May 11, 2001

MEMORANDUM TO: ACRS Members

/RA/

FROM: Robert B. Elliott, Acting Senior Staff Engineer
ACRS

SUBJECT: CERTIFIED MINUTES OF THE ACRS SUBCOMMITTEE MEETING ON PLANT LICENSE RENEWAL REGARDING THE SAFETY EVALUATION REPORT RELATED TO THE LICENSE RENEWAL APPLICATION OF EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2, MARCH 28, 2001 - ROCKVILLE, MARYLAND

The minutes of the subject meeting, issued on May 8, 2001, have been certified as the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc via e-mail:
J. Larkins
H. Larson
S. Duraiswamy
ACRS Fellows and Technical Staff

Issued: May 8, 2001
Certified: May 9, 2001 ACRS-3246

CERTIFIED

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF ACRS SUBCOMMITTEE MEETING ON
PLANT LICENSE RENEWAL
MARCH 28, 2001
ROCKVILLE, MARYLAND

The ACRS Subcommittee on Plant License Renewal held a meeting on March 28, 2001, at 11545 Rockville Pike, Rockville, Maryland, in Room T-2 B3. The purpose of the meeting was to hold discussions with representatives of the NRC staff and Southern Nuclear Operating Company, Inc. (SNC), concerning the safety evaluation report (SER) on the license renewal application for Edwin I. Hatch Nuclear Plant, Units 1 and 2, and related license renewal activities. Mr. Sam Duraiswamy and Mr. Robert B. Elliott were the cognizant ACRS staff engineers for this meeting. The meeting was convened at 8:30 a.m. on March 28, 2001, and adjourned at 1:37 p.m. on the same day.

ATTENDEES:

ACRS
M. Bonaca, Chairman
F. P. Ford, Member
T. Kress, Member
J. Barton, Consultant
R. Elliott, ACRS Staff
G. Lietch, Member
W. Shack, Member
R. Uhrig, Member
S. Duraiswamy, ACRS Staff

NRC STAFF
C. Grimes, NRR
W. Burton, NRR
J. Fair, NRR
B. Elliot, NRR
H. Ashar, NRR
M. Khanna, NRR
J. Rajan, NRR
C. Lauron, NRR

SOUTHERN NUCLEAR OPERATING COMPANY, INC. (SNC)
R. Baker
C. Pierce
Kenneth McCracken
William Evans
R. Dyle
J. Mulvehill
Wayne Lunceford

There were no written comments or requests for time to make oral statements received from members of the public. Approximately seven members of the public attended the meeting. A list of meeting attendees is available in the ACRS office files.

SUBCOMMITTEE CHAIRMAN'S INTRODUCTION

Dr. Mario Bonaca, Chairman of the Plant License Renewal Subcommittee, convened the meeting at 8:30 a.m. on March 28, 2001. He stated that the purpose of the meeting was to review the license renewal application for the Edwin I. Hatch Nuclear Plant, Units 1 and 2, and the

associated NRC staff's SER. He called upon Mr. Christopher Grimes of the Office of Nuclear Reactor Regulation (NRR) to begin.

NRC STAFF PRESENTATIONS

Introduction - Mr. Christopher Grimes, NRR

Mr. Grimes outlined the information the staff planned to present to the Subcommittee and noted that the staff would emphasize some of the uniqueness identified by its review of the first license renewal application for a boiling water reactor (BWR) review.

Overview - Mr. William Burton, NRR

Mr. Burton provided an overview of the SER for the Hatch license renewal application. He discussed the differences in the Hatch application related to the scoping and aging management review processes as compared to previous license renewal applications. Mr. Burton stated that the staff's review of the Hatch application found that there are no unique materials, environments, or aging effects for Hatch as compared to the pressurized water reactors (PWRs) previously reviewed. The primary differences between the Hatch application and previous PWR applications are primarily process and formatting differences. There were no significant technical differences. Mr. Burton noted that Hatch was also the first to incorporate the Boiling Water Reactor Vessel and Internals Project (BWRVIP) topical reports into its application. The Subcommittee had previously reviewed some of these reports in its March 27, 2001 meeting.

The staff and the Subcommittee discussed whether or not the number of requests for additional information (RAIs) was high for the Hatch license renewal review. The staff stated that a lot of the RAIs were due to the difficulties the staff had in navigating through the application to find specific information. Many other RAIs were duplicative because of the format of the application. If these problems are accounted for, Mr. Grimes stated that he believed the number of RAIs for Hatch was similar to the number for the Arkansas Nuclear One, Unit 1, license renewal application review.

