington Books, 2005)

"The Digital Divide Confronts the Telecommunications Act of 1996: Economic Reality versus Public Policy," in Benjamin M. Compaine (Ed.), *The Digital Divide: Facing a Crisis or Creating a Myth?* (Cambridge: MIT Press, 2001)

Articles and Papers:

"Structured Viral Communications: The Political Economy and Social Organization of Digital Disintermediation," *Journal on Telecommunications and High Technology Law*, 9 (2011)

"The Central Role of Wireless in the 21st Century Communications Ecology: Adapting Spectrum and Universal Service Policy to the New Reality," *Telecommunications Policy Research Conference*, September 2011

"Round #1 in the Digital Intellectual Property Wars: Economic Fundamentals, Not Piracy, Explain How Consumers and Artists Won in the Music Sector," Telecommunications Policy Research Conference, September 2008.

"When The Market Does Not Reign Supreme: Localism And Diversity In U.S. Media Policy," *International Communications Association*, forthcoming, May 2008

"Minority Programming: Still at The Back of the Bus," *International Communications Association*, forthcoming, May 2008, with Adam Lynn

"Traditional Content Is Still King as the Source of Local News and Information," *International Communications Association*, forthcoming, May 2008

"Junk Science And Administrative Abuse In The Effort Of The FCC To Eliminate Limits On Media Concentration," *International Communications Association*, forthcoming, May 2008.

"Contentless Content Analysis: Flaws In The Methodology For Analyzing The Relationship Between Media Bias And Media Ownership," forthcoming, *International Communications Association*, May 2008.

"Network Neutrality," *Toll Roads? The Legal and Political Debate Over Network Neutrality*, University of San Francisco Law School, January 26, 2008

"The Lack of Racial and Gender Diversity in Broadcast Ownership and The Effects of FCC Policy: An Empirical Analysis," *Telecommunications Research Policy Conference*, September 2007, with Derek Turner

"New Media and Localism: Are Local Cable Channels and Locally Focused Websites Significant New and Diverse Sources of Local News and Information? An Empirical Analysis," *Telecommunications Research Policy Conference*, September 2007, with Adam Lynn

"A Case Study of Why Local Reporting Matters: Photojournalism Framing of the Response to Hurricane Katrina in Local and National Newspapers," *International Communications Association*, May 2007.

"Will the FCC Let Local Media Rise from the Ashes of Conglomerate Failure," *International Communications Association*, May 2007.

"The Failure of Federal Authorities to Protect American Energy Consumers From Market Power and Other Abusive Practices," *Loyola Consumer Law Review*, 19:4 (2007)

"The Central Role of Network Neutrality in the Internet Revolution," *Public Interest Advocacy Center*, Ottawa Canada, November 24, 2006

"Governing the Spectrum Commons," September 2006. *Telecommunications Policy Research Conference*, October 2006

"Accessing the Knowledge Commons in the Digital Information Age," *Consumer Policy Review*, May/June 2006

"Independent, Non-Commercial Video," *Beyond Broadcast*, Berkman Center, Harvard University, May 12, 2006

"Defining Appropriation Right in the Knowledge Commons of the Digital Information Age: Rebalancing the Role of Private Incentives and Public Circulation in Granting Intellectual Monopoly Privileges," *Legal Battle Over Fair Use, Copyright, and Intellectual Property*, March 25, 2006

"The Economics of Collaborative Production: A Framework for Analyzing the Emerging Mode of Digital Production," *The Economics of Open Content: A Commercial Noncommercial Forum*, MIT January 23, 2006

"From Wifi to Wikis and Open Source: The Political Economy of Collaborative Production in the Digital Information Age," *Journal on Telecommunications and High Technology Law*, 5:1, 2006

"Information is a Public Good," *Extending the Information Society to All: Enabling Environments, Investment and Innovation, World Summit on the Information Society*, Tunis, November 2005

"The Importance of Collateral Communications and Deliberative Discourse in Building Internet-Based Media Reform Movements," *Online Deliberation: Design, Research and Practice/ DIAC*, November, 2005

"Collaborative Production in Group-Forming Networks: The 21st Century Mode of Information Production and the Telecommunications Policies Necessary to Promote It," *The State of Telecom: Taking Stock and Looking Ahead*, Columbia Institute on Tele-Information, October 2005

"The Economics of Collaborative Production in the Spectrum Commons," *IEEE Symposium on New Frontiers in Dynamic Spectrum Access Networks*, November 2005

"Independent Noncommercial Television: Technological, Economic and Social Bases of A New Model of Video Production," *Telecommunications Policy Research Conference*, October 2005

"Spectrum as Speech in the 21st Century," *The Public Airwaves as a Common Asset and a Public Good: Implications for the Future of Broadcasting and Community Development in the U.S.*, Ford foundation, March 11, 2005

"When Law and Social Science Go Hand in Glove: Usage and Importance of Local and National News Sources, Critical Questions and Answers for Media Market Analysis, Telecommunications Policy Research Conference, October 2004

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"On Behalf of the Universal Service Alliance, in the Matter of the Application of New York Telephone Company for Changes in it Rates, Rules, and Regulations for Telephone Service, State of New York Public Service Commission, Case No. 28961, April 1, 1985

"On Behalf of North Carolina Legal Services, in the Matter of Application of Continental Telephone Company of North Carolina for an Adjustment of its Rates and Charges, Before the North Carolina Utilities Commission, Docket No. P-128, Sub 7, February 20, 1985

"On Behalf of the Consumer Advocate in re: Application of Southern Bell Telephone and Telegraph Company for Approval Increases in Certain of Its Intrastate Rates and Charges," Before the South Carolina Public Service Commission, Docket No. 84-308-c, October 25, 1984

"On Behalf of the Office of the Consumers' Counsel in the Matter of the Commission Investigation into the Implementation of Lifeline Telephone Service by Local Exchange Companies," Before the Public Utilities Commission of Ohio, Case No. 84-734-TP-COI, September 10, 1984

"On Behalf of North Carolina Legal Services Resource Center in the Matter of Application Southern Bell Telephone and Telegraph Company for an Adjustment in its Rates and Charges Applicable to Intra-state Telephone Service in North Carolina," Before the North Carolina Utilities Commission, Docket No. P-55, Sub 834, September 4, 1984

"On Behalf of Mississippi Legal Services Coalition in the Matter of the Citation to Show Cause Why the Mississippi Power and Light Company and Middle South Energy Should not Adhere to the Representation Relied Upon by the Mississippi Public Service Commission in Determining the Need and Economic Justification for Additional Generating Capacity in the Form of A Reheating on Certification of the Grand Gulf Nuclear Project," Before the Mississippi Public Service Commission, Docket No. U-4387, August 13, 1984

"On Behalf of the Mississippi Legal Services Corporation Re: Notice of Intent to Change Rates of South Central Bell Telephone Company for Its Intrastate Telephone Service in Mississippi Effective January 1, 1984," before the Mississippi Public Service Commission, Docket No. U-4415, January 24, 1984

"The Impact of Rising Energy Prices on the Low Income Population of the Nation, the South, and the Gulf Coast Region," before the Mississippi Public Service Commission, Docket No. U4224, November 1982

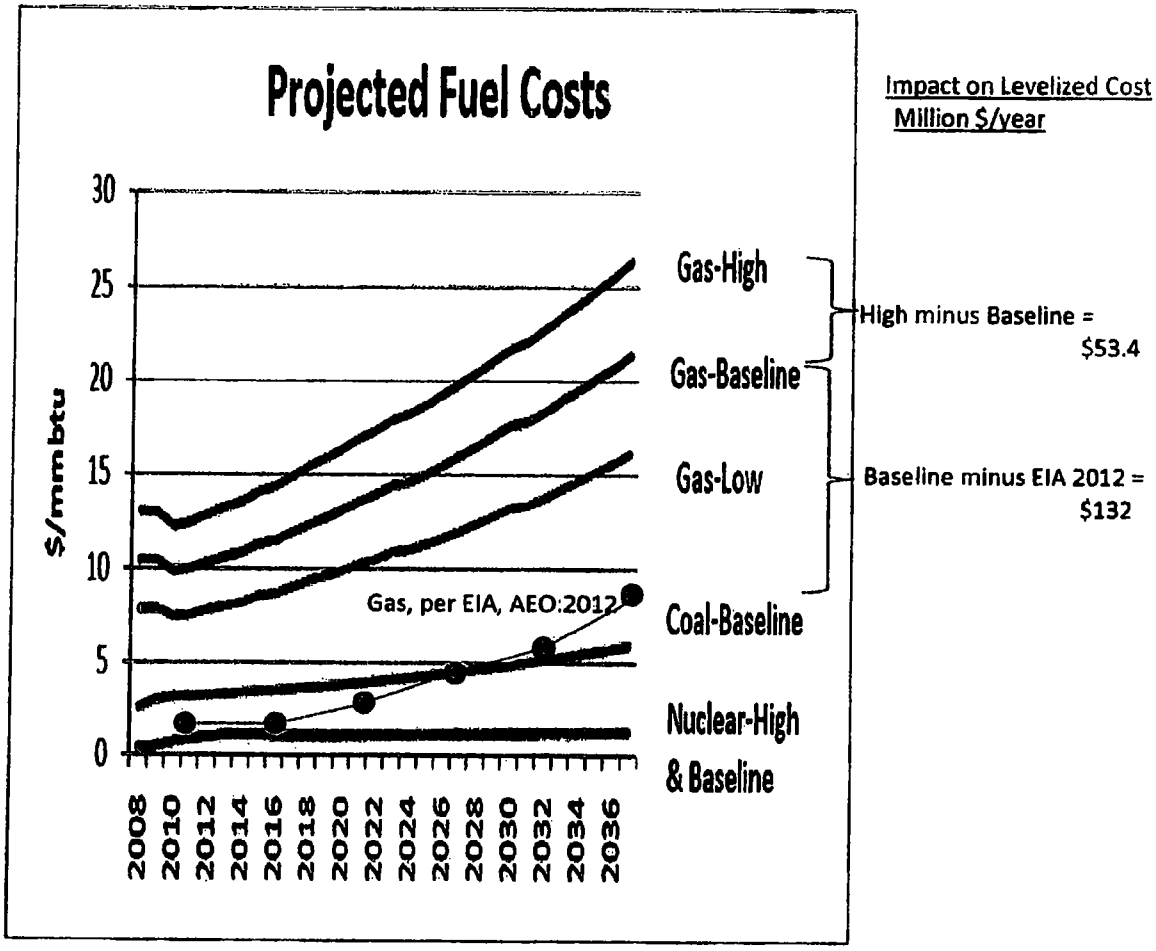
"In the Matter of the Joint Investigation of the Public Service Commission and the Maryland Energy Office of the Implementation by Public Utility Companies Serving Maryland Residents of the Residential Conservation Service Plan," before the Public Service Commission of the State of Maryland, October 12, 1982

"The Impact of Rising Utility Rates on he Budgets of Low Income Households in the Region of the United States Served by the Mississippi Power Company and South Central Bell Telephone Company," before the Chancery Court of Forrest County, Mississippi, October 6, 1982

"The Impact of Rising Energy Prices on the Low Income Population of the Nation, the South and the Gulf Coast Region," before the Mississippi Public Service Commission, Docket No. U-4190, August 1982

EXHIBIT MNC-2

2008 NATURAL GAS COST ASSUMPTIONS COMPARED TO CURRENT, EIA COST PROJECTIONS

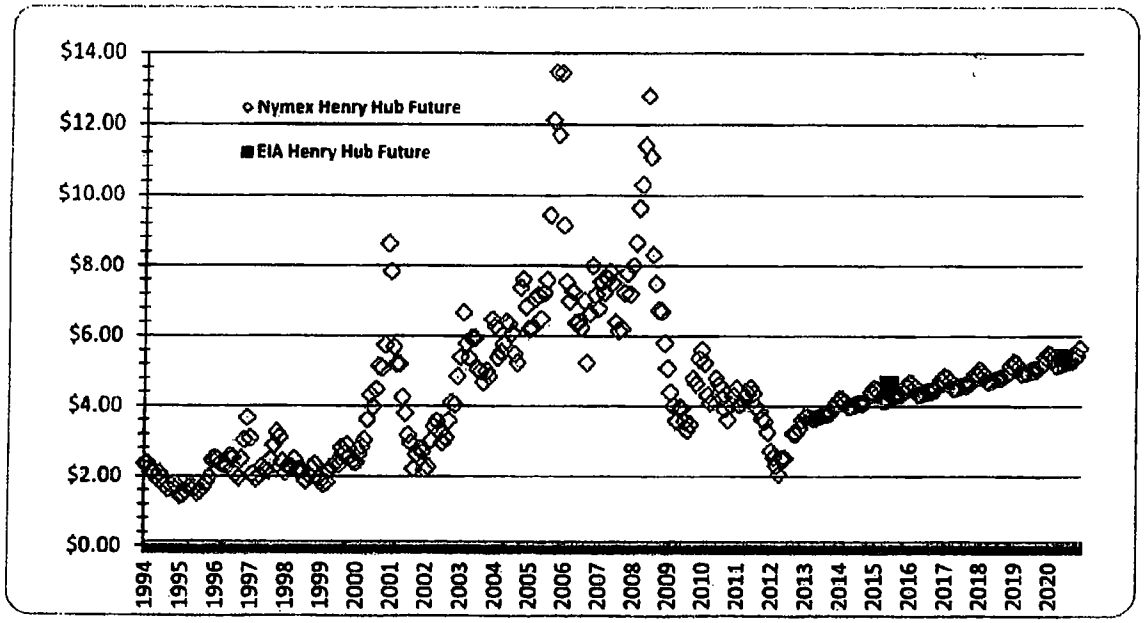


Notes:
Baseline 2008: Average gas price is $16.40; 25% higher - $4.10, $4.10 = $53.4 million/year levelized.
Levelized cost decrease per $1/mmbtu difference = ($53.4/$4.10) =13.0244

EIA 2012: Average gas price is $6.27; $10.13 lower, Levelized cost reduction = ($10.13 * 13.024) = $131.9

Sources: Source: Exhibit H (Lynch, 2008, Exhibit JML-2), pp. 9-10; Energy Information Administration, Annual Energy Outlook, 2012, Table A1-p. 132.

