

July 31, 1985

Docket No. 50-395

LICENSEE: South Carolina Electric & Gas Company

FACILITY: V. C. Summer Nuclear Station

SUBJECT: SUMMARY OF MEETING WITH SOUTH CAROLINA ELECTRIC & GAS COMPANY

GENERAL

On July 24 and 25, 1985, the NRC staff met with South Carolina Electric and Gas Company (SCE&G) to discuss the licensee's recent reanalysis of fire protection capability for the V.C. Summer Nuclear Station. The meeting was held in Bethesda, Maryland. A list of those persons who attended the meeting is included as Enclosure 1.

DISCUSSION

SCE&G presented a summary of their fire protection reevaluation program (Enclosure 2) that resulted in their submittal of May 29, 1985. Certain program areas were then discussed in detail including associated circuit analysis, revised plant shutdown scheme, emergency 8-hour lighting units, a horizontal barrier installed above the A-train service water booster pump, and common enclosure sampling methodology.

From this discussion, the NRC staff requested additional information be submitted in the areas of non-scheduled outage modification performance, non-outage work schedule, summary of times and steps to clarify the timeline, emergency lighting, sampling methodology for common enclosure, identification of areas that are local control areas, protection for the structural steel of the 'M' board, and information regarding fuses, lifted leads, and disconnects.

SCE&G agreed to provide the requested information.

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Jon B. Hopkins, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosures:
As stated

cc: See next page

DL:LB #4
JHopkins/ah
7/31/85

KNT
DL:LB #4
EAdensam
7/31/85

8508210036 850731
PDR ADOCK 05000395
F PDR

Mr. O. W. Dixon, Jr.
South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station

cc:

Mr. William A. Williams, Jr.
Technical Assistant - Nuclear Operations
Santee Cooper
P.O. Box 764 (Mail Code 167)
Columbia, South Carolina 29218

J. B. Knotts, Jr., Esq.
Bishop, Liberman, Cook, Purcell
and Reynolds
1200 17th Street, N.W.
Washington, D. C. 20036

Mr. Mark B. Whitaker, Jr.
Group Manager - Regulatory and
Support Services
South Carolina Electric & Gas Company
P.O. Box 764 (Mail Code 160)
Columbia, South Carolina 29218

Resident Inspector/Summer NPS
c/o U.S. Nuclear Regulatory Commission
Route 1, Box 64
Jenkinsville, South Carolina 29065

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission,
101 Marietta Street, N.W., Suite 2900
Atlanta, Georgia 30323

Chairman, Fairfield County Council
P.O. Box 293
Winnsboro, South Carolina 29180

Attorney General
Box 11549
Columbia, South Carolina 29211

Mr. Heyward G. Shealy, Chief
Bureau of Radiological Health
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

ATTENDEES

July 24 and 25, 1985

NRC

J. Hopkins
J. Wermeil
D. Kubicki
R. Anand
P. Madden
P. Taylor

Interscience Consultants

E. Christensen
T. Keckeisen

SCE&G

M. Whitaker
J. Barker
L. Lunden

Gilbert/Commonwealth Inc.

D. Kelly

South Carolina Public Service Authority

W. Williams, Jr.

10CFR50 Appendix R
Compliance Re-Evaluation
Summary of Program

PURPOSE

The following is a description of the evaluation which is being performed by SCE&G to demonstrate the compliance of V. C. Summer Nuclear Station to the latest interpretations of 10CFR50 Appendix R. This description has been developed to brief SCE&G executives and for presentation to the NRC NRR staff. It provides a summary of the effort performed to date and the planned effort to bring the evaluation to completion.

COMPLETED WORK

Due to the complex nature of this re-evaluation effort, special procedures were developed for each major activity prior to performance of the actual work. This ensured control of the work and provided a common base of understanding for all parties. It also provided a solid historical basis for future design control.

The re-evaluation effort was carried out in a carefully documented program that ensured that appropriate quality assurance considerations were employed. All proposed plant modifications will be made after an independent 10CFR50.59 analysis has been performed.

This re-evaluation effort started in the summer of 1984. The first effort was to independently evaluate the plant systems and mechanical components, including instrumentation transmitters, needed to ensure a safe shutdown consistent with current NRC interpretations of Appendix R. As a part of this

effort, mechanical components whose spurious actuation could be detrimental to safe shutdown were identified. The results of this effort included a list of components required for each basic shutdown function along with a working set of marked flow diagrams. As a means of checking, the results were then compared to the equipment defined by the original analysis performed in 1980. Differences were evaluated and the basis for the differences were documented.

As the effort proceeded, it was concluded that two different analyses were appropriate. The first analysis, known as the Compliance Review, would emphasize shutdown using only essential equipment with no restriction on the use of manual operation of components such as valves. Equipment included in this evaluation would be protected against the consequences of a fire if it was needed for safe shutdown for that particular fire location. The second analysis, known as the Normal Control Review, would emphasize using the normal control room controls for remote actuation of components. The intent of this analysis was to determine that, if a particular control scheme was found to be degraded due to a fire in a particular location, this could be identified on a component by component basis, and the operating procedure for a fire in that location could direct the operator to use local manual control.

Once the list of mechanical systems and equipment had been re-evaluated, an effort was undertaken to re-evaluate the electrical power systems and equipment. In this case, the systems and equipment were essentially identical to those established in 1980.

In parallel to establishing these lists of systems and equipment, a formal set of assumptions and necessary supporting evaluations was developed. This included individually documenting the basis for each of these assumptions and to providing the necessary calculations to support each identified shutdown consideration.

A composite list of equipment including both mechanical and electrical components was developed. The list also defined the control location for equipment, or the location of indication for instruments, to be used for either the Compliance Review or Normal Control Review evaluation.

