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

December 4, 2007

MEMORANDUM TO: ACRS Members

FROM: Charles G. Hammer, ACRS Senior Staff Engineer **/RA/**

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE ACRS SUBCOMMITTEE ON LICENSE RENEWAL FOR FITZPATRICK, SEPTEMBER 5, 2007 - ROCKVILLE, MARYLAND

The Subcommittee Chairman has certified the minutes of the subject meeting, issued November 21, 2007, as the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated
electronic cc: FGillespie SDuraiswamy C. Santos

November 21, 2007

MEMORANDUM TO: Mario V. Bonaca, Chairman
License Renewal Subcommittee

FROM: Charles G. Hammer, ACRS Senior Staff Engineer **/RA/**

SUBJECT: WORKING COPY OF THE MINUTES OF THE MEETING OF THE ACRS SUBCOMMITTEE ON LICENSE RENEWAL FOR FITZPATRICK, SEPTEMBER 5, 2007 - ROCKVILLE, MARYLAND

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

Attachment: Minutes (DRAFT)

cc: License Renewal Subcommittee
CSantos

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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WASHINGTON, DC 20555 - 0001

MEMORANDUM TO: Charles G. Hammer, ACRS Senior Staff Engineer

FROM: Mario V. Bonaca, Chairman
License Renewal Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE ACRS SUBCOMMITTEE ON LICENSE RENEWAL FOR FITZPATRICK, SEPTEMBER 5, 2007 - ROCKVILLE, MARYLAND

I do hereby certify that, to the best of my knowledge and belief, the minutes of the subject meeting on September 5, 2007, are an accurate record of the proceedings for that meeting.

/RA/ 12/4/2007
Mario V. Bonaca Date
Subcommittee Chairman

Issued: 11/21/2007
Certified: 12/4/2007

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MEETING OF THE ACRS SUBCOMMITTEE ON
LICENSE RENEWAL FOR FITZPATRICK - MEETING MINUTES
SEPTEMBER 5, 2007
ROCKVILLE, MARYLAND

INTRODUCTION

The ACRS Subcommittee on License Renewal held a meeting on September 5, 2007, in Room T-2B3, 11545 Rockville Pike, Rockville, MD. The purpose of this meeting was to review issues related to the license renewal of the James A. FitzPatrick Nuclear Power Station. Gary Hammer was the Designated Federal Official for this meeting. The Subcommittee received no written statements or requests for time to make oral statements from the public. The Subcommittee Chairman convened the meeting at 10:30 a.m. on September 5, 2007, and adjourned at 3:51 p.m.

ATTENDEES

ACRS Members

M. Bonaca, Subcommittee Chairman	O. Maynard, Member
S. Armijo, Member	W. Shack, Member
S. Abdel-Khalik, Member	G. Wallis, Member

J. Barton, Consultant

ACRS Staff
G. Hammer, Designated Federal Official

Principal NRC Speakers

P.T. Kuo, NRR	T. Le, NRR	L. Lois, NRR	K. Chang, NRR
B. Elliot, NRR	J. Medoff, NRR	G. Meyer, Region I	R. Conte, Region I

Applicant Speakers

S. Bono, Entergy	T. Moskalyk, Entergy	J. Pechacek, Entergy
G. Young, Entergy	A. Cox, Entergy	G. Rorke, Entergy
A. Smith, Entergy	L. Leiter, Entergy	

Other members of the public attended this meeting. A complete list of attendees is in the ACRS Office File and is available upon request. The presentation slides and handouts used during the meeting are attached to the office copy of these minutes.

OPENING REMARKS BY CHAIRMAN BONACA

Dr. Mario V. Bonaca, Chairman of the ACRS Subcommittee on License Renewal convened the

meeting at 10:30 a.m. Chairman Bonaca stated that the purpose of this meeting was to discuss the FitzPatrick license renewal application. He stated that the Subcommittee would hear presentations from Entergy Nuclear, the Office of Nuclear Reactor Regulation (NRR), and Region I. He said the Subcommittee would gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee. The rules for participation in the meeting were announced as part of the notice of the meeting previously published in the Federal Register. Chairman Bonaca acknowledged that the Committee had received no written statements or requests for time to make oral statements from members of the public.