SER Section 2 - Structures and Components Subject to an Aging Management Review - Mr. William Burton, NRR

Mr. Burton described the staff's methodology for reviewing the applicant's scoping and screening process (including on-site inspections), and the staff's findings and conclusions. He explained the differences between the Hatch scoping and screening processes and the approaches taken by the previous license renewal applicants. Mr. Burton further explained that as part of the staff's review, three inspections were conducted. The first of these inspections was a scoping inspection. This inspection was performed in September 2000. In this inspection, the staff sampled several systems and walked through the scoping process. Mr. Burton stated that inspectors found that the applicant performed their scoping reviews consistent with their application and with the License Renewal Rule (10 CFR Part 54). The inspectors did find that the scoping procedures needed to be improved because they were results oriented and did not

provide step by step procedures for performing the scoping review. In the next inspection, it was found that the applicant had made appropriate corrections to their procedures. Mr. Burton also pointed out some of the difficulties encountered by the staff due to the function oriented approach utilized by the applicant for scoping. In many cases, the staff had trouble identifying where a particular system or portion of a system having an intended function had actually been identified in the application. The difficulty resulted from the applicant's grouping of structures, systems and components with similar functions under one functional category (e.g., all portions of systems having containment isolation intended functions were grouped under intended function C-61, "Containment Isolation," instead of listing each system separately and indicating that it performed a containment isolation intended function).

Mr. Burton stated that there are 18 open items in SER, and that at the time of the Subcommittee meeting, four were undergoing the first level of the appeal process. This process allows for appeals to successive levels of NRC management when the staff and the applicant cannot agree on a resolution for an open item. Although four were currently under appeal, this did not prohibit the applicant from identifying other open items that they wanted to appeal.

Mr. Burton presented several significant open items, including items concerning seismic II/I piping, complex assemblies (e.g., skid mounted equipment for the hydrogen recombiners), housings for active components (fans, filters, cooling coils, etc.), and radwaste building fire protection system. For the seismic II/I piping issue, the staff believes that this piping should be in scope because it meets the scoping criteria of 10 CFR 54.4 (i.e., a non-safety structure, system or component whose failure could prevent a safety structure, system or component from performing its safety function). SNC believes that since this piping is seismically supported, only the supports are in scope. Mr. Burton stated that this is one of the four open items undergoing appeal. For the complex assembly issue, Mr. Burton indicated that SNC has agreed to perform the scoping review for these items consistent with the current Standard Review Plan for License Renewal. This item is, therefore, on a path to resolution. For the housings on active components issue, the staff believes that fan, filter, and coil housings should be considered in scope similar to valve and pump casings because they perform similar pressure retaining functions. The applicant and the industry are concerned about how far they have to break down an active component in search of passive elements. Mr. Burton stated that this item was the second of the four items undergoing appeal. The radwaste building fire protection system was not shown as being within the scope of license renewal in the Hatch application. The staff disagreed, and Mr. Burton stated that he believes that SNC will bring this system within scope, perform an aging management review, and establish how any aging effects will be managed.

The staff, SNC and the Subcommittee discussed how specific components are addressed in the application, including plant service water intake structure, access doors, scram discharge volume, refueling crane 125 ton hook, air receivers, nuclear boiler system accumulator, piping insulation inside containment, traveling water screen and trash racks, and condensate transfer system pumps and piping.

SER Section 3 - Aging Management Review:

Section 3.1: Ms. Meena Khanna and Mr. Jai Rajan, NRR, described the staff's overall review of 30 aging management programs and seven related significant open items in the SER. Ms. Khanna discussed open items related to the reactor water chemistry control program, corrosion of diesel fuel oil storage tanks, stress corrosion cracking of high strength bolting, the integrated surveillance program, and the residual heat removal (RHR) heat exchanger augmented inspection and testing program. Mr. Burton pointed out that none of these items were under appeal by SNC. Mr. Grimes stated, however, that the issue of stress corrosion cracking of high strength bolting was undergoing an industry level appeal. The industry concern is the evaluation guidelines. They do not want to have to differentiate between high strength bolts (i.e., greater than 150 ksi) and bolts with yield strengths below 150 ksi.

Mr. Rajan then followed with a discussion of two open items related to fire protection aging management programs: testing of sprinkler heads in the fire protection system and sprinkler head inspection intervals. The testing of sprinkler head issue is on a road to resolution based on lessons learned from the GALL report. The concern with testing of sprinkler heads is flow blockage. However, in GALL flow obstruction is not considered an aging effect and is related to the active features of system flow. For the sprinkler head inspection interval item, the staff and the applicant are not close to agreement. The applicant is proposing a one-time inspection at 50 years of service life. The staff is proposing inspection and testing consistent with the National Fire Protection Association Codes and Standards that require laboratory testing of representative samples at 50 years, or replacement. If testing is chosen, additional testing is required every 10 years thereafter.

