



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

December 16, 2004

MEMORANDUM TO: ACRS Members

FROM: Cayetano Santos Jr., Senior Staff Engineer */RA/*
Technical Support Staff
ACRS/ACNW

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS
SUBCOMMITTEE MEETING ON THE ARKANSAS NUCLEAR ONE
UNIT 2 LICENSE RENEWAL APPLICATION, DECEMBER 1, 2004 -
ROCKVILLE, MARYLAND

The minutes of the subject meeting were certified on December 15, 2004, as the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc: J. Larkins
S. Duraiswamy
J. Flack
M. Snodderly



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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WASHINGTON, DC 20555 - 0001

December 15, 2004

MEMORANDUM TO: Mario Bonaca, Chairman
ACRS Plant License Renewal Subcommittee

FROM: Cayetano Santos Jr., Senior Staff Engineer, **/RA/**
Technical Support Staff
ACRS/ACNW

SUBJECT: WORKING COPY OF THE MINUTES OF THE ACRS
SUBCOMMITTEE MEETING ON THE ARKANSAS NUCLEAR ONE
UNIT2 LICENSE RENEWAL APPLICATION, DECEMBER 1, 2004 -
ROCKVILLE, MARYLAND

A working copy of the minutes for the subject meeting is attached for your review. Please review and comment on them at your earliest convenience. If you are satisfied with these minutes please sign, date, and return the attached certification letter.

Attachments: Certification Letter
Minutes (DRAFT)

cc w/o Attachment:

J. Larkins
J. Flack
S. Duraiswamy
M. Snodderly



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WASHINGTON, DC 20555 - 0001

MEMORANDUM TO: Cayetano Santos Jr., Senior Staff Engineer,
Technical Support Staff
ACRS/ACNW

FROM: Mario Bonaca, Chairman
ACRS Plant License Renewal Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS
SUBCOMMITTEE MEETING ON THE ARKANSAS NUCLEAR ONE,
UNIT 2 LICENSE RENEWAL APPLICATION, DECEMBER 1, 2004 -
ROCKVILLE, MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on December 1, 2004, are an accurate record of the proceedings for that meeting.

/RA/ _____ 12/15/04
Mario Bonaca , Date
Plant License Renewal Subcommittee Chairman

CERTIFIED

12/15/04

By Mario Bonaca

Issued: 12/13/04

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF ACRS PLANT LICENSE RENEWAL SUBCOMMITTEE MEETING
ON THE ARKANSAS NUCLEAR ONE, UNIT 2 NUCLEAR POWER PLANT
DECEMBER 1, 2004
ROCKVILLE, MARYLAND

On December 1, 2004, the Plant License Renewal Subcommittee held a meeting in Room T2B3, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to review and discuss the Arkansas Nuclear One, Unit 2 License Renewal Application (LRA) and Draft Safety Evaluation Report (SER).

The meeting was open to the public. No written comments or requests to make oral statements were received from members of the public related to this meeting. Mr. Cayetano Santos was the Designated Federal Official for this meeting. The meeting convened at 1:30 pm and adjourned at 5:45 pm on December 1, 2004.

ATTENDEES:

ACRS MEMBERS/STAFF

Mario Bonaca, Chairman
Richard Denning, Member
John Sieber, Member
Victor Ransom, Member
Cayetano Santos Jr., ACRS Staff

Stephen Rosen, Member
Peter Ford, Member
Graham Wallis, Member
Graham Leitch, Consultant

NRC STAFF/PRESENTERS

P. Kuo, NRR
J. Rowley, NRR
L. Lois, NRR
J. Medoff, NRR
R. Nease, Region IV
G. Georgiev, NRR
R. McNally, NRR
D. Merzke, NRR
L. Tran, NRR
C. Li, NRR
S. Hoffman, NRR
T. Liu, NRR
B. Rogers, NRR
M. Mitchell, NRR
M. Hartzman, NRR
J. Hernandez, NRR
K. Chang, NRR

G. Suber, NRR
R. Dipert, NRR
J. Ayala, NRR
K. Cozens, NRR
G. Cranston, NRR
D. Nguyen, NRR
S. Lee, NRR
M. Lintz, NRR
J. Guo, NRR
T. Le, NRR
M. Morgan, NRR
R. Auluck, NRR
S. Mitra, NRR
J. Tsao, NRR
V. Rodriguez, NRR
K. Hsu, NRR
J. Zimmerman, NRR