DISCUSSION OF AGENDA ITEMS

Introduction and General Discussion on Fatigue Issue

Dr. P.T. Kuo, Director of the Division of License Renewal in NRR made a brief introduction and provided a general presentation on the metal fatigue review process and acceptance criteria. The fatigue review is performed on ASME Class 1 components and some other non-ASME components. The fatigue analysis procedure has been changed since the original design of the plant to account for the environmental effects on fatigue life. This is done by applying a factor based on the coolant environment. The Generic Safety Issue (GSI)-166 study found that for the six critical locations in the primary system, the environmental effects did not invalidate a 40-year design life. However, a 60-year life (with license renewal) had to be evaluated further, which was done under GSI-190. It concluded that there would likely be no safety concerns, except for some leakage which may occur, but recommended that the same six critical locations be evaluated for license renewal considering environmental effects. There are three options provided in 10 CFR 54.21(c)(i) to either: identify that the original analysis remains valid, project the current 40-year analysis to 60 years, or provide an aging management program for the additional 20 years.

Applicant Presentation

Mr. Steve Bono with Entergy Nuclear presented the plant site description and licensing history. The plant is a BWR-4 with a Mark I containment. It was uprated by 4% in 1996 and the original license will expire on October 17, 2014. He also described some of the major improvements made to the plant, such as the Mark I modifications, hydrogen water chemistry, the replacement ECCS strainers, the replacement of the off-gas condenser, the addition of other chemistry controls, and the addition of the HPCI discharge exhaust sparger.

He also described the license renewal (LR) project, which incorporated lessons from previous applications, such as at Vermont Yankee. He stated that the LR commitments were tracked and that there were 36 aging management programs (AMPs). There were 26 AMPs already in place with 9 of those which were enhanced. There are 10 AMPs which are new. 10 of the 36 AMPs are consistent with Generic Aging Lessons Learned (GALL); 20 have some exceptions to GALL; and 6 are plant-specific. Their goals were to make all Entergy plants consistent and use industry experience for scheduling. The scoping of non-safety related systems, structures, and components (SSCs) was performed under 10 CFR 54.4a(2) and was verified by a regional inspection.

Mr. Bono stated there are two open items in the draft SER: reactor vessel fluence and environmentally assisted fatigue. There are no confirmatory items

Mr. Bono stated that for the reactor vessel fluence issue, the current pressure-temperature (P-T) curves are valid through 2014, which is for 32 effective full power years (EFPYs). They will submit fluence calculations per regulatory guide (RG) 1.190 by September 2007. They evaluated the following time-limited aging analyses (TLAAs) to determine the limiting fluence per RG 1.190:

- adjusted reference temperatures (ART) must be <200 F
- upper shelf energy (USE) must be >50 ft-lb)
- reactor pressure vessel (RPV) welds
- RPV nozzles near the beltline region

The applicant determined that the axial weld failure frequency is limiting at 1E-6/reactor-year, and the ART and USE will not be challenged for the renewal period of 54 EFPYs.

Mr. Bono stated that to address environmentally assisted fatigue, they made a commitment number 20 regarding use of the ASME code and a transient monitoring program.

Mr. Bono also presented the six cost-beneficial severe accident mitigation alternatives (SAMAs). There are no age-related SAMAs at FitzPatrick. Those being implemented are: opening of the emergency diesel generator doors via a procedure change, designing to allow a portable battery charger, and four others relating to battery loading conditions for the HPCI and RCIC operation.

Mr. Bono also presented the FitzPatrick drywell and torus monitoring, including details of the sand cushion, the drain lines, the air gap between the concrete and drywell shell, and the internal caulk seal that is inspected every refueling outage. The torus and drywell interior coating system is Carbozinc 11 (a sacrificial type galvanic coating having zinc which is depleted over time) and Dupont Corlar epoxy which is inspected to ASME Section XI IWE requirements during refueling outages. The torus interior shell was inspected in 1998 when the ECCS suction strainers were installed.