2008 EIA NATURAL GAS COST ASSUMPTIONS COMPARED TO NYMEX FUTURES



Source: Exhibit H (Exhibit JML-2), pp. 9-10; Energy Information Administration, Natural Gas Spot and Future Prices, Contract 1; Prices, Annual Energy Outlook, 2012, Table A1-p. 132. CME, NyMex, Natural Gas Henry Hub, visited 8-1-2012.

Exhibit MNC-4

The 2008 Net Cost Comparison of the Nuclear and Gas Options

Change in Levelized Rev. Req.: Gas Strategy Minus Nuclear Strategy
Positive Entries Represent Nuclear Advantage in Millions of Dollars

CO_2 Price / Escalation	$0	$5	$10	$15	$20	$25	$30	$35	$40	$45	$50
0%	-87	-75	-63	-51	-40	-28	-16	-5	7	19	31
2%	-87	-71	-55	-39	-23	-7	9	25	41	57	73
4%	-87	-64	-42	-20	2	24	47	69	91	113	135
5%	-87	-60	-34	-7	19	45	72	98	124	151	177
6%	-87	-55	-24	8	39	71	102	134	165	197	228
8%	-87	-41	5	50	96	141	187	233	278	324	369
10%	-87	-19	48	116	183	250	318	385	453	520	587

Source: Exhibit H (Lynch, 2008, Exhibit JML-2), p. 11.

2008 Base Case

CURRENT GAS PRICES DRAMATICALLY ALTER THE DISTRIBUTION OF OUTCOMES

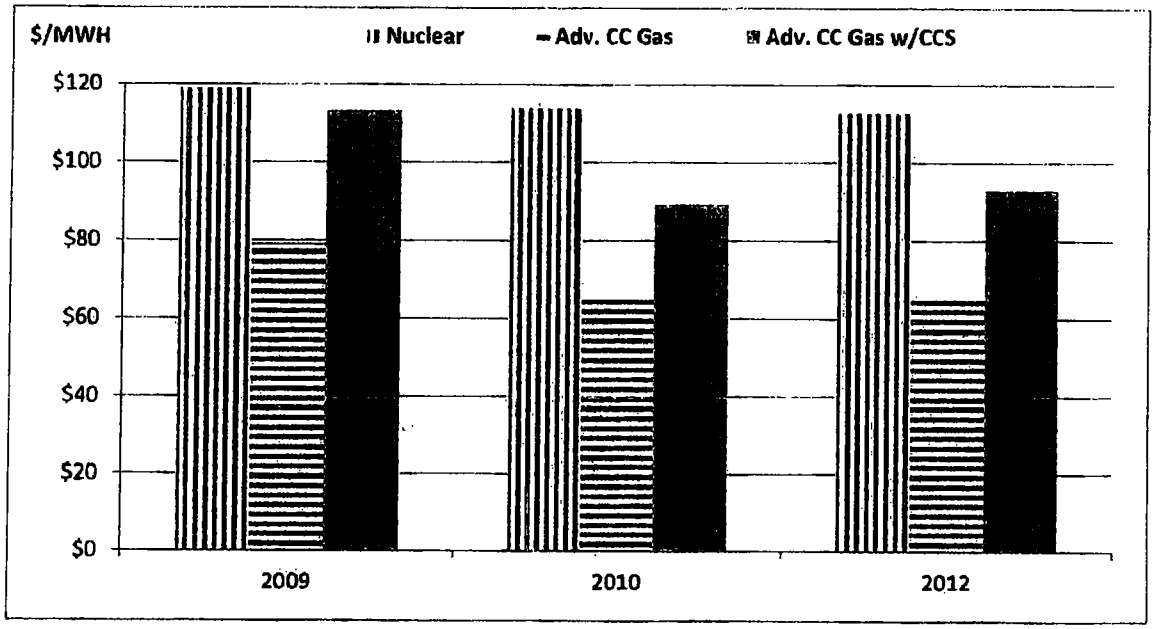
Change in Levelized Rev. Req.: Gas Strategy Minus Nuclear Strategy
Positive Entries Represent Nuclear Advantage in Millions of Dollars

CO_2 Price / Escalation	$0	$5	$10	$15	$20	$25	$30	$35	$40	$45	$50
0%	-87	-75	-63	-51	-40	-28	-16	-5	7	19	31
2%	-87	-71	-55	-39	-23	-7	9	25	41	57	73
4%	-87	-64	-42	-20	2	24	47	69	91	113	135
5%	-87	-60	-34	-7	19	45	72	98	124	151	177
6%	-87	-55	-24	8	39	71	102	134	165	197	228
8%	-87	-41	5	50	96	141	187	233	278	324	369
10%	-87	-19	48	116	183	250	318	385	453	520	587

Source: Exhibit H (Lynch, 2008, Exhibit JML-2), p. 11.

Exhibit MNC-6

EIA Estimates of Levelized Cost of Generation Resources in Annual Energy Outlook



Value of cost difference at 90% capacity factor and 40 year reactor life (Billions):

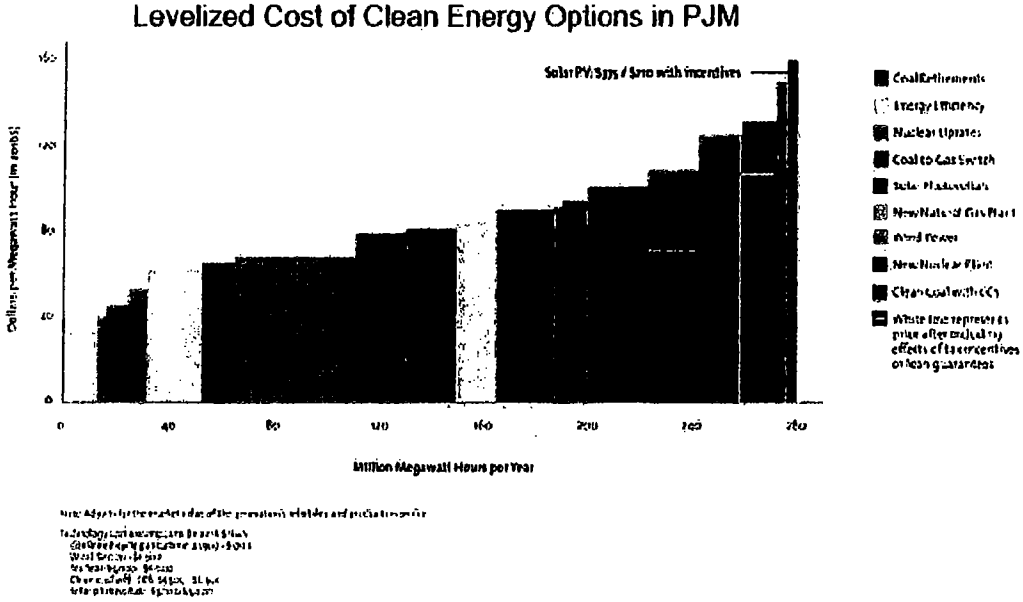
	Nuclear vs. Advanced Combined Cycle Gas	
	No Carbon Capture	With Carbon Capture
2009	$15.4	$2.2
2010	$19.7	$9.5
2012	$18.3	$8.0

Source: Energy Information Administration, *Levelized Cost of New Generation Resources,* various years.

PJM Generation Resource Cost Curve

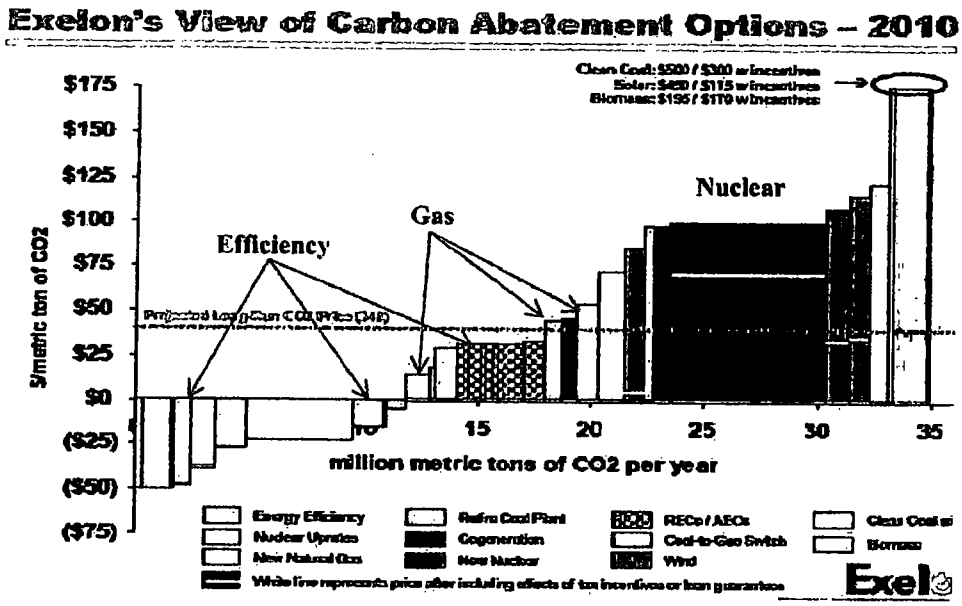
There are Cheap Ways and Costly Ways to Clean the Generation Fleet

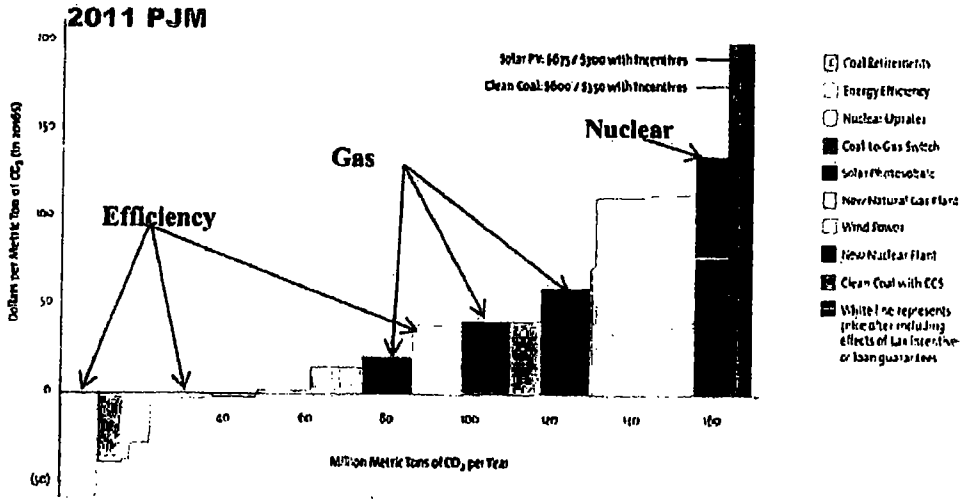
5



Source: John Rowe, *Energy Policy: Above All, Do No Harm,* American Enterprise Institute, March 8, 2011

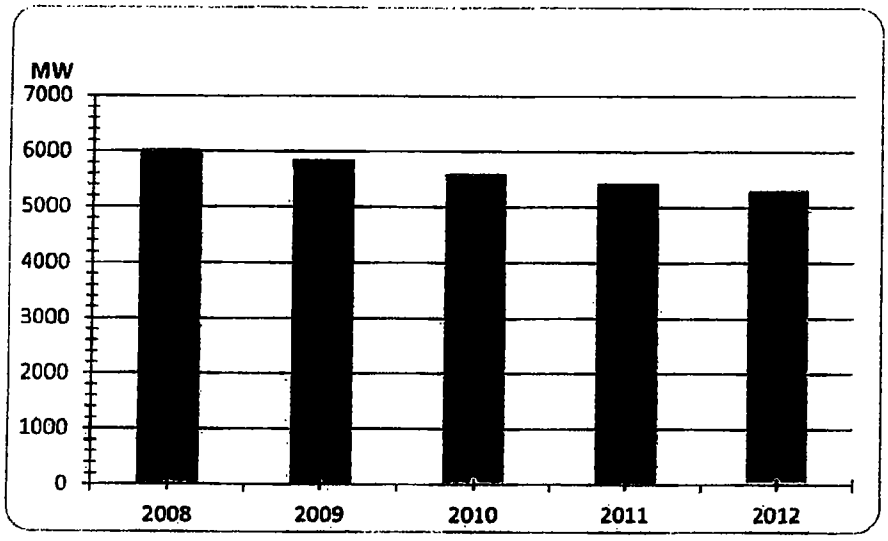
Evaluating Options in terms of the Cost of Carbon Reductions