The Subcommittee and the staff discussed the handling of the torus, embedded components, and the applicant's passive component inspection program.

Section 3.2: Mr. Barry Elliot, NRR, presented an overview of the reactor and reactor coolant system aging management programs, and the incorporation of the BWR Vessel and Internals Project (BWRVIP) topical reports by reference in the Hatch application. Mr. Elliot stated that there are 15 aging management programs associated with the reactor and reactor coolant system. These programs encompass the reactor pressure vessel, the reactor vessel internals, the reactor recirculation loops, the reactor coolant system piping and valves, main steamlines, main steam isolation valves, safety relief valves, feedwater lines, feedwater line check valves, and instrumentation and control. Two of the programs, the reactor vessel and internals program and the reactor pressure vessel monitoring program, reference 12 BWRVIP reports that establish the guidelines for inspection during the renewal period. The staff has not completed its generic review of three of the referenced reports; however, it was able to complete the review for Hatch on a plant-specific basis. Mr. Elliot stated that there are two open items in this section. First, the staff believes that the cast stainless steel jet pump assemblies and the fuel supports are susceptible to loss of fracture toughness due to neutron irradiation. The staff is proposing a one-time inspection to address this. The second open item is related to potential cracking in small bore piping. These pipes are not inspected during the first 40 years of life. The staff believes a

one-time inspection of a sample of small bore piping is appropriate for the extended period of operation. Mr. Grimes stated that the small bore piping issue is the subject of an industry appeal.

The staff and the applicant answered questions by the Subcommittee and provided the following additional information. The staff and the BWRVIP will continue to evaluate new data that come from the BWRVIP inspections. If the data show that any portion of the BWRVIP reports, such as the disposition curves in the BWRVIP-60, "Evaluation of Crack Growth in BWR Low Alloy Steel Reactor Pressure Vessel Internals," are non-conservative, then the staff and the BWRVIP will revisit the applicable reports. Very thick section components such as the bottom head and the H9 weld in the reactor vessel are being inspected consistent with BWRVIP-38, "Shroud Support Inspection and Evaluation Guidelines," and with Section XI of the ASME code. Because of incidents of cracking encountered in foreign plants, the BWRVIP and the staff are evaluating the need to revise the BWRVIP-38 report. The staff agrees with the Subcommittee that stress corrosion cracking of the reactor vessel would be a serious safety concern if it occurs, but experience has shown that cracks penetrating the clad have failed to propagate through the carbon steel. The staff does not consider void swelling to be an issue for BWRs because they operate at a substantially lower temperature than PWRs. However, if it were to occur, it would likely be identified in one of the vessel internals inspections (e.g., cracking in the core shroud).

Sections 3.3, 3.4, and 3.5: Ms. Carolyn Lauron, NRR, presented overviews of the engineered safety features, auxiliary systems, and the steam and power conversion system aging management programs. She indicated that there are no open items related to these sections.

Section 3.6: Mr. Hans Ashar, NRR, presented an overview of structures and structural components aging management programs. He stated that two of the three open items in the SER had already been closed. One was undergoing an appeal. The first of the resolved open items related to a question from the staff on how aging management of corrosion of torus penetrations is being managed. The applicant provided additional information demonstrating adequate management of aging effects on torus penetrations. The second of the closed open items related to concerns the staff had about adequate aging management of gears, latches, and linkages for access openings. This item was closed based on GALL report which demonstrated that there were sufficient programs in place to manage the aging effects for these components. The remaining open item relates to the need to have an aging management program to ensure that the secondary containment provides adequate leakage characteristics so that the standby gas treatment system can perform its safety function during an accident. This is the item that was under appeal by SNC.

The staff and the applicant answered several Subcommittee questions and provided the following additional information. None of the electrical components in the switchyard are within the scope of license renewal. However, the emergency diesel generator's ability to provide alternate sources of electricity is within scope. For the service water intake structure, silting is addressed by the applicant. Divers are used to inspect the structure for silting effects. There are no concerns at present regarding settling of structures and any potential impact on piping systems at Hatch.

Section 3.7: Mr. Burton then presented an overview of the electrical and instrumentation and control aging management program. The staff did not have any open items in this area. In response to a question from the Subcommittee, the staff indicated that electrical cabinets are within scope for structural reasons. These cabinets are managed for aging effects such as corrosion. The internals of the cabinets, however, are active components not subject to aging management.