Mr. Bono stated a torus shell through-wall leak was found in June 2005 which was located in the same bay as the HPCI steam exhaust discharge pipe. An ASME Section XI repair was made by removing the flaw and welding in a circular repair plate. The root cause of the flaw was vibration fatigue HPCI steam condensation oscillation loading. A sparger assembly was added in October 2006 which directs steam flow away from the torus shell, and it significantly reduces the condensation oscillation loads. They also performed ASME visual exams of similar ring girder gusset welds at HPCI and RCIC steam discharge locations and performed general visual exams at other locations in the torus. There were two other locations found with flaws in the HPCI discharge bay. These were also found to be caused by the HPCI steam exhaust loading. The flaws were ground out and welded.

NRC Staff Presentation

Following the applicant's presentation, Dr. Kuo introduced Mr. Tommy Le, who briefly described

the results of the staff's review of the LRA. He stated that the staff had determined that the LRA was approximately 83% consistent with GALL when considering that some areas had exceptions to GALL, but were enhanced. The audit team activity determined that there are no omissions of systems, structures, or components in the scope of the LRA for Sections 2.1 and 2.2. The audit included review of 57 mechanical systems, which included 26 balance-of-plant (BOP) systems. There are 18 sub-systems that are not safety significant, but which might impact a safety system in some way. As a result, the staff identified some additional components which the applicant added to the scope.

Mr. Glenn Meyer with Region I made a presentation of the inspection performed for the FitzPatrick LRA, which included a comparison of the findings with those at Vermont Yankee (VY) and Pilgrim. A difficult part of the inspection is determining the scope of non-safety related components for LR. At Pilgrim, the evaluation of structural interactions was inadequate. The inclusion of the turbine building components at VY required that this information be exchanged with FitzPatrick and Pilgrim. By comparison, FitzPatrick only had minor issues with the scope. He also stated that FitzPatrick has green performance indicators, green findings, and no cross-cutting issues. The plant receives the lowest level of inspection oversight.

Mr. Ken Chang and Mr. Jim Medoff with NRR made a presentation of the audit review activities which included AMPs, aging management reviews (AMRs), and TLAAs. The audit resulted in 345 questions all of which the applicant adequately responded to, with the exception of the unresolved fatigue issue that is generic to all reviews.

Mr. Le made a presentation of the TLAA review. Both of the open items are TLAAs, which are the reactor vessel neutron fluence that the applicant will respond to in September 2007 and environmental fatigue.

COMMENTS AND OBSERVATIONS FROM THE SUBCOMMITTEE MEMBERS

- Member Wallis asked if there is operational or experimental evidence of what fatigue effects are in plant components. Dr. Kuo and Mr. Ken Chang responded that there is experimentation, but not much operational experience because of the conservatism in the fatigue calculations. If the cumulative usage factor (CUF) = 1.0, this means that a crack may initiate, not that one has been formed. Member Armijo added that there have been instances of fatigue failures in plants due to either high cycles or thermal loadings. Mr. Chang also stated that in recent plant audits, the staff has asked licensees to consider alert limits in aging management programs below a CUF = 1.0. Dr. Kuo added that there is experience with fatigue failure due to thermal cyclic loads at the Farley plant, which is described in Information Notice 88-08.

- Member Shack asked if this plant is different from other plants reviewed for license renewal regarding the fatigue issue. Dr. Kuo responded that it is not different.

- Consultant John Barton asked if all plants reviewed to date have all satisfied the fatigue analysis requirement to consider environmental effects. Dr. Kuo indicated that all but two plants have done so. He added that applicants have to actually perform a revised analysis, not just make a projection based on the original analysis. He said the FitzPatrick applicant has completed their fatigue analysis.