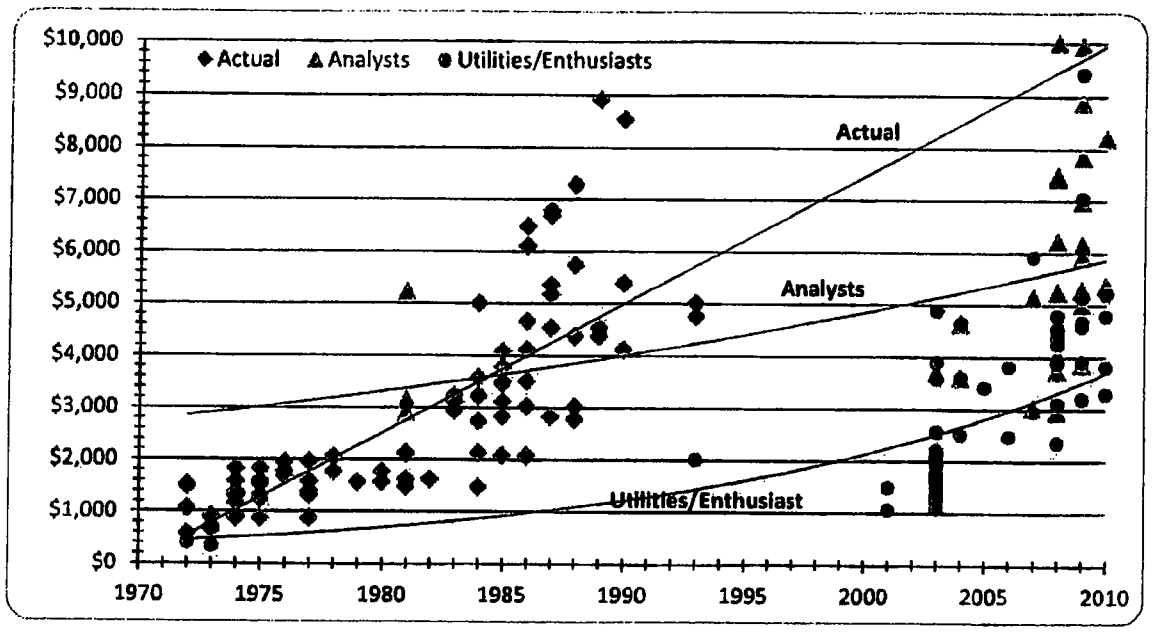
Sources: Rowe, John, *Fixing the Carbon Problem without Breaking the Economy*, Resources for the Future Policy Leadership Forum Lunch, May 12, 2010; *Energy Policy: Above All, Do No Harm*, American Enterprise Institute, March 8, 2011

Exhibit MNC-9
Total Firm Peak Power Projections Since Certification



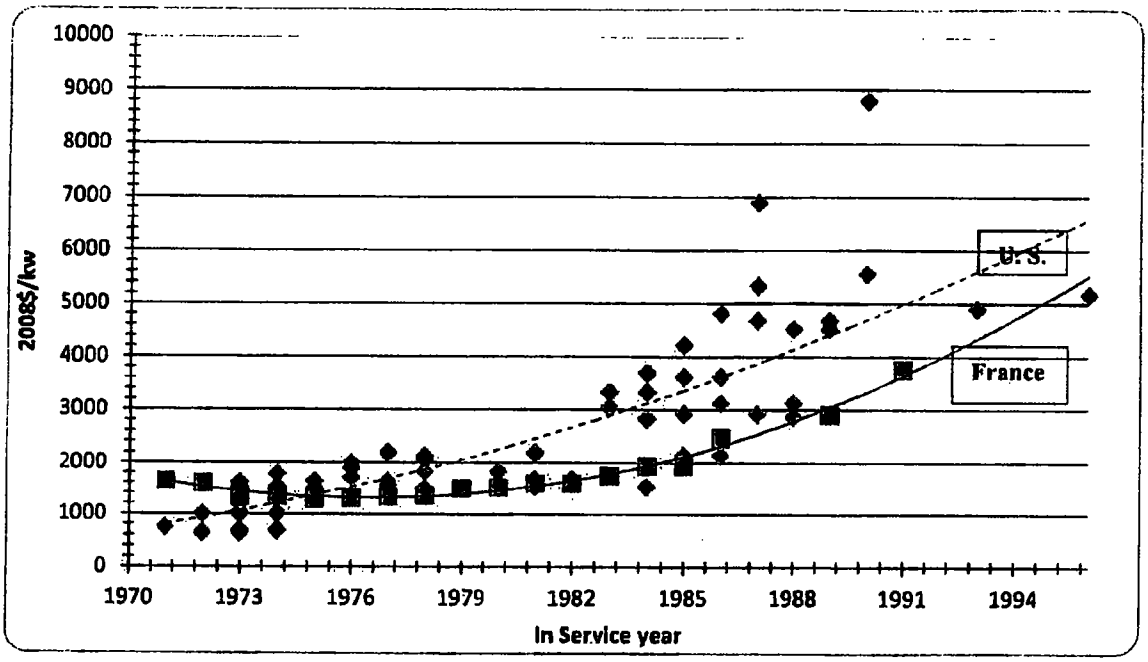
Sources: 2008: Exhibit H (Lynch, 2008, Exhibit JML-2); S.C. Coastal, Conservation League, et al., South Carolina Electric & Gas, Integrate Resource Plan, Docket No. 2012-9-E, Table 1.2009-2012.

Overnight Construction Cost per KW, in $2010



Source: Mark Cooper, "Nuclear Safety and Affordable Reactors: Can We Have Both?," *Bulletin of the Atomic Scientists*, 68(2), 2012, p. 63.

OVERNIGHT COSTS OF PRESSURIZED WATER REACTORS (2008$)



Source: Mark Cooper, *Policy Challenges of Nuclear Reactor Construction: Cost Escalation and Crowding Out Alternatives*, Institute for Energy and the Environment, Vermont Law School, September, 2010; Arnulf Grubler, *An Assessment of the Costs of the French Nuclear PWR Program: 1970-2000*, International Institute for Applied Systems analysis, October 6, 2009.

Fuel costs represent only about 13% of the busbar cost of nuclear generation, compared to new combined cycle gas plants, where fuel costs is still 41% of the cost of busbar cost even at today's low gas prices. March (p. 7)

Assume for argument that nuclear cost reduction equals $313 million

Assume gas non-fuel cost reduction proportionate to nuclear non-fuel cost

(.59/.87) * 313 = 212

Assume gas non-fuel cost reduction proportionate to total nuclear cost

(.59/1.0) * 313 = 185

Levelized cost is often cited as a convenient summary measure of the overall competiveness of different generating technologies. Levelized cost represents the present value of the total cost of building and operating a generating plant over an assumed financial life and duty cycle, converted to equal annual payments and expressed in terms of real dollars to remove the impact of inflation. (EIA, Annual Energy Outlook, 201, http://www.eia.gov/oiaf/aeo/electricity_generation.html).

Levelized cost is often cited as a convenient summary measure of the overall competiveness of different generating technologies. It represents the per-kilowatt hour cost (in real dollars) of building and operating a generating plant over an assumed financial life and duty cycle (EIA, Annual Energy Outlook, 2012, http://www.eia.gov/forecasts/aeo/pdf/electricity_generation.pdf).

Exhibit H JML-2, p. 9, 11.

The following table shows the results of an economic analysis using SCE&G's baseline assumptions.

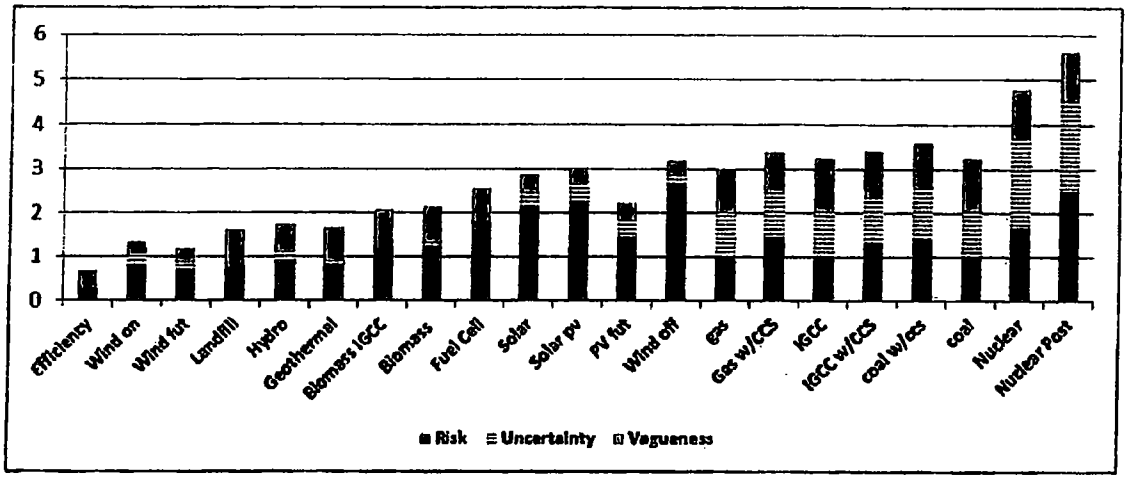
Levelized Present Value of Comparative Revenue Requirements ($Million Per Year) – Shown as Change from the Nuclear Strategy	CO_2 at $15	CO_2 at $30	High Natural Gas Prices
1) Nuclear Strategy	-	-	-
2) Gas Strategy	15.1	125.2	68.5
3) Coal Strategy	94.9	267.5	99.0
Note: Revenue includes production costs for all plants and the capital costs of all new plants.			

The nuclear strategy is seen to be the lowest cost option for SCE&G's customers over the long run. Cost here is measured in terms of the impact on SCE&G's customers' bills and is quantified in the table as the levelized present value of comparative revenue requirements. Comparative revenue requirements refer to all fixed and variable production costs from all of the power plants plus the capital costs from all of the incremental power plants. Each of the three strategies

The table below shows the sensitivity of the economic results to the price of a CO_2 credit. For each combination of escalation rate and CO_2 price in 2012, the table shows the approximate difference in levelized revenue requirements between the nuclear strategy and the gas strategy. For example, if the CO_2 price in 2012 is $20 and escalates at 5% per year, then the nuclear strategy would save SCE&G's customers about $19 million per year on a levelized basis. On the other hand if the CO_2 price were only $5 escalating at 2%, then the nuclear strategy would cost about $71 million more per year than the gas strategy. The shaded area highlights the combinations of CO_2 price and escalation which result in the gas strategy being more economical than the nuclear strategy.

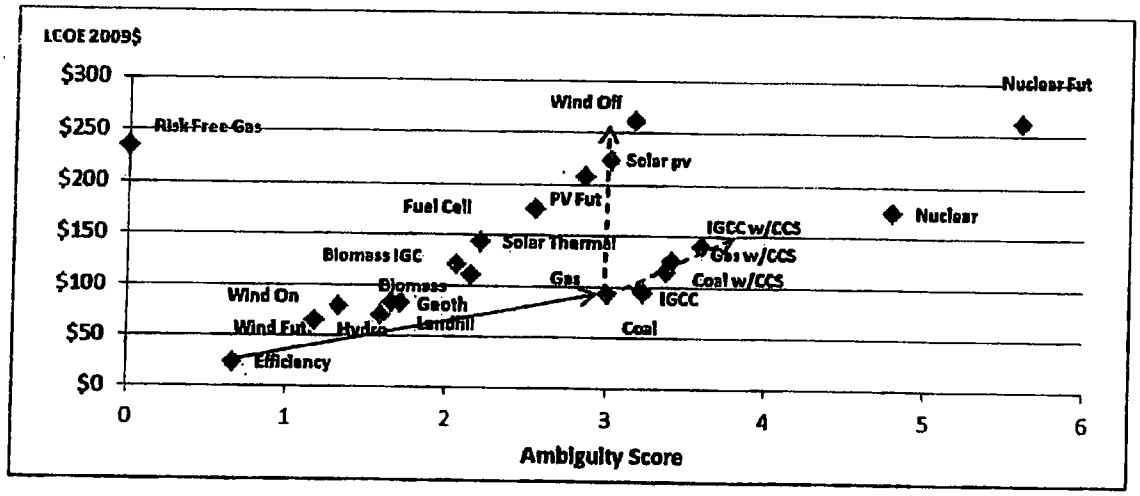
Change in Levelized Rev. Req.: Gas Strategy Minus Nuclear Strategy Positive Entries Represent Nuclear Advantage in Millions of Dollars											
CO_2 Price / Escalation	$0	$5	$10	$15	$20	$25	$30	$35	$40	$45	$50
0%	-87	-75	-63	-51	-40	-28	-16	-5	7	19	31
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4%	-87	-64	-42	-20	2	24	47	69	91	113	135
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8%	-87	-41	5	50	96	141	187	233	278	324	369
10%	-87	-19	48	116	183	250	318	385	453	520	587

EXHIBIT III-7: THE SEQUENCE OF RESOURCE ACQUISITION IN AN AMBIGUOUS ENVIRONMENT



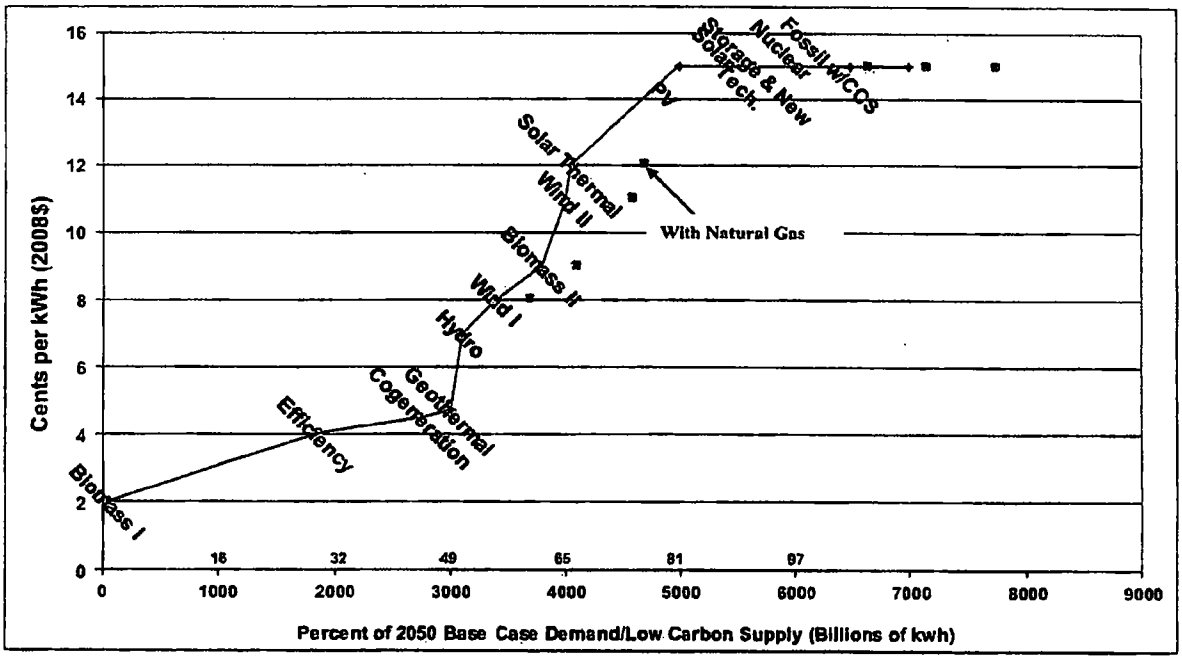
Source: Mark Cooper, "Prudent Resource Acquisition in a Complex Decision Making Environment: Multidimensional Analysis Highlights the Superiority of Efficiency, Current Approaches to Integrated Resource Planning," *2011 ACEEE National Conference on Energy Efficiency as a Resource*, Denver, September 26, 2011