Y. Li, NRR
P. Kang, RES
A. Stone, Region III

J. Ma, NRR
T. Cheng, NRR

OTHER ATTENDEES

G. Young, Entergy
M. Miller, AREVA
M. Stroud, Entergy
R. Rucker, Entergy
J. Ivy, Entergy
A. Cox, Entergy
R. Ahrabus, Entergy
J. Knorr, NMC-LLC
K. Green, ISL
P. Schoepf, AEP
D. Mlynarczyk, ISL
R. Vincent, NMC

M. Rinckel, AREVA
B. Kalinowski, AEP
D. Wooten, Dominion
D. Lach, Entergy
N. Haggerty, AEP
D. Johnson, NMC-LLC
P. Aitken, Dominion
M. Patterson, Metamorph
R. Grumbir, AEP
S. Pope, ISL
K. Prasad, ISL

The presentation slides, handouts used during the meeting, and a complete list of attendees are attached to the Office Copy of the meeting minutes. The presentation to the Subcommittee is summarized below.

Opening Remarks

Mr. Bonaca, Chairman of the Plant License Renewal Subcommittee, convened the meeting and made a few introductory remarks. The purpose of this meeting is to review Entergy's license renewal application (LRA) and the related Draft Safety Evaluation Report (SER) for Arkansas Nuclear One, Unit 2 (ANO2). Mr. Bonaca called upon Mr. Kuo of the Office of Nuclear Reactor Regulation (NRR) to begin the discussion.

Staff Introduction

Mr. Kuo introduced several members of the staff including Mr. Suber (license renewal program manager), Ms. Nease (inspection team leader), and Mr. Cranston (audit team leader). Mr. Kuo also noted that ANO2 is the second plant to be reviewed with a new process that uses on-site audits to verify consistency with the Generic Aging Lessons Learned Report (GALL).

ANO2 License Renewal Application

Mr. Young, Entergy, greeted the Subcommittee and introduced accompanying members of the Entergy and AREVA staff. The key elements of Mr. Young's presentation included a description of ANO2, its operating history, the scoping methodology, the application of GALL, and commitment tracking.

Background and Plant Description

On October 15, 2003, Entergy submitted an application to the NRC for renewal of the ANO2 operating license for an additional 20 years. The current operating license for ANO2 expires on July 17, 2018. Entergy also identified staff approved past precedents that are not in GALL and provided this information to the staff.

ANO2 is a pressurized water reactor (PWR) unit with a dry ambient containment. ANO2 began initial operations in 1978 and has a capacity of 3026 MWt or 1023 MWe. Mr. Young also noted some differences between ANO Unit 1 and 2. Unit 1 is a Babcock and Wilcox PWR that uses once through cooling, while Unit 2 is a Combustion Engineering PWR with a cooling tower.

Operating History/Major Equipment Replacements and Repairs

In 2002, a power uprate of 7.5% increased capacity by 210 MWe. In 2000 the steam generators were replaced with Westinghouse Delta 109 U-tube steam generators.

Scoping and Screening Method

The scoping methodology was applied on a plant system basis per the requirements of 10 CFR 54.4(a) and screening was performed per the requirements of 10 CFR 54.21(a)1. Mr. Young added that all components located in a room that contains both safety and non-safety related equipment were assumed to be in scope.

Application of GALL

The ANO2 license renewal application focused on consistency with GALL but since some material/environment/program combinations were not addressed in GALL some plant-specific programs were used. Mr. Young stated that information from Entergy's past precedent review was provided separately from the LRA. This information is being considered by the staff in an update of the GALL report.

Of the 33 aging management programs (AMPs) at ANO2, 15 are consistent with GALL with enhancements, 7 are consistent with GALL with exceptions, and 11 are plant-specific. Of the 11 plant-specific programs, 8 are based on past precedents. Mr. Young stated that the One-Time Inspection Program was added after the LRA was submitted.

Commitment Tracking

Mr. Young stated that all commitments made through the LRA, the audit/inspection process, and requests for additional information are tracked with the ANO Licensing Commitment Tracking System.

Mr. Young concluded by stating that the use of past precedents and the on-site audits increase the efficiency of the license renewal process.

SER Overview

Mr. Suber discussed the staff's license renewal activities. The key elements of the staff's presentation described an overview of the Draft SER, the aging management program reviews and audits, and the time-limited aging analyses.