SER Section 4 - Time Limited Aging Analyses: Mr. John Fair

Mr. John Fair, NRR, presented an overview of the staff's review of the Hatch time limited aging analyses (TLAAs). He stated that there were two open items in Section 4.1 related to the identification of TLAAs. The first open item is a question from the staff as to why certain fatigue evaluations of reactor vessel internals were not identified as TLAAs. A second part to this open item is a catch-all question from the staff asking the applicant to identify any other fatigue evaluations that were not considered TLAAs. The second open item related to postulated high-energy line-breaks (postulations that are based on a fatigue cumulative usage factor) was one of the four open items under appeal. In Section 4.2, there is one open item related to the resolution of the environmentally assisted fatigue issue. The staff is questioning the applicability of generic reports to specific locations at Hatch. Dialog on this issue is ongoing. No open items were identified for Sections 4.3-4.7. Main steam isolation valve operating cycles was originally considered a TLAA by the applicant; however, upon further review, the applicant withdrew this item as a TLAA on the basis of maintenance and monitoring programs. The staff has accepted the applicant's position that it is not a TLAA.

SOUTHERN NUCLEAR OPERATING COMPANY PRESENTATIONS

Background - Mr. Charles Pierce

Mr. Pierce presented introduction and background information on the Hatch license renewal application and the license renewal project methodology and management plan. He stated that SNC has been very active in license renewal from the beginning dating back to the first license renewal rule. They had also participated in the license renewal demonstration project with the NRC in 1996. He noted that SNC was the first applicant to effectively file an electronically formatted application and drawings. The application and drawings were hyperlinked for ease of use. The application had undergone a major rewrite prior to its submission so that it would be consistent with the standard application format developed by the industry and the NRC. This standard format was developed late in the development of the Hatch application, but SNC felt that the rewrite was important and that it benefitted both the NRC and SNC to do so. Mr. Pierce concluded his presentation by stating that the application underwent a peer review by approximately 25 to 30 industry experts prior to its submission to the NRC.

Hatch License Renewal Application - Mr. Ray Baker

Mr. Baker explained the application format, scoping and screening processes, and methodology for identifying the aging effects associated with mechanical, electrical, and structural components. Mr. Baker described the aging management programs that included 30 programs: 17 existing programs, 5 enhanced or modified programs, and 8 new programs. He also summarized the time limited aging analysis process.

The Subcommittee and Mr. Baker discussed the reasons Hatch used a functional approach for scoping versus the systems approach in the Hatch application. Mr. Baker stated that the functional approach was chosen because of the similarities in scoping criteria between the Maintenance Rule and the License Renewal Rule. Because of these similarities, the Plant Hatch Maintenance Rule Manual was selected as one of the key documents for performing a scoping review for the license renewal application. Since the functional approach was used for the Maintenance Rule scoping, it was also used for the license renewal application because it gave the applicant a readily available starting point for the scoping analysis. Mr. Baker further stated that the output of the applicant's scoping review was a set of intended functions. All structures or components performing an intended function were considered in scope regardless of the system designation for those structures and components. Structures or components having more than one intended function were grouped under one main function. The Subcommittee pointed out that this made it difficult to determine if a specific component was within scope. Mr. Baker agreed and pointed out that system boundary drawings were generated as an adjunct to the application to make it clear which structures and components were considered to be within scope. The Subcommittee asked if SNC utilized the draft Generic Aging Lessons Learned (GALL) Report in developing its application. Mr. Baker replied that SNC did not use the GALL report because it was being developed at the same time SNC was developing the Hatch application. SNC was following the development of the GALL report and some of the processes used in the development of the application were similar to processes contained in the early version of the GALL report.

The structures and components identified as being within scope and subject to an aging management review were broken down into commodity groups. Mr. Baker stated that the demonstration of adequate aging management is made for each commodity group by the combination of programs or activities credited for managing the associated aging effects for each commodity group. The combination of aging management activities selected in an aging management review addressed all 10 attributes of an adequate aging management program as defined in the Standard Review Plan for License Renewal.

Mr. Baker concluded his presentation with a discussion on SNC's time-limited aging analysis process. 10 CFR 54.3 provides six criteria that define a time-limited aging analysis. The applicant identified approximately 8300 calculations which were initially screened using the third criterion of 10 CFR 54.3 to see if they were time-limited in nature. More than 1200 were considered to be time-limited. These were then evaluated against the remaining five criteria to determine if they were time-limited aging analyses. More than 900 met all six of the criteria. The applicant also

performed a word search of their Final Safety Analysis Report and other documents to try and identify any other time-limited aging analyses.