EXHIBIT ES-7: AMBIGUITY AND LEVELIZED COST: A ROAD MAP FOR RESOURCE ACQUISITION



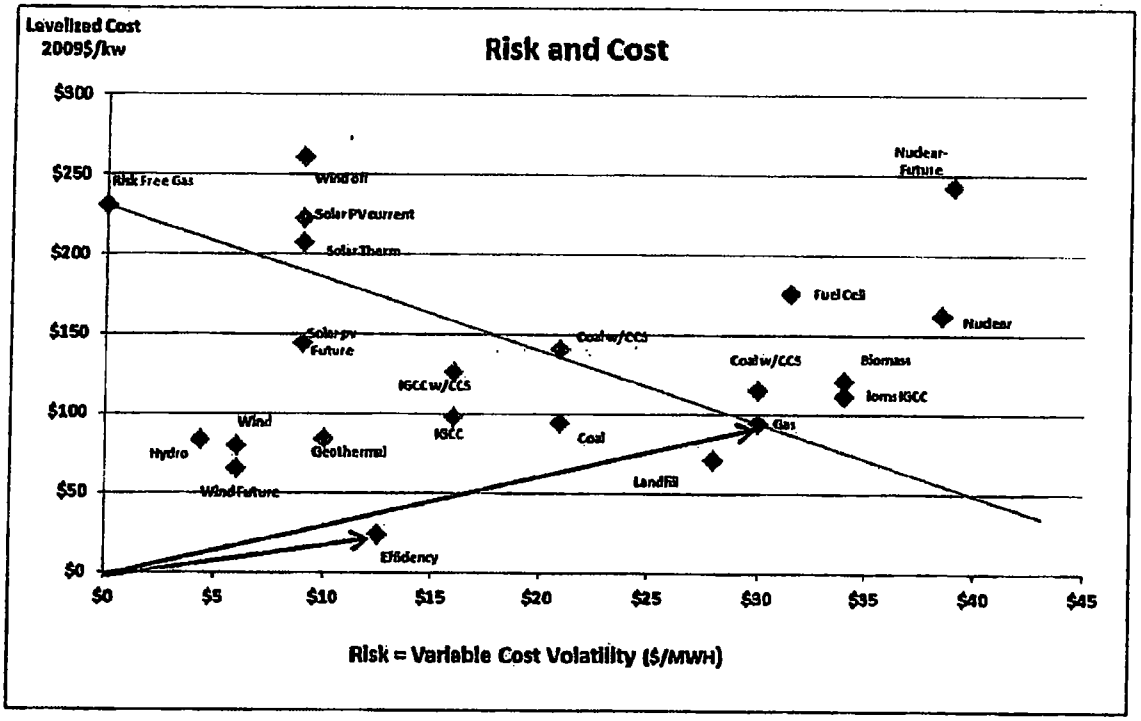
Source: Mark Cooper, "Least-Cost Planning For 21st Century Electricity Supply: Meeting the Challenges of Complexity and Ambiguity in Decision Making," *MARC Annual Meeting*, Rapid City South Dakota, June, 2011

Figure V-9: Electricity Supply Curve in a Carbon Constrained Environment



Mark Cooper, *The Economics of Nuclear Reactors: Renaissance of Relapse*, Institute for Energy and the Environment, Vermont Law School, June 2009, HTTP://WWW.VERMONTLAW.EDU/DOCUMENTS/COOPER%20REPORT%20ON%20NUCLEAR%20ECONOMICS%20FINAL%5B1%5D.PDF

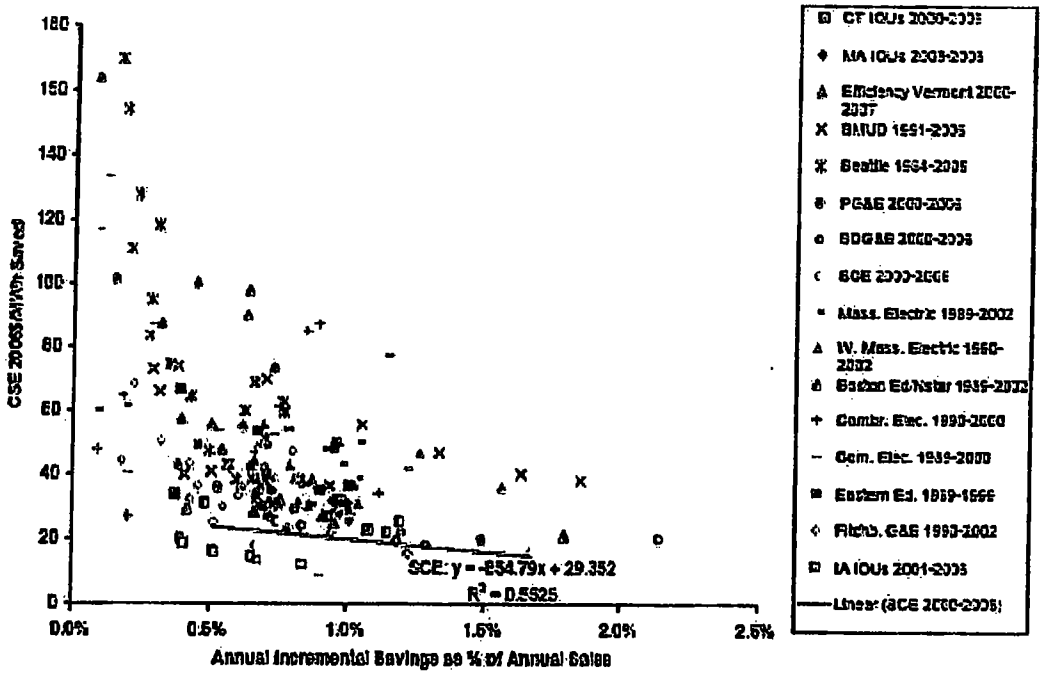
EXHIBIT III-2: RISK: AVERAGE LEVELIZED COST V. VARIABLE COST



Source: Lazard, *Levelized Cost of Energy Analysis – Version 4.0, June 2010*, California Energy Commission, *Comparative Cost of Central Station Electricity Generation*, January 2010. *EIA, Annual Energy Outlook: 2011, Levelized cost of New Electricity Generating Technologies, is used to provide the second estimate in the case of* Lazard hydro, Lazard wind-off, CEC, coal w/CCS, coal.

Exhibit II-1

Figure 2. Utility Cost of Saved Energy (2006$/MWh) vs. Incremental Annual Savings as % of Sales

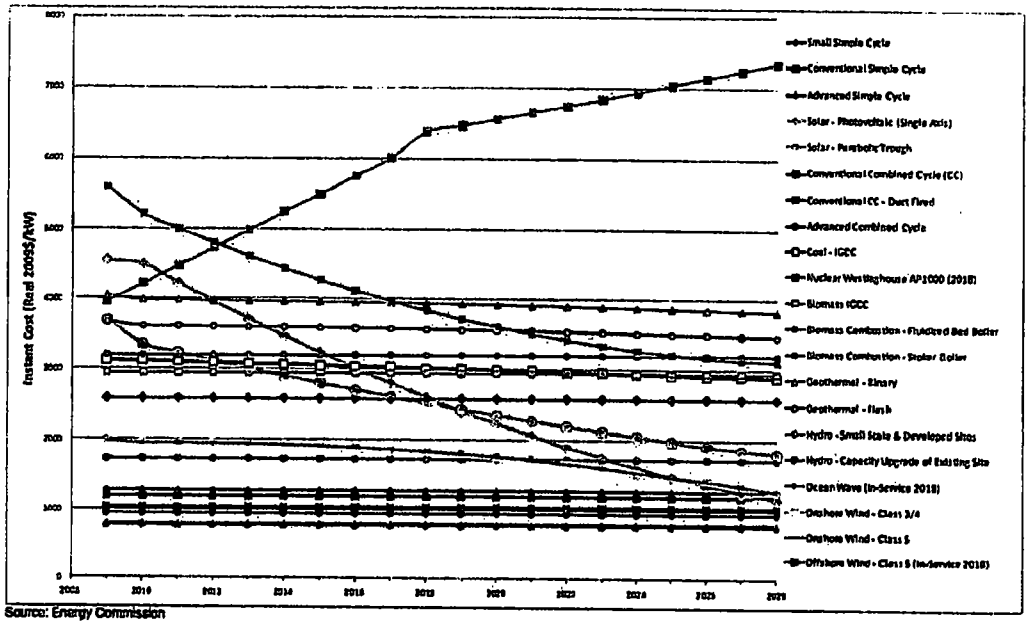


Source:

Mark Cooper, A Consumer Analysis of Energy Efficiency and Renewable Energy Standards: The Cornerstone of Consumer-Friendly Energy/Environmental Policy, May 2009, based on Kenji Takahasi and David Nichols, "Sustainability and Costs of Increasing Efficiency Impact: Evidence from Experience to Date," *ACEE Summer Study on Energy Efficient Buildings* (Washington, D.C., 2008), p. 8-363.

EXHIBIT IV-2: CEC OVERNIGHT COST TRENDS

Figure 3: Average Instant Cost Trend (Real 2009 $/kW)



Source: Energy Commission

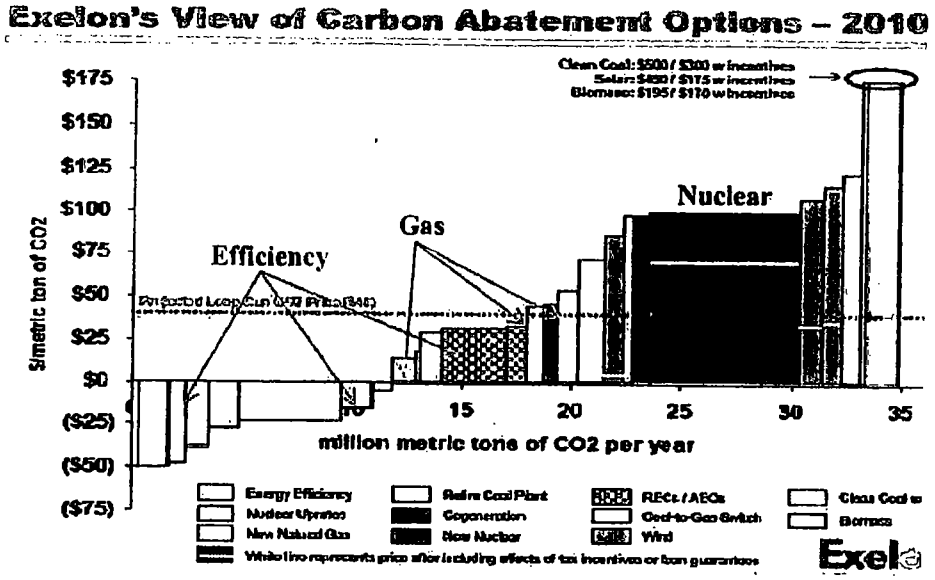
Comparative Cost of California Central Station Electricity Generation, 2010, http://www.energy.ca.gov/2009publications/CEC-200-2009-017/CEC-200-2009-017-SF.PDF

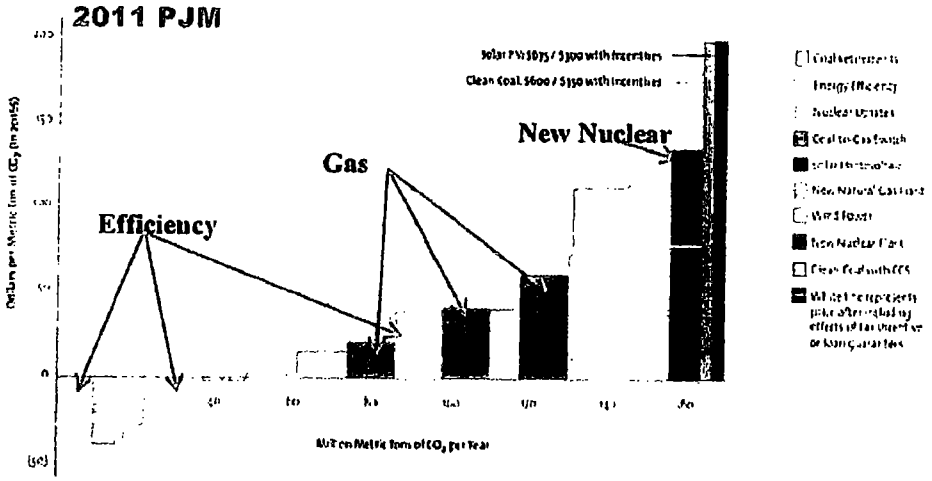
EXHIBIT 11

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

EXHIBIT MNC-R-2-1:

EVALUATING OPTIONS IN TERMS OF THE COST OF CARBON REDUCTIONS

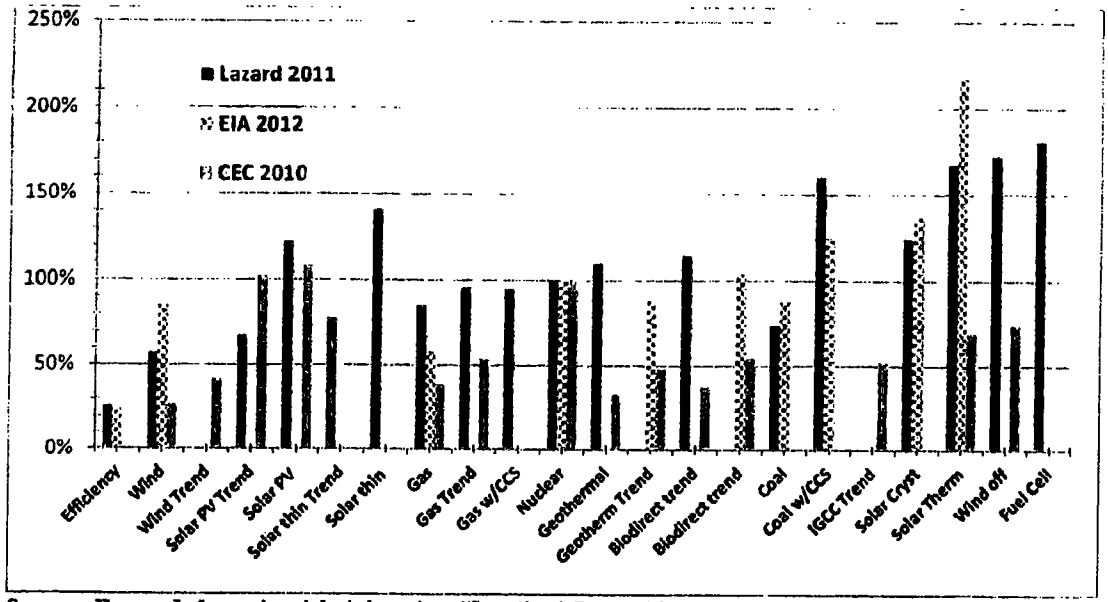




Sources: Rowe, John, *Fixing the Carbon Problem without Breaking the Economy*; Resources for the Future Policy Leadership Forum Lunch, May 12, 2010; *Energy Policy: Above All, Do No Harm*, American Enterprise Institute, March 8, 2011

EXHIBIT 10/3/12 11 2012-203-E
RENSAD 800-631-6989

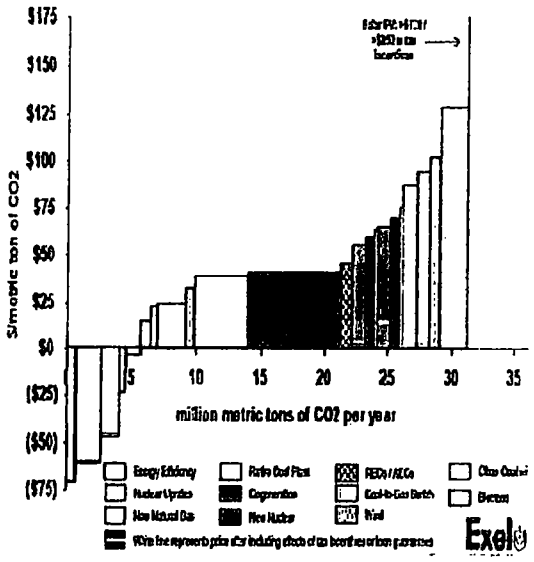
EXHIBIT MNC-R-2- 2:
CURRENT (2010) AND PROJECTED (2016-2018) LEVELIZED COST OF OPTIONS CALCULATED AS A PERCENT OF NUCLEAR COST



Sources: Energy Information Administration, "Levelized Cost of New Generation Resources in the Annual Energy Outlook," *Annual Energy Outlook*, July 12, 2012, with the cost of energy efficiency from National Research Council, *America's Energy Future: Technology and Transformation*, National Academy of Sciences, 2011. California Energy Commission, *Comparative Cost of California Central Station Electricity Generation*, January 2010, using 2009 as current and 2018 as trend. Lazard, *Lazard Cost of Energy Analysis – Version 5.0*, June 2011, using 2018 trends for solar.

EXHIBIT MNC-R-3: CHANGING VIEWS OF ALTERNATIVES

Exelon's View of Carbon Abatement Options - 2008



Exelon's View of Carbon Abatement Options - 2010

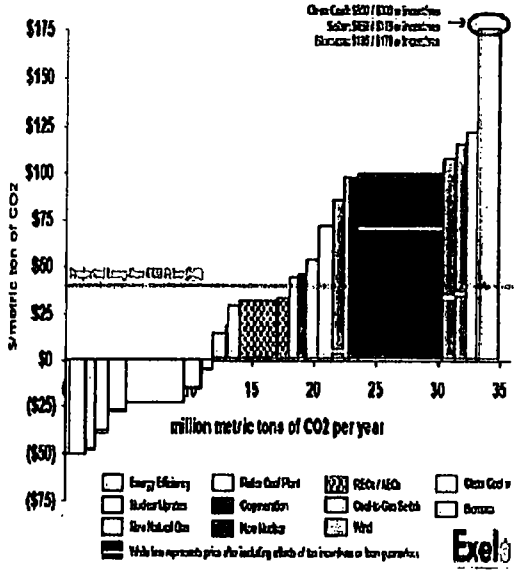
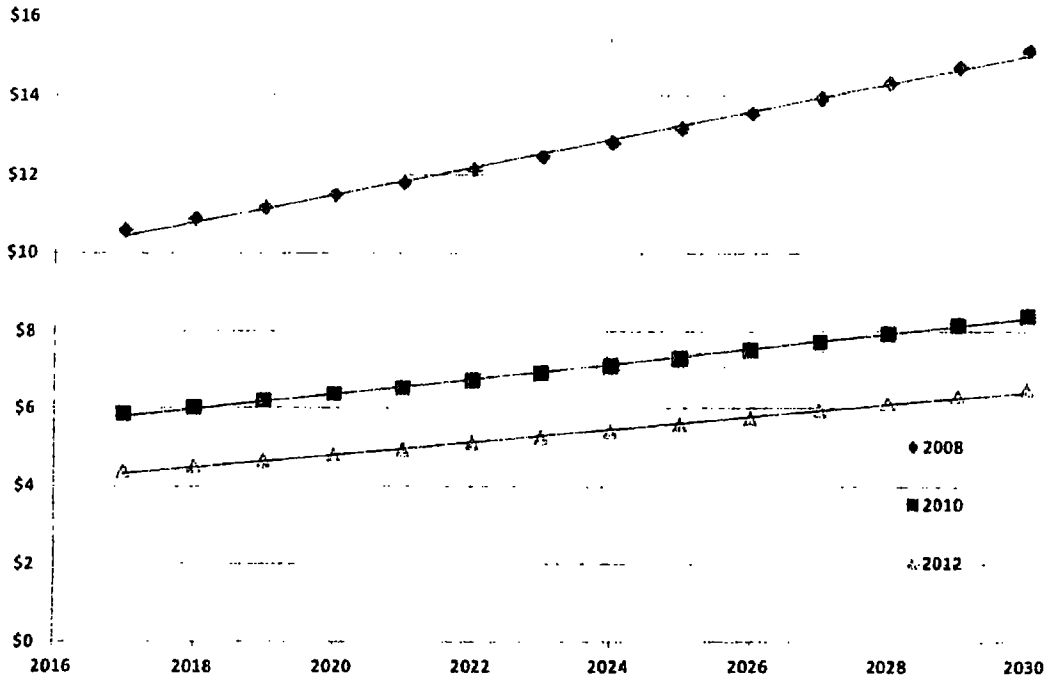
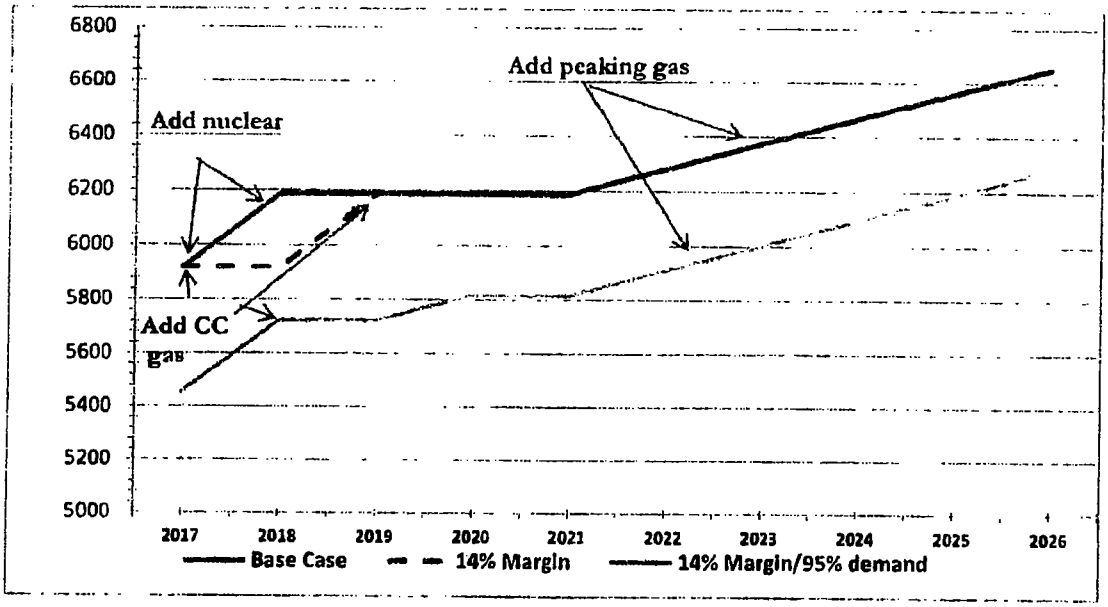


EXHIBIT MNC-R-4: THE DRAMATIC SHIFT IN NATURAL GAS PRICE PROJECTIONS



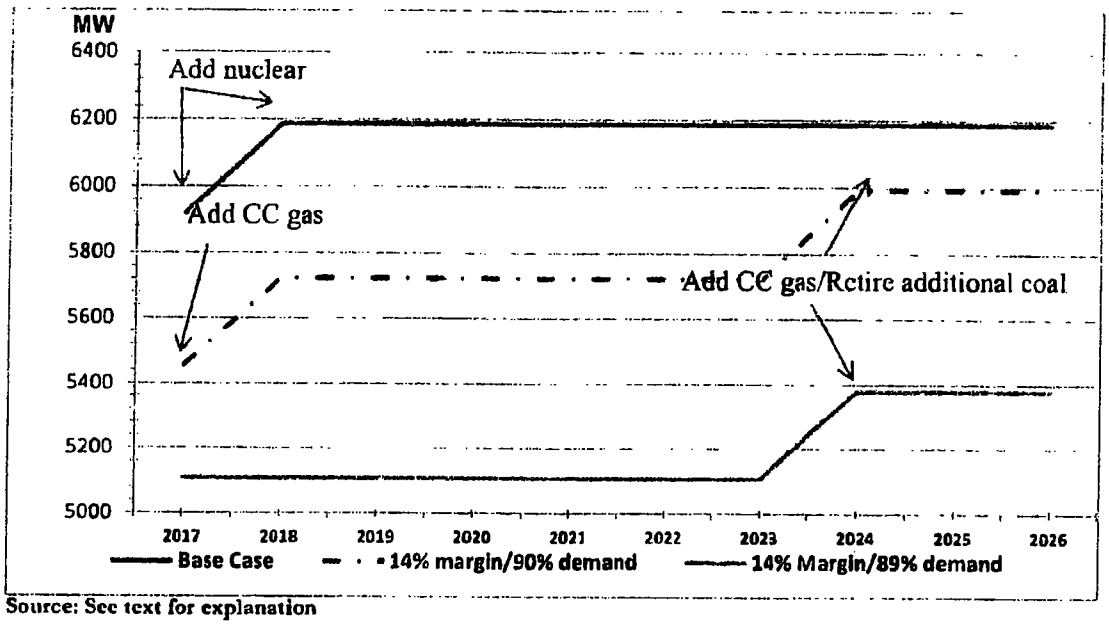
Source: Interrogatory Response to Sierra Club #1

EXHIBIT MNC-R-2- 5:
GENERATION CAPACITY UNDER VARIOUS RESERVE MARGIN AND DEMAND ASSUMPTIONS
(ALL SCENARIOS INCLUDE RETIREMENT OF 640 MW OF COAL IN 2017-2018)



Sources: *Comparative Economic Analysis of Completing construction or Pursuing a Gas Resource Strategy*, **Appendix 1.**