The Draft SER did not contain any open or confirmatory items but did list the following license conditions:

1. The FSAR should be updated upon issuance of the renewed license.
2. The future activities should be completed as described in the FSAR Supplement prior to entering the period of extended operation.

3. The reactor vessel surveillance capsules should be removed and tested in accordance with ASTM E185-82 and any changes to the withdrawal schedule or storage requirements should be approved by the NRC.

Mr. Suber listed the dates of the various audits and inspections performed by the staff.

Scoping and Screening

Mr. Suber stated that the scoping and screening methodology is adequately described in the LRA and satisfies the requirements in 10 CFR 54.4 and 10 CFR 54.21(a)(1). In addition, the review of the scoping and screening results found that the systems, structures, and components (SSCs) within scope of license renewal and subject to an aging management review (AMR) have been identified. As a result of the staff's review, the feedwater outboard block valve and the power transmission conductors were brought into scope, and the intake canal structure was included in an aging management program.

Onsite Inspection Results

Ms. Nease, Region IV, described the license renewal inspections performed by the Region. These inspections were performed in accordance with License Renewal Manual Chapter MC2516, Inspection Procedure IP 71002, and a site-specific inspection plan. The scoping and screening inspection was performed in March 2004 and concluded that the scoping and screening process successfully identified those SSCs requiring an AMR. As a result of this inspection the spent fuel pool cooling pumps and the switchyard control house were brought into scope of license renewal. The aging management review inspection was performed in November 2004 to confirm that the applicant has or will implement AMPs to manage the effects of aging. The results of this inspection will be documented in a future inspection report.

Ms. Nease also described the recent performance of ANO2. All of the NRC performance indicators for the third quarter of 2004 are green. However, ANO2 is in the Regulatory Response Column of the NRC Action Matrix because of a white finding in the area of fire protection. Ms. Nease concluded by stating that the Annual Assessment Letter for ANO2 identified a substantive issue regarding Problem Identification and Resolution.

Aging Management Program Review and Audits

Mr. Suber described the staff's review of the aging effects associated with various plant systems and components. The staff's review of the reactor vessel, internals and reactor coolant systems resulted in 1 license condition and 3 commitments to submit AMPs for NRC review and approval. As a result of the staff's review the One-Time Inspection Program was added to supplement the System Walkdown AMP and the intake canal structure was included in the Structures Monitoring Program. Even though the pH, chloride and sulfate levels of the below grade water environment are nonaggressive, the Structures Monitoring Program will be used to manage the effects of aging of inaccessible concrete. Mr. Suber also noted that the power transmission conductors which were brought in scope as a result of the staff's review, did not require an AMP.

Mr. Cranston, NRR, stated that AMPs are divided into 4 categories: consistent with GALL, consistent with GALL with exceptions, consistent with GALL with enhancements, and based on previously approved staff positions. Mr. Cranston also noted that information regarding NRC approved precedents was supplementary information provided voluntarily by the applicant. It

was not part of the LRA. For the AMPs based on past precedents, the audit team evaluated the applicability of the previously approved staff position, determined if the program was bounded by the conditions for which the previous staff position was approved, and verified that the program contains the attributes of the referenced precedent. Mr. Cranston described several of the AMPs including the Structures Monitoring - Masonry Wall Program, the Diesel Fuel Monitoring Program, the Fire Water System Program, and the Cast Austenitic Stainless Steel Evaluation Program.

The Structures Monitoring - Masonry Wall Program is an existing AMP that is consistent with GALL. During the audit of this AMP, the team found that the initial baseline examinations were not documented properly, the first 5 year reexamination was not performed, and qualifications for personnel qualified to perform walkdowns were not established. The applicant generated a condition report to document and correct these deficiencies.

The Diesel Fuel Monitoring Program is new AMP that is consistent with GALL with exceptions. The exceptions are the use of fewer additives, the use of ASTM standard D 1796 instead of D 2709, the use of a smaller filter pore size, and a lack of ultrasonic measurements of tank bottoms. The staff found these exceptions acceptable because a vendor recommended additive package was used, ASTM D2709 did not apply, the smaller pore size is more conservative, the bottom of the tank is not likely to be exposed to water, accessible tank surfaces undergo a periodic visual inspection, and operating experience at ANO2 has not shown any wall thinning problems.

The Fire Water System is an example of an AMP that is consistent with GALL with enhancements. The program enhancement is to inspect sprinkler heads consistent with Interim Staff Guidance (ISG) 04.