Based on the list of mechanical and electrical components, the control scheme for each component was evaluated. This evaluation had multiple objectives which included:

- 1) The identification of individual cables required for the equipment's actuation.
- 2) The identification of supplemental equipment such as relay panels, power supplies, termination cabinets and control panels.
- 3) Cables whose failure could actuate equipment whose spurious actuation could be detrimental.
- 4) Power disconnect locations for valves whose spurious actuation could be detrimental.

Simultaneously with the development of the composite equipment list, a set of logic diagrams called "success trees" were developed. These success trees define all of the components necessary to achieve safe shutdown with each train of equipment while showing the various alternative systems and cross-connect possibilities. One set of success trees was developed for the Compliance Review evaluation and a second set was developed for the Normal Control Review evaluation.

These diagrams also carefully documented the interrelationships between various systems. For example, the logic block for a pump would also indicate any required cooling water, cooling air and its electrical power source. It should also be emphasized that these were logic diagrams as opposed to flow diagrams. Thus, two normally open valves in series, which were required to

remain open, were shown as series blocks on the logic diagram. Conversely, two valves in series which were normally closed, at least one of which needed to remain closed for safe shutdown, were shown as parallel items on the logic diagrams.

The next effort in the evaluation was to develop a list of equipment and cables located within each fire area. For each cable identified as being located in a particular fire area, the equipment whose function would be affected was also identified.

An analysis was then performed for each fire area to determine if one train of equipment would remain free from fire damage for a fire in that area. This was done by taking copies of the success tree diagrams and marking one copy for each fire area. When either a component, or a cable supporting a component, or a function shown elsewhere on the success tree was identified as being affected by the fire in the area, that component was marked as unavailable. After the success tree was marked in this manner for a given fire area, it was then reviewed to determine if an unaffected path existed which could be used for safe shutdown. If an unaffected path was found, it was then concluded that one train of equipment was free from fire damage; if no path was found, it was then necessary to analyze the diagram to determine the cause of the system failures.

The evaluation of these failures was done as a separate analysis, with each failure defined as a "potential deviation". Each potential deviation was given a unique identifier. The point in the success tree diagram was annotated by circling the diagram and the apparent solution was noted. After the potential deviations for each fire area in the plant were identified and documented,

a more complete evaluation was undertaken. This evaluation included walkdowns of each fire area to establish the exact location of components and cables, the existence of intervening combustibles, and the adequacy of the existing detection and suppression systems. Each potential deviation was studied in detail and an appropriate resolution was proposed. In many cases, these resolutions consisted of taking a credit for existing one hour rated conduit and cable tray wraps, the use of existing repair procedures for cold shutdown, or the recognition of existing spacial separation with limited intervening combustibles.

Each proposed resolution to a potential deviation was reviewed in detail with SCE&G lead personnel prior to its final signoff. Based on these accepted resolutions, requests for plant modifications were formally initiated. In addition, development was started on plant emergency procedures specific to major exposure fires. These procedures are being based on the results of the analysis including the identified resolutions of potential deviations.

In parallel with the above effort for analyzing each fire area, an effort was also undertaken to list each component and cable by fire zone. Based on this listing, an analysis was done using the success trees for the Normal Control Review evaluation. The intent of this evaluation was to identify those cases where control can be maintained for safe shutdown equipment from the control room versus those situations where some local manual actuation of devices such as valves will be required.

Concurrent with the evaluation described above, an independent review was made of the adequacy of the existing emergency battery pack lighting system, and the adequacy of the portable radio system and plant paging system to ensure that communications would remain operable for fire in any one location. Additionally, a review was made of the adequacy of the documentation for the design of the reactor coolant pump oil collection system.

Evaluations were also made of the adequacy of electrical power distribution system overcurrent coordination to demonstrate that cables "associated by common power supply" would not be detrimental to safe shutdown. Similarly, an evaluation was made of the adequacy of overcurrent protection for all power cables within the plant to demonstrate that cables "associated by common enclosure" could not be detrimental to safe shutdown.

PLANNED WORK

At this time, a procedure is being developed for long term control of design changes and the long term maintenance of Appendix R design features and documentation. It is the intent to implement this procedure in parallel with the completion of the analysis so that it will be fully functional at the time the analysis effort has been completed.

As a check on the long term maintenance procedure and as a verification of the effectiveness of our interim design control procedures, a review of all modifications in progress subsequent to the start of this review (October 1984) will be made.

Along with updating the data for plant modifications, a set of shutdown paths (trains of equipment) will be defined through the success trees. It is the intent, at this time, to select a path through the Compliance Review evaluation for fire areas where control room evacuation is necessary. However, for fires in general plant areas, it is anticipated that the defined paths will be equivalent to those of the Normal Control Review evaluation. This will ensure that, except for specially noted situations, normal control room controls will be used for fires outside of the control room, relay room and cable spreading room areas.

A report documenting the results of the previously completed evaluation for each fire area and zone will be prepared for future reference. This report will document any special actions to be incorporated in plant emergency procedures, or any special repairs required for cold shutdown.

In parallel with the completion of the analysis and preparation of the revision to the fire protection evaluation report the effort to make the necessary plant modifications and to complete the development of the emergency procedures will also be ongoing. Schedules for the completion of this work are covered under separate documentation.

July 31, 1985

MEETING SUMMARY DISTRIBUTION

Docket No(s): 50-395

NRC PDR

Local PDR

NSIC

PRC System

LB #4 r/f

Attorney, OELD

E. Adensam

Project Manager J. Hopkins

Licensing Assistant M. Duncan

NRC PARTICIPANTS

J. Hopkins

J. Wermeil

D. Kubicki

R. Anand

P. Madden

P. Taylor

bcc: Applicant & Service List