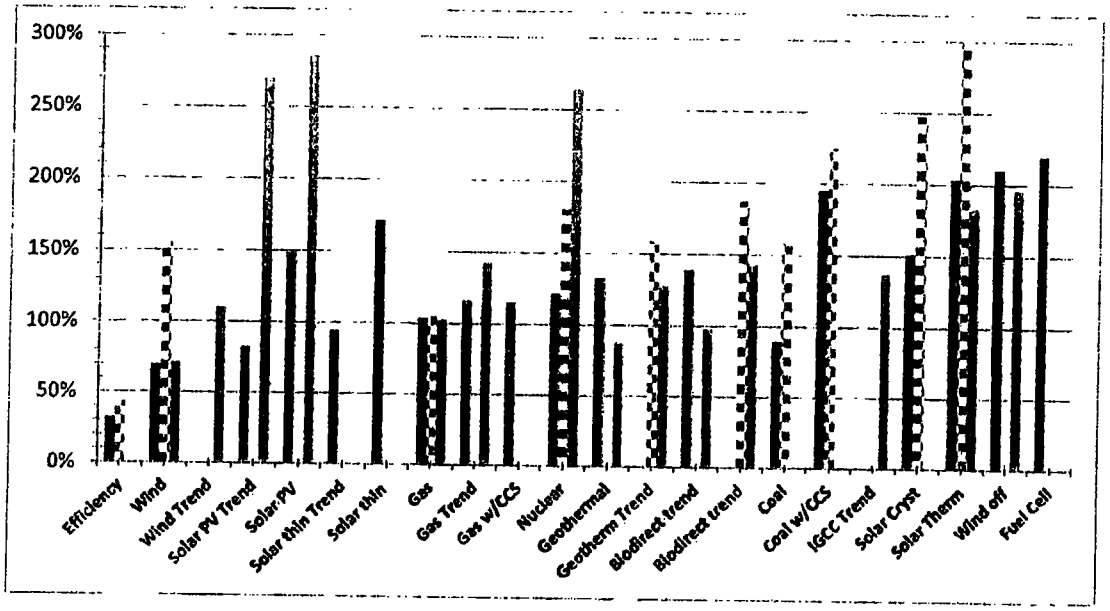
EXHIBIT MNC-R-2- 6:
MW OF NON-RENEWABLE GENERATION CAPACITY NEEDED TO MEET A 14% RESERVE MARGIN WITH THE EFFECTS OF CLIMATE LEGISLATION
(all scenarios include retirement of 640 MW of coal in 2017-2018)



Source: See text for explanation

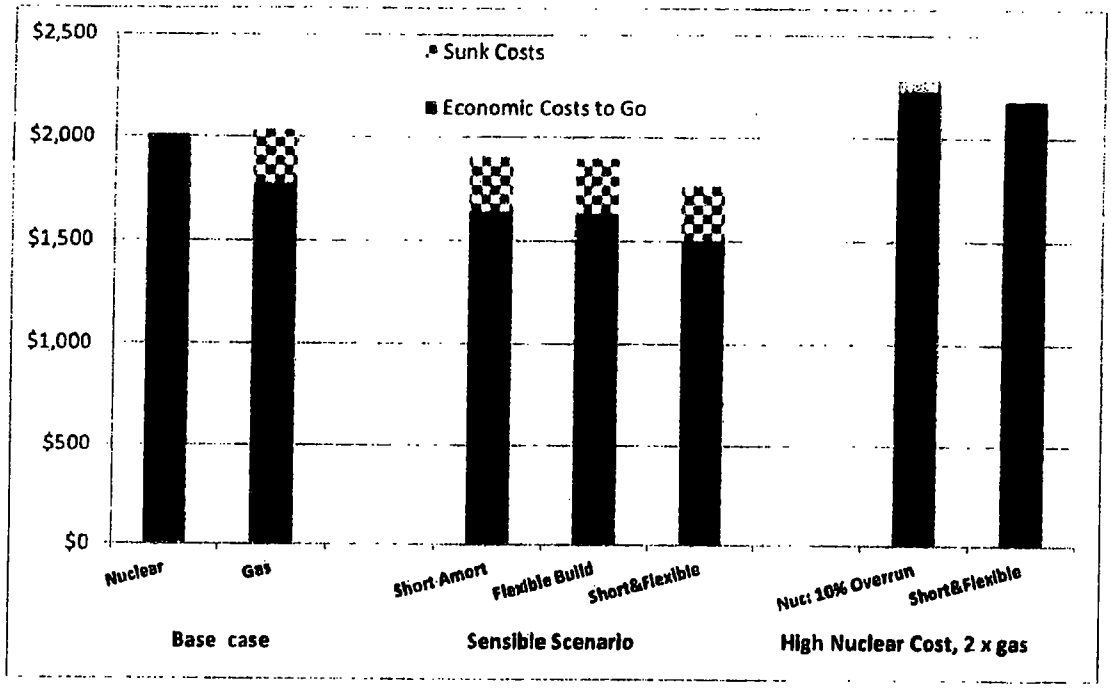
EXHIBIT MNC-R-2- 7:

CURRENT (2010) AND PROJECTED (2016-2018) LEVELIZED COST OF OPTION (calculated as a percent of Natural Gas with $0.003/kwh subtracted to account for claimed nuclear cost advantage over Gas)



Sources: See Exhibit MNC-R-2- 2.

MNC-R-8: ANNUAL PRESENT VALUE OF REVENUE REQUIREMENT UNDER VARIOUS SCENARIOS



Sources and Notes:
Base Case = Interrogatory Response to Sierra Club #1: $0CO_2$ Base Gas, Base Load
Sensible Case = Short Amortization Lowers cost 50%
Flexible Case = Matching Supply and Demand Saves One Year of New Gas Capital Cost
High Case = Interrogatory Response to Sierra Club #1: $0CO_2$, Gas 2 times base
High Nuc = Add 10% to new nuclear construction cost.

EXHIBIT 12

Hearing on October 2 & 3, 2012
Docket No. 2012-203-E

GARY C. JONES

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Safety Reviews
Project Management
Engineering Management
Quality Improvement
Safety Standards Development
Project Development
Reengineering
Business Management
Executive Consulting
Resource Allocation
International Business
Application of Safety Standards

PROFESSIONAL EXPERIENCE:

December 2008 –Present **JONES PARTNERS, LTD., Chicago, IL, USA**

President

Leader of a private energy consulting firm. Providing confidential nuclear power plant engineering consulting services to a large European nuclear steam supply system contractor and to the South Carolina Office of Regulatory Staff. Provided consulting engineering services to the International Atomic Energy Agency on the safety review of Ukrainian nuclear power plants in 2009 and served in July 2011 as part of the team to review the Egyptian Request for Proposal for their first nuclear power plant. Instructor at ASME seminar on new nuclear power plant system design in June 2009 in Atlanta, GA, June 2010 in Bethesda, MD, June 2011 in Columbia, SC and June 2012 in Augusta, GA.

July 2006 – November 2008 **INTERNATIONAL ATOMIC ENERGY AGENCY, Vienna, Austria**

Senior Engineering Safety Officer

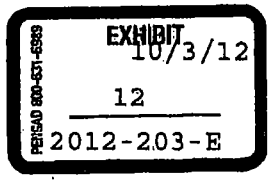
Team leader in the development, review and revision of international nuclear safety standards and in assisting IAEA Member States in the application of these safety standards to their nuclear facilities through workshops, training courses, missions, conferences, seminars, scientific visits and other means. Project Manager of a multi-million dollar European Commission funded program to assess the compliance of the 15 Ukrainian nuclear power plants with IAEA Safety Standards.

2004 – July 2006 **JONES PARTNERS, LTD., Chicago, IL, USA**

President

Leader of a private energy consulting and real estate investment firm.

1971 – 2003 **SARGENT & LUNDY, LLC, Chicago, IL**



1988-2003 **Sr. Vice President/Owner**

- Led a multi-million dollar global consulting organization to perform high level, quality driven consulting assignments in the development, assessment, design, construction and operation of power facilities.

- Led the engineering and design for the restart of nuclear power plants and directed staff in all disciplines associated with plant restart, providing licensing interface and analytical support for submissions to the Nuclear Regulatory Commission.

- Provided the full range of architect-engineering services to support the on-going operation of nuclear power plants including safety review, licensing and regulatory support, corrective action programs and procedure and test review.

- Served as Mechanical Department Manager and executive in charge of all mechanical discipline resources in the company including standards, software, recruitment, project staffing, training, quality performance and budget.

- Developed strategies and resources to increase business creating a profitable, respected organization; ensured financial performance, technical compliance and human resource management and development.

- Directed the assessment and implementation of the Sargent & Lundy conversion from a partnership to a Limited Liability company; managed the development and implementation of regional offices.

- **SELECTED LEADERSHIP ROLES INCLUDE:**

    - Served as interim Mechanical and Structural Chief Engineer for Commonwealth Edison Company Nuclear Division responsible for oversight and corporate engineering at all nuclear power plants.

    - Senior review board member for the Dresden Integrated System Inspection.

    - Independent safety review for Peoples Republic of China's first indigenous nuclear power plant, Qin Shan, including visits to the PRC and interface with the Shanghai Nuclear Engineering Design Institute.

    - Independent design review of Korea Electric Power Corporation/Korea Power Engineering Company Yonggwang 3 and 4 nuclear power plant.

    - Developed industry standards, guidelines and software applications in conjunction with the Electric Power Research Institute.

    - Remediation and decommissioning studies and assessments for Savannah River and Argonne National Laboratory environmental cleanup of nuclear and hazardous wastes.

    - Root cause investigations to determine reasons for failure and recommendations for fixes of various power plant systems including diesel generators, pumps, valves and other major components and systems.

- Development and implementation of new business strategies, processes, standards and procedures as Executive Director of Nuclear Services.
- Company-wide Malcolm Baldrige self-assessment and the Total Quality Management implementation in addition to special post-implementation assessment teams.

1976-1988 Associate/Project Manager, Sr. Mechanical Project Engineer

- Planned, coordinated and monitored performance for full scope engineering and design projects for Commonwealth Edison's Braidwood and Indiana's Marble Hill nuclear stations.
- Managed 1,500 engineering personnel assigned to projects.
- Project Manager for Design Basis Verification Program at TVA's Watts Bar Nuclear power plant.
- Led the mechanical Nuclear Steam Supply System process and physical engineering and design for Commonwealth Edison's dual unit LaSalle nuclear power station.
- Served as principal technical interface and author of the LaSalle County Station Final Safety Analysis report.

1971-1976 Mechanical Engineer

- Performed engineering duties for multiple nuclear power plants.

1966-1967
1968-1969 OAK RIDGE NATIONAL LABORATORY, Oak Ridge, TN, USA

Cooperative Education Assignments

- Radioisotopes Division
- Reactor Operations Division

EDUCATION:

- Bachelor of Science, Engineering Science – Mechanical and Nuclear Tennessee Technological University in Cookeville, TN
- University of Michigan Executive Program

REGISTRATIONS:

- Professional Engineer – Missouri and South Carolina

ASSOCIATIONS:

- American Nuclear Society
- American Society of Mechanical Engineers
- Founder, Past President and current Vice President of the Engineers Without Borders-USA-Chicagoland Professional Chapter
- Member of the Great Lakes Region Technical Advisory Committee of Engineers Without Borders-USA
- Board Member of SALUTE, Inc., a non-profit organization assisting military service personnel and their families

BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

[illegible] ID	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	Approve Engineering Procurement and Construction Agreement	Complete	Complete		
2	Issue P.O.'s to nuclear component fabricators for Units 2 and 3 Containment Vessels	Complete	Complete		
3	Contractor Issue PO to Passive Residual Heat Removal Heat Exchanger Fabricator - First Payment - Unit 2	Complete	Complete		
4	Contractor Issue PO to Accumulator Tank Fabricator - Unit 2	Complete	Complete		
5	Contractor Issue PO to Core Makeup Tank Fabricator - Units 2 & 3	Complete	Complete		
6	Contractor Issue PO to Squib Valve Fabricator - Units 2 & 3	Complete	Complete		
7	Contractor Issue PO to Steam Generator Fabricator - Units 2 & 3	Complete	Complete		
8	Contractor Issue Long Lead Material PO to Reactor Coolant Pump Fabricator - Units 2 & 3	Complete	Complete		
9	Contractor Issue PO to Pressurizer Fabricator - Units 2 & 3	Complete	Complete		
10	Contractor Issue PO to Reactor Coolant Loop Pipe Fabricator - First Payment - Units 2 & 3	Complete	Complete		
11	Reactor Vessel Internals - Issue Long Lead Material PO to Fabricator - Units 2 and 3	Complete	Complete		
12	Contractor Issue Long Lead Material PO to Reactor Vessel Fabricator - Units 2 & 3	Complete	Complete		
13	Contractor Issue PO to Integrated Head Package Fabricator - Units 2 & 3	Complete	Complete		
14	Control Rod Drive Mechanism Issue PO for Long Lead Material to Fabricator - Units 2 and 3 - first payment	Complete	Complete		
15	Issue P.O.'s to nuclear component fabricators for Nuclear Island structural CA20 Modules	Complete	Complete		

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

16	Start Site Specific and balance of plant detailed design	Complete	Complete		
17	Instrumentation & Control Simulator - Contractor Place Notice to Proceed - Units 2 & 3	Complete	Complete		
18	Steam Generator - Issue Final PO to Fabricator for Units 2 and 3	Complete	Complete		
19	Reactor Vessel Internals - Contractor Issue PO for Long Lead Material (Heavy Plate and Heavy Forgings) to Fabricator - Units 2 & 3	Complete	Complete		
20	Contractor Issue Final PO to Reactor Vessel Fabricator - Units 2 & 3	Complete	Complete		
21	Variable Frequency Drive Fabricator Issue Transformer PO - Units 2 & 3	Complete	Complete		
22	Start clearing, grubbing and grading	Complete	Complete		
23	Core Makeup Tank Fabricator Issue Long Lead Material PO - Units 2 & 3	Complete	Complete		
24	Accumulator Tank Fabricator Issue Long Lead Material PO - Units 2 & 3	Complete	Complete		
25	Pressurizer Fabricator Issue Long Lead Material PO - Units 2 & 3	Complete	Complete		
26	Reactor Coolant Loop Pipe - Contractor Issue PO to Fabricator - Second Payment - Units 2 & 3	Complete	Complete		
27	Integrated Head Package - Issue PO to Fabricator - Units 2 and 3 - second payment	Complete	Complete		
28	Control Rod Drive Mechanisms - Contractor Issue PO for Long Lead Material to Fabricator - Units 2 & 3	Complete	Complete		
29	Contractor Issue PO to Passive Residual Heat Removal Heat Exchanger Fabricator - Second Payment - Units 2 & 3	Complete	Complete		
30	Start Parr Road intersection work.	Complete	Complete		