The Cast Austenitic Stainless Steel (CASS) Evaluation Program was originally submitted based on a previously approved staff position but was changed to be consistent with GALL. The audit team determined that the code case to perform only external visual inspections was not applicable to ANO2. Therefore, the applicant revised the AMP to be consistent with GALL. An example of a plant-specific AMP based on a previously approved staff position is the Wall Thinning Monitoring Program. This AMP was previously approved by the staff for ANO1.

The staff concluded that the applicant has demonstrated the effects of aging will be managed so that the intended functions will be maintained consistent with the current licensing basis for the period of extended operation.

Time Limited Aging Analyses (TLAAs)

Mr. Suber stated that the applicant has identified the appropriate TLAAs. Of the 11 TLAAs at ANO2, 5 were identified from NUREG 1800 and 6 were identified by the applicant. The applicant has also demonstrated that (1) the TLAAs are valid for the period of extended operation, (2) the TLAAs are projected to the end of the period of extended operation, or (3) that aging effects will be adequately managed for the period of extended operation.

Embrittlement of the reactor vessel affects TLAAs associated with upper shelf energy (USE), pressurized thermal shock (PTS), and pressure temperature limits. Calculations by the staff and applicant demonstrate that the beltline materials continue to meet the USE acceptance

criterion in 10 CFR 50 Appendix G through 48 Effective Full Power Years (EFPY). The staff also performed independent calculations of RT_{PTS} values and concluded that the limiting beltline material continues to meet the screening criterion in 10 CFR 50.61 through 48 EFPY.

The staff concluded that analyses associated with fatigue of ASME Class 1 components; fatigue of ASME Non-Class 1 piping components; fatigue of containment liner plate and penetrations; fracture of reactor coolant pump casings, and Leak-Before-Break of RCS piping systems remain valid for the period of extended operation.

The staff made the following conclusions regarding the other TLAAAs:

1. The loss of prestress in containment tendons will be adequately managed for the extended period of operation.
2. The Environmental Qualification Program is consistent with GALL and will continue to manage equipment in accordance with 10 CFR 50.49.
3. The analyses of Alloy 600 nozzle repairs projected through the period of extended operation are valid.

Mr. Suber concluded by stating that the applicant has met the requirements for license renewal and there is reasonable assurance that activities will continue to be conducted in the renewal term in accordance with the current licensing basis.

Member Comments

General

Chairman Bonaca and Member Rosen asked about the replacement steam generators. Mr. Young replied that the replacement steam generators were of the same design as the original steam generators but were designed for a higher power rating and contained tube materials constructed from Alloy 690.

Several Members and Consultant Leitch asked questions regarding the reactor pressure vessel head. The applicant stated that an inspection of the head in 2002 did not indicate any leakage even though ANO2 is a high susceptibility plant. Since some of the penetrations are covered by a shroud which prevents a complete 360E bare metal visual inspection, alternative eddy current and ultrasonic inspections were performed. The results of these volumetric inspections did not show any cracking. The applicant has plans to replace the head, but the earliest this could be done is 2008. In the meantime the applicant plans to modify the shroud covering the penetrations to allow increased access for visual inspections.

In response to a question from Consultant Leitch, Ms. Nease stated that the material condition of the plant was very good.

Chairman Bonaca and Member Rosen asked about the issue identified in the Annual Assessment Letter regarding Problem Identification and Resolution. Ms. Nease responded that errors in the prioritization, implementation, and effectiveness of corrective actions were found across the board at the plant. This is a concern because AMPs depend upon the effectiveness of the Corrective Action Program.

Chairman Bonaca and Member Wallis commented that the audit report for AMPs and AMRs is very valuable to reviewers.

Several Members commented that there are no issues regarding the ANO2 license renewal application or draft SER.

Scoping and Screening

Several Members and Consultant Leitch asked questions regarding the justification for the scoping and screening classification of components.

In response to a question from Consultant Leitch, the applicant stated that there were no problems associated with the scoping of systems shared between Units 1 and 2.

Consultant Leitch asked if the scoping process considers situations in which the disintegration of non safety-related components affects the operation of safety-related components. Except for steam dryers in BWRs, operating experience has shown that this type of interaction has not been a problem. The staff added that active components are examined routinely as part of the maintenance program.