At the Subcommittee's request, SNC provided a brief overview of some of the operating experience relative to aging effects of components or systems at Hatch. The following summarizes the Hatch operating experience presented by the applicant:

- Unit 1 experienced intergranular stress corrosion cracking in the core spray sparger (years ago). Crack was repaired by installing a mechanical clamp.
- Unit 1 experienced a flaw initiated by thermal fatigue in the feedwater sparger. The sparger was replaced by a triple sleeve double piston sparger. The problem was fixed for Unit 2 before startup by replacing the sparger with a welded in-place sparger with a single thermal sleeve.
- Since replacing/repairing the spargers and implementing inspections in accordance with NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking," no further problems have been experienced by any BWR in the industry.
- Hatch replaced the jet pump beams with newer heat treated versions.
- Inspections of the top guides at Hatch per the BWRVIP guidance have found no evidence of cracking. Oyster Creek is the only plant to experience this.
- Hatch performed a preemptive repair to the core shroud for economic reasons.
- Cracking was observed in access hole covers several years back. SNC was not able to determine the cause. The covers were replaced with mechanical devices which are regularly inspected.
- Hatch has detected corrosion and stress corrosion on some cap screws for the control rod drive housings. Per GE recommendations, Hatch is replacing the affected screws with an improved design, higher grade material screw.
- Hatch has experience corrosion and erosion of small bore piping (4 inch diameter and smaller). Failed lines have been replaced with type 304 or 304L piping in lieu of the original carbon steel. Some flow assisted corrosion (FAC) has been experienced in the high pressure coolant injection (HPCI) and the reactor core isolation cooling (RCIC) drains to the condenser. This piping has been added to the plant FAC program and is periodically inspected for degradation.
- Minor corrosion pitting has been experienced in the Hatch torus. The torus is monitored for coating degradation. One unit is inspected with divers every outage, the other unit is inspected every second outage. There is some variation in corrosion rates between the units. The cause of this difference is not yet identified.
- Hatch has experienced instances of high particulate levels in the diesel fuel tanks. This has been corrected by filtration or by draining and cleaning the tanks. Other methods of reducing particulate levels in the tanks are being evaluated.

SUBCOMMITTEE COMMENTS, CONCERNS, AND RECOMMENDATIONS

- The Subcommittee requested to be notified of any progress of the March 29, 2001 appeals meeting by March 30, 2001, so that the Subcommittee members could consider any progress prior to the Full Committee meeting on April 5, 2001.

- The Subcommittee commented that the approach used by SNC for developing the Hatch application was confusing to the reviewer. Information was difficult to access, and the application was difficult to navigate. The application is not readily scrutable to a member of the public.

- Notwithstanding the remaining 18 SER open items, the applicant has adequately demonstrated that the existing programs and proposed new programs will adequately manage aging effects during the period of extended operation.

- At the Full Committee meeting on April 5, 2001, the staff should present the scoping and screening methodology, a summary of the open issues with a focus on the results of the appeals, the BWRVIP topical reports, and a summary of how the numbers of one-time inspections are evolving from application to application.

SUBCOMMITTEE DECISIONS

The Subcommittee decided to recommend to the Full Committee that an interim letter be prepared at the April 5-7, 2001 ACRS meeting.

The Subcommittee plans to review the resolution of the open items at the October 2001 ACRS meeting.

PRESENTATION SLIDES AND HANDOUTS PROVIDED DURING THE MEETING

The presentation slides and handouts used during the meeting are available in the ACRS office files or as attachments to the transcript.

BACKGROUND MATERIAL PROVIDED TO THE SUBCOMMITTEE:

1. Letter from David B. Matthews, Office of Nuclear Reactor Regulation to H.I. Summer, Southern Nuclear Operation Company, Inc., “Determination of Acceptability and Sufficiency for Docketing and Opportunity for a Hearing Regarding an Application from Southern Nuclear Operating Company, Inc. for Renewal of the Operating License for Units 1 and 2 of Edwin I. Hatch Nuclear Plant,” dated March 24, 2000.
2. “Safety Evaluation Report with Open Items Related to the License Renewal of Edwin I. Hatch Nuclear Plant, Units 1 and 2," dated February 2001.

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NOTE: Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, MD, (301) 415-7000, or can be purchased from Neal R. Gross and Co., Inc. 1323 Rhode Island Avenue, N.W., Washington, D.C. 20005, (202) 234-4433.

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