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

31	Reactor Coolant Pump - Issue Final PO to Fabricator - Units 2 and 3	Complete	Complete		
32	Integrated Heat Packages Fabricator Issue Long Lead Material PO - Units 2 & 3	Complete	Complete		
33	Design Finalization Payment 3	Complete	Complete		
34	Start site development	Complete	Complete		
35	Contractor Issue PO to Turbine Generator Fabricator - Units 2 & 3	Complete	Complete		
36	Contractor Issue PO to Main Transformers Fabricator - Units 2 & 3	Complete	Complete		
37	Core Makeup Tank Fabricator Notice to Contractor Receipt of Long Lead Material - Units 2 & 3	Complete	Complete		
38	Design Finalization Payment 4	Complete	Complete		
39	Turbine Generator Fabricator Issue PO for Condenser Material - Unit 2	Complete	Complete		
40	Reactor Coolant Pump Fabricator Issue Long Lead Material Lot 2 - Units 2 & 3	Complete	Complete		
41	Passive Residual Heat Removal Heat Exchanger Fabricator Receipt of Long Lead Material - Units 2 & 3	Complete	Complete		
42	Design Finalization Payment 5	Complete	Complete		
43	Start erection of construction buildings, to include craft facilities for personnel, tools, equipment; first aid facilities; field offices for site management and support personnel; temporary warehouses; and construction hiring office.	Complete	Complete		
44	Reactor Vessel Fabricator Notice to Contractor of Receipt of Flange Nozzle Shell Forging - Unit 2	Complete	Complete		
45	Design Finalization Payment 6	Complete	Complete		

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

46	Instrumentation and Control Simulator - Contractor Issue PO to Subcontractor for Radiation Monitor System - Units 2 & 3	Complete	Complete		
47	Reactor Vessel Internals - Fabricator Start Fit and Welding of Core Shroud Assembly - Unit 2	Complete	Complete		
48	Turbine Generator Fabricator Issue PO for Moisture Separator Reheater/Feedwater Heater Material - Unit 2	Complete	Complete		
49	Reactor Coolant Loop Pipe Fabricator Acceptance of Raw Material - Unit 2	Complete	Complete		
50	Reactor Vessel Internals - Fabricator Start Weld Neutron Shield Spacer Pads to Assembly - Unit 2	10/31/2011	7/31/2012	Unit 2	Due to schedule refinement and sequencing.
51	Control Rod Drive Mechanisms - Fabricator to Start Procurement of Long Lead Material - Unit 2	Complete	Complete		
52	Contractor Notified that Pressurizer Fabricator Performed Cladding on Bottom Head - Unit 2	Complete	Complete		
53	Start excavation and foundation work for the standard plant for Unit 2	Complete	Complete		
54	Steam Generator Fabricator Notice to Contractor of Receipt of 2nd Steam Generator Tubesheet Forging - Unit 2	Complete	Complete		
55	Reactor Vessel Fabricator Notice to Contractor of Outlet Nozzle Welding to Flange Nozzle Shell Completion - Unit 2	Complete	Complete		
56	Turbine Generator Fabricator Notice to Contractor Condenser Fabrication Started - Unit 2	Complete	Complete		
57	Complete preparations for receiving the first module on site for Unit 2.	Complete	Complete		
58	Steam Generator Fabricator Notice to Contractor of Receipt of 1st Steam Generator Transition Cone Forging - Unit 2	Complete	Complete		

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

59	Reactor Coolant Pump Fabricator Notice to Contractor of Manufacturing of Casing Completion - Unit 2	Complete	Complete		
60	Reactor Coolant Loop Pipe Fabricator Notice to Contractor of Machining, Heat Treating & Non-Destructive Testing Completion - Unit 2	Complete	Complete		
61	Core Makeup Tank Fabricator Notice to Contractor of Satisfactory Completion of Hydrotest - Unit 2	5/31/2011	9/30/2012	Unit 2	Due to vendor delays, COL approval and schedule refinement and sequencing.
62	Polar Crane Fabricator Issue PO for Main Hoist Drum and Wire Rope - Units 2 & 3	Complete	Complete		
63	Control Rod Drive Mechanisms - Fabricator to Start Procurement of Long Lead Material - Unit 3	Complete	Complete		
64	Turbine Generator Fabricator Notice to Contractor Condenser Ready to Ship - Unit 2	Complete	Complete		
65	Start placement of mud mat for Unit 2	7/14/2011	6/29/2012	Unit 2	COL approval and additional fill concrete in the nuclear island.
66	Steam Generator Fabricator Notice to Contractor of Receipt of 1st Steam Generator Tubing - Unit 2	Complete	Complete		
67	Pressurizer Fabricator Notice to Contractor of Welding of Upper and Intermediate Shells Completion - Unit 2	Complete	Complete		
68	Reactor Vessel Fabricator Notice to Contractor of Closure Head Cladding Completion - Unit 3	2/28/2012	6/30/2012	Unit 3	Due to schedule refinement and review.
69	Begin Unit 2 first nuclear concrete placement	10/3/2011	8/24/2012	Unit 2	COL approval and additional fill concrete in the nuclear island.

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
70	Reactor Coolant Pump Fabricator Notice to Contractor of Stator Core Completion - Unit 2	Complete	Complete		
71	Fabricator Start Fit and Welding of Core Shroud Assembly - Unit 2	Complete	Complete		
72	Steam Generator Fabricator Notice to Contractor of Completion of 1st Steam Generator Tubing Installation - Unit 2	Complete	Complete		
73	Reactor Coolant Loop Pipe - Shipment of Equipment to Site - Unit 2	12/31/2012	12/31/2012	Unit 2	On schedule.
74	Control Rod Drive Mechanism - Ship Remainder of Equipment (Latch Assembly & Rod Travel Housing) to Head Supplier - Unit 2	12/31/2011	6/30/2012	Unit 2	Due to delay in predecessor schedule activities.
75	Pressurizer Fabricator Notice to Contractor of Welding of Lower Shell to Bottom Head Completion - Unit 2	Complete	Complete		
76	Steam Generator Fabricator Notice to Contractor of Completion of 2nd Steam Generator Tubing Installation - Unit 2	6/30/2011	5/31/2012	Unit 2	This milestone completed in May 2012.
77	Design Finalization Payment 14	Complete	Complete		
78	Set module CA04 for Unit 2	1/27/2012	11/6/2012	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
79	Passive Residual Heat Removal Heat Exchanger Fabricator Notice to Contractor of Final Post Weld Heat Treatment - Unit 2	Complete	Complete		
80	Passive Residual Heat Removal Heat Exchanger Fabricator Notice to Contractor of Completion of Tubing - Unit 2	1/31/2011	5/31/2012	Unit 2	This milestone completed in May 2012.
81	Polar Crane Fabricator Notice to Contractor of Girder Fabrication Completion - Unit 2	2/28/2012	10/31/2012	Unit 2	Due to schedule refinement and review.

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

82	Turbine Generator Fabricator Notice to Contractor Condenser Ready to Ship - Unit 3	8/31/2013	8/31/2013	Unit 3	On schedule.
83	Set Containment Vessel ring #1 for Unit 2	4/3/2012	1/7/2013	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
84	Reactor Coolant Pump Fabricator Delivery of Casings to Port of Export - Unit 2	3/31/2012	7/31/2012	Unit 2	Due to schedule refinement and review.
85	Reactor Coolant Pump Fabricator Notice to Contractor of Stator Core Completion - Unit 3	8/31/2013	8/31/2013	Unit 3	On schedule.
86	Reactor Vessel Fabricator Notice to Contractor of Receipt of Core Shell Forging - Unit 3	Complete	Complete		
87	Contractor Notified that Pressurizer Fabricator Performed Cladding on Bottom Head - Unit 3	Complete	Complete		
88	Set Nuclear Island structural module CA03 for Unit 2	8/30/2012	6/26/2013	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
89	Squib Valve Fabricator Notice to Contractor of Completion of Assembly and Test for Squib Valve Hardware - Unit 2	5/31/2012	5/31/2012	Unit 2	On schedule.
90	Accumulator Tank Fabricator Notice to Contractor of Satisfactory Completion of Hydrotest - Unit 3	12/31/2012	3/31/2013	Unit 3	Due to schedule refinement and review.
91	Polar Crane Fabricator Notice to Contractor of Electric Panel Assembly Completion - Unit 2	7/31/2012	9/31/2013	Unit 2	Due to schedule refinement and review.
92	Start containment large bore pipe supports for Unit 2	4/9/2012	6/28/2013	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison Exhibit GCJ-2
VC Summer Units 2 and 3

93	Integrated Head Package - Shipment of Equipment to Site - Unit 2	10/31/2012	3/31/2013	Unit 2	Due to schedule refinement and review.
94	Reactor Coolant Pump Fabricator Notice to Contractor of Final Stator Assembly Completion - Unit 2	11/30/2012	5/31/2013	Unit 2	Due to delay in predecessor schedule activities.
95	Steam Generator Fabricator Notice to Contractor of Completion of 2nd Steam Generator Tubing Installation - Unit 3	5/31/2013	6/30/2013	Unit 3	Due to schedule refinement and review.
96	Steam Generator Fabricator Notice to Contractor of Satisfactory Completion of 1st Steam Generator Hydrotest - Unit 2	5/31/2012	1/31/2013	Unit 2	Due to COL approval and schedule refinement and sequencing.
97	Start concrete fill of Nuclear Island structural modules CA01 and CA02 for Unit 2	2/26/2013	4/3/2014	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
98	Passive Residual Heat Removal Heat Exchanger - Delivery of Equipment to Port of Entry - Unit 2	4/30/2012	12/31/2012	Unit 2	Due to schedule refinement and sequencing.
99	Refueling Machine Fabricator Notice to Contractor of Satisfactory Completion of Factory Acceptance Test - Unit 2	2/28/2013	11/30/2013	Unit 2	Due to delay in predecessor schedule activities.
100	Deliver Reactor Vessel Internals to Port of Export - Unit 2	7/31/2013	1/31/2014	Unit 2	Due to schedule refinement and sequencing.
101	Set Unit 2 Containment Vessel #3	4/17/2013	4/24/2014	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
102	Steam Generator - Contractor Acceptance of Equipment at Port of Entry - Unit 2	3/31/2013	7/31/2013	Unit 2	Due to schedule refinement and review.
103	Turbine Generator Fabricator Notice to Contractor Turbine Generator Ready to Ship - Unit 2	4/30/2013	4/30/2013	Unit 2	On schedule.

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

104	Pressurizer Fabricator Notice to Contractor of Satisfactory Completion of Hydrotest - Unit 3	2/28/2014	3/31/2014	Unit 3	Due to schedule refinement and sequencing.
105	Polar Crane - Shipment of Equipment to Site - Unit 2	5/31/2013	1/31/2014	Unit 2	Due to schedule refinement and sequencing.
106	Receive Unit 2 Reactor Vessel on site from fabricator	5/20/2013	5/13/2014	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
107	Set Unit 2 Reactor Vessel	6/18/2013	6/23/2014	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
108	Steam Generator Fabricator Notice to Contractor of Completion of 2nd Channel Head to Tubesheet Assembly Welding - Unit 3	12/31/2013	12/31/2013	Unit 3	On schedule.
109	Reactor Coolant Pump Fabricator Notice to Contractor of Final Stator Assembly Completion - Unit 3	8/31/2014	8/31/2014	Unit 3	On schedule.
110	Reactor Coolant Pump - Shipment of Equipment to Site (2 Reactor Coolant Pumps) - Unit 2	9/30/2019	10/31/2013	Unit 2	Due to schedule refinement and review.
111	Place first nuclear concrete for Unit 3	8/1/2013	10/9/2013	Unit 3	The Unit 3 FNC was offset by 14 months from the Unit 2 FNC per agreement between SCE&G & Consortium.
112	Set Unit 2 Steam Generator	9/9/2013	10/23/2014	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
113	Main Transformers Ready to Ship - Unit 2	9/30/2013	9/30/2013	Unit 2	On schedule.
114	Complete Unit 3 Steam Generator Hydrotest at fabricator	2/28/2014	2/28/2014	Unit 3	On schedule.

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

115	Set Unit 2 Containment Vessel Bottom Head on basemat legs	11/21/2011	10/11/2012	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
116	Set Unit 2 Pressurizer Vessel	1/24/2014	5/16/2014	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
117	Reactor Coolant Pump Fabricator Notice to Contractor of Satisfactory Completion of Factory Acceptance Test - Unit 3	2/28/2015	2/28/2015	Unit 3	On schedule.
118	Deliver Reactor Vessel Internals to Port of Export - Unit 3	6/30/2015	6/30/2015	Unit 3	On schedule.
119	Main Transformers Fabricator Issue PO for Material - Unit 3	4/30/2014	2/28/2015	Unit 3	Due to schedule refinement and review.
120	Complete welding of Unit 2 Passive Residual Heat Removal System piping	3/19/2014	2/5/2015	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
121	Steam Generator - Contractor Acceptance of Equipment at Port of Entry - Unit 3	4/30/2015	4/30/2015	Unit 3	On schedule.
122	Refueling Machine - Shipment of Equipment to Site - Unit 3	5/31/2014	2/28/2015	Unit 3	Due to schedule refinement and review.
123	Set Unit 2 Polar Crane	4/3/2014	1/9/2015	Unit 2	COL approval, additional fill concrete in the nuclear island, and schedule sequencing and detailing.
124	Reactor Coolant Pumps - Shipment of Equipment to Site - Unit 3	6/30/2015	6/30/2015	Unit 3	On schedule.
125	Main Transformers Ready to Ship - Unit 3	9/30/2014	7/31/2015	Unit 3	Due to schedule refinement and review.