Aging Management

Consultant Leitch asked why buried components are inspected opportunistically and not at a scheduled frequency as recommended by GALL. Mr. Young replied that operating experience has shown that underground pipes are excavated every 5 to 10 years and inspected at that time. Mr. Young added that excavating a pipe has the potential to damage its external coating. In response to a question from Member Sieber, the applicant stated that no inspections are performed on the inside of buried pipes because other AMPs are credited for managing corrosion on these interior surfaces.

Consultant Leitch asked about the schedule for implementing new AMPs and suggested that this information be discussed at the Full Committee meeting. The applicant stated that the new AMPs will be phased in such that they will all be in place at least 2 years before the 40th year of operation. A detailed implementation schedule will be developed after the renewed license has been issued.

Several Members asked questions regarding the staff's review of the quality of the AMPs. The headquarters staff and audit team assess the quality of the programs while the regional inspection team verifies that the programs are implemented as described. In determining the effectiveness of current AMPs, the staff considers operating experience, performs walkdowns, and examines Condition Reports.

Member Ford asked about the inspection program for reactor vessel internals. The staff responded that the reactor vessel internals programs have not been finalized but the applicant has committed to submitting these programs for staff review 2 years before entering the period of extended operation.

Member Ford asked if corrosion of carbon steel pipes could clog up the nozzles in the fire protection systems. The applicant responded that if this clogging occurred, it would be identified during the periodic flushing performed as part of the AMP for the fire protection systems.

Members Ford and Rosen asked about the aging management of inaccessible concrete. The most recent tests of groundwater chemistry indicate that the below grade environment is not aggressive. Since well water is no longer available for periodic monitoring, the applicant chose to use the Structures Monitoring Program to manage the effects of aging. Under this program concrete exposed to lakewater will be periodically inspected. Since the chemistry of lakewater and ground water are similar, these inspection results will be representative of underground concrete exposed to groundwater.

Member Rosen asked if the root cause of the discrepancies in the Structures Monitoring - Masonry Wall Program was identified. The applicant stated that some of these discrepancies were simply the result of the wrong date used in determining the time for the next inspection.

TLAAs

The TLAAs for reactor vessel embrittlement assumed a constant capacity factor of 80% for 60 years resulting in 48 EFPY. Consultant Leitch and Member Rosen questioned the basis for this assumption and asked if the USE and PTS requirements could still be met at 54 EFPY. The applicant stated that the basis for this assumption was that the LRA for ANO1 assumed 48 EFPY and that operating experience to date has shown an 80% capacity factor for ANO2. The staff stated that at 54 EFPY the RT_{PTS} value for the limiting beltline material increases by only 2 degrees and would continue to meet the PTS screening criterion. The staff added that the Reactor Vessel Integrity Program will ensure that fluence values are updated as needed.

Several Members and Consultant Leitch asked why cumulative usage factors greater than 1 are acceptable for some components. The staff stated that these analyses are conservative and the actual number of cycles are much lower than those used in these analyses. The staff added that if the usage factor of a component exceeds 1, the licensee would have to repair the component, replace the component, refine the analysis, or implement an aging management program. The applicant added that fatigue calculations are updated every fuel cycle to verify that cumulative usage factors won't exceed 1 during the next cycle.

Member Wallis asked what data was used to analyze the loss of prestress in concrete containment tendons. The applicant stated that data from the containment of ANO1 was extrapolated to 60 years and is above the minimum requirements.

Staff Commitments

The staff will calculate the USE of the limiting beltline material at 54 EFPY and report the results to the Committee.

Subcommittee Decisions and Follow-up Actions

The Subcommittee will summarize the discussions to the full Committee during the December 2004 ACRS meeting.

Background Materials Provided to the Committee

1. License Renewal Application for Arkansas Nuclear One Unit 2, October 14, 2003

2. NRC Inspection Report 05000368/2004-06, License Renewal Scoping and Screening Inspection Report, April 19, 2004
3. Information Systems Laboratories, Inc., Audit and Review Report for Plant Aging Management Reviews and Programs, Arkansas Nuclear One Unit 2, July 29, 2004
4. Draft Safety Evaluation Report Related to the License Renewal of the Arkansas Nuclear One, Unit 2, dated November 2004

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, downloading or view on the Internet at <http://www.nrc.gov/reading-rm/doc-collections/acrs/> can be purchased from Neal R. Gross and Co., 1323 Rhode Island Avenue, NW, Washington, D.C. 20005, (202) 234-4433 (voice), (202) 387-7330 (fax), nrgross@nealgross.com (e-mail).