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCI-2**
VC Summer Units 2 and 3

126	Spent Fuel Storage Rack - Shipment of Last Rack Module - Unit 3	12/31/2014	7/31/2014	Unit 3	Due to schedule refinement and review.
127	Start electrical cable pulling in Unit 2 Auxiliary Building	12/26/2014	8/14/2013	Unit 2	COL approval, additional fill concreted for nuclear island and schedule sequencing and detailing.
128	Complete Unit 2 Reactor Coolant System cold hydro	8/3/2015	1/22/2016	Unit 2	COL approval, additional fill concreted for nuclear island, additional duration for Shield Bldg construction, and schedule sequencing and detailing.
129	Activate class 1E DC power in Unit 2 Auxiliary Building.	3/5/2015	3/15/2015	Unit 2	COL approval, additional fill concreted for nuclear island and schedule sequencing and detailing.
130	Complete Unit 2 hot functional test.	9/21/2015	5/3/2016	Unit 2	COL approval, additional fill concreted for nuclear island, additional duration for Shield Bldg construction, and schedule sequencing and detailing.
131	Install Unit 3 ring 3 for containment vessel	7/30/2015	8/25/2015	Unit 3	Schedule sequencing and detailing.
132	Load Unit 2 nuclear fuel	10/28/2015	9/15/2016	Unit 2	COL approval, additional fill concreted for nuclear island, additional duration for Shield Bldg construction, and schedule sequencing and detailing.

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

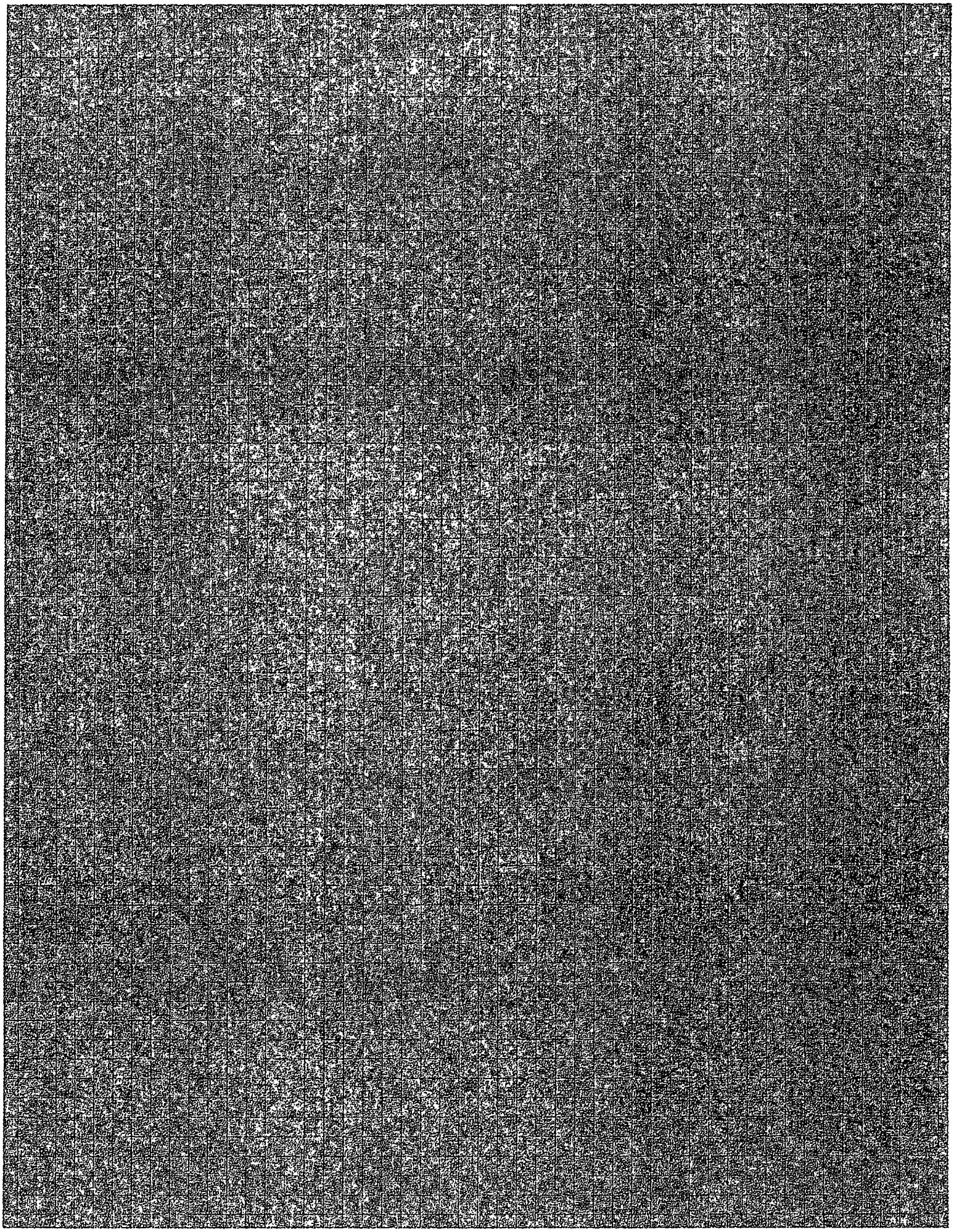
133	Unit 2 Substantial Completion	4/1/2016	3/15/2017	Unit 2	COL approval, additional fill concreted for nuclear island, additional duration for Shield Bldg construction, and schedule sequencing and detailing.
134	Set Unit 3 Reactor Vessel	10/1/2015	10/22/2015	Unit 3	Schedule sequencing and detailing.
135	Set Unit 3 Steam Generator #2	12/22/2015	2/25/2016	Unit 3	Schedule sequencing and detailing.
136	Set Unit 3 Pressurizer Vessel	5/16/2016	7/16/2015	Unit 3	Schedule sequencing, detailing and compression.
137	Complete welding of Unit 3 Passive Residual Heat Removal System piping	6/20/2016	6/16/2016	Unit 3	Schedule sequencing and detailing.
138	Set Unit 3 polar crane	7/18/2016	5/9/2016	Unit 3	Schedule sequencing, detailing and compression.
139	Start Unit 3 Shield Building roof slab rebar placement	1/16/2017	5/26/2016	Unit 3	Schedule sequencing, detailing and compression.
140	Start Unit 3 Auxiliary Building electrical cable pulling	4/6/2017	11/7/2014	Unit 3	Schedule sequencing and detailing.
141	Activate Unit 3 Auxiliary Building class 1E DC power	6/9/2017	5/15/2016	Unit 3	Unit 3 substantial completion 14 months after Unit 2 substantial completion.
142	Complete Unit 3 Reactor Coolant System cold hydro	1/1/2018	3/22/2017	Unit 3	Unit 3 substantial completion 14 months after Unit 2 substantial completion.

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BLRA Order No. 2010-12 and Docket No. 2012-203-E Revised Milestones Comparison **Exhibit GCJ-2**
VC Summer Units 2 and 3

143	Complete Unit 3 hot functional test	2/15/2018	7/3/2017	Unit 3	Unit 3 substantial completion 14 months after Unit 2 substantial completion.
144	Complete Unit 3 nuclear fuel load	7/31/2018	11/15/2017	Unit 3	Unit 3 substantial completion 14 months after Unit 2 substantial completion.
145	Begin Unit 3 full power operation	10/31/2018	4/8/2018	Unit 3	Unit 3 substantial completion 14 months after Unit 2 substantial completion.
146	Unit 3 Substantial Completion	1/1/2019	5/15/2018	Unit 3	Unit 3 substantial completion 14 months after Unit 2 substantial completion.

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THE STATE OF SOUTH CAROLINA
In The Supreme Court

APPEAL FROM THE PUBLIC SERVICE COMMISSION

Docket No. 2012-203-E

Sierra Club, Respondent/Appellant,

v.

The Public Service Commission of South Carolina,
South Carolina Electric & Gas Company,
the South Carolina Office of Regulatory Staff,
Pamela Greenlaw and South Carolina Energy Users Committee,
of whom, South Carolina Energy Users Committee is Respondents,

Appellant/Respondent.

NOTICE OF APPEAL

Sierra Club appeals the decisions of the Public Service Commission of South Carolina, Order No. 2012-884, dated November 15, 2012, and Order No. 2013-5, dated February 14, 2013. Respondent/Appellant received Order No. 2013-5, denying petitions for rehearing and reconsideration on February 27, 2013; and received Appellant/Respondent's notice of appeal on March 15, 2013.

March 18, 2013

Robert Guild
314 Pall Mall Street
Columbia, South Carolina 29201
(803) 252-1419
Attorney for RespondentAppellant

Other Counsel of Record and Parties Below:

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1508 Lady Street
Columbia, SC, 29201
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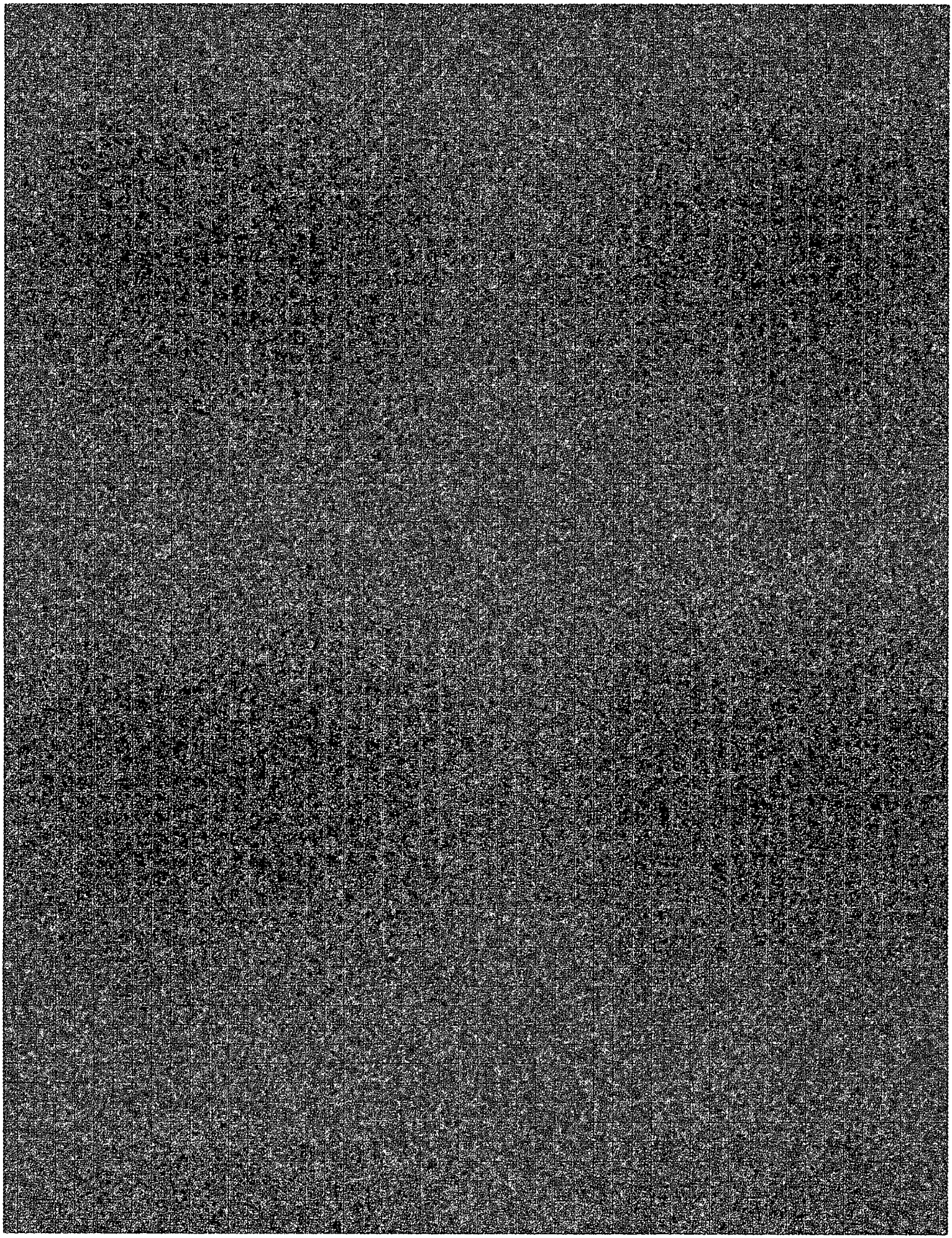
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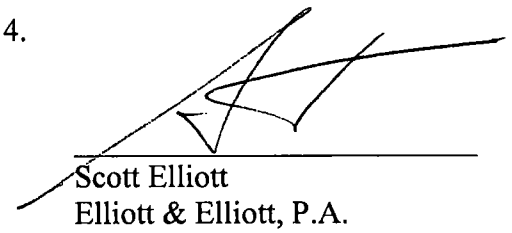
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CERTIFICATE OF COUNSEL

I, Scott Elliott, the undersigned attorney for the Appellant-Respondent, do hereby certify that this Record on Appeal contains all material proposed to be included by any of the parties and does not contain any matter which is irrelevant to this appeal.

This the 1st day of January, 2014.



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