- Member Wallis asked what the design snow load is. Mr. Tom Moskalyk with Entergy responded that it is 50 pounds per square foot.

- Member Shack asked if the applicant still injected zinc. Mr. Bono responded that they do inject it into the feedwater system.

- Member Shack asked if electrical systems were also capable of supporting power uprating. Mr. Bono responded that the secondary system is capable of further uprate, but that right now they are limited on the electrical side.

- Consultant Barton asked what is the 1990 power uprate and what equipment upgrades were made. Mr. Bono responded that the uprate is 4 percent. Mr. Bono responded that they did some secondary plant upgrades, mostly in the feedwater system, including monitoring feedwater components for vibration.

- Member Shack asked if there are discharge lines into the torus, other than the HPCI steam exhaust, and if they had spargers. Mr. Bono responded that there are the safety relief valve discharge lines and a RCIC steam discharge line, and that the RCIC line does not have a sparger.

- Member Wallis asked if the addition of spargers in the HPCI exhaust line changed the audible noise. Mr. Bono and Mr. Moskalyk responded that it did significantly lower the noise level and changed the peak vibration frequency response from about 8 hertz to 250 hertz.

- Consultant Barton asked about the current condenser tubing. Mr. Bono responded that there is titanium tubing in the upper regions and admiralty brass in the lower regions (not steam impinged).

- Member Abdel-Khalik asked if there has been gas intrusion into the HPCI system. Mr. Bono responded no, but there has been some gas intrusion at some Entergy PWRs.

- Member Wallis asked if water hammer had been evaluated for normally dry fire protection lines when the system actuates and fills. Mr. Joe Pechacek with Entergy responded that they evaluated the plant configurations and concluded it would not be an issue, unlike some other plants. They also evaluated flooding effects if lines were broken. Member Wallis then asked what the consequences would be for a broken pipe in the diesel generator area. Mr. Pechacek stated that the fire water discharge from the break would adequately drain away.

- Chairman Bonaca asked for assurance that the scoping implementation problem at Vermont Yankee (in the turbine building systems) has not occurred at FitzPatrick. Mr. Young stated they used the same methodology as Vermont Yankee, but that after discovering the missing data during the regional inspection at Vermont Yankee, they did revisit FitzPatrick, Pilgrim, and Arkansas 1&2. They have not seen the same problem at any plant, other than Vermont Yankee.

- Member Wallis asked why there were so many onsite audit findings after an internal review had already occurred. Mr. Alan Cox with Entergy indicated that the audit team seemed to be enthusiastic, but that many of the findings were not about significant issues.

- Member Abdel-Khalik asked if the commitment tracking system is the same for the whole fleet. Mr. Bono and Mr. Cox responded that the system is the same, but the commitment tracking is done at each site.

- Chairman Bonaca asked why current operation is acceptable regarding the evaluation of the need for wedges with ring holddown bolts on the vessel internals to prevent lateral motion during a blowdown, since the evaluation has not yet been done. Dr. Kuo responded that there are several LR issues which are also issues for current operation that get referred to the NRR technical staff for review. Mr. Pecachek with Entergy stated that they currently have an engineering evaluation that supports operations without the BWR Vessel Internals Project (VIP) recommended holddown bolts, due to the absence of needed technology (ultrasonic testing from above or ultrasonic testing or enhanced digital inspection from below). He added that several BWRs have taken the same approach. Chairman Bonaca then asked if the evaluation was reviewed by the NRC. Mr. Pecachek responded that it was available to the NRC for review and that it was discussed during one of the BWR VIP audits when NRC staff was on site. He also stated that there were some additional inspections performed to provide reasonable assurance that a welding lock is on the nuts of the core plate holddown bolts.

- Chairman Bonaca asked for the basis for the exceptions 3 and 4 to the BWR VIP inspections. Mr. Pechacek responded that in October 2006 (refuel 17) the jet pump holddown beams on the group 2 pumps and the internals of all jet pumps were inspected with ultrasonic testing (UT). For the other uncompleted inspections, there is not yet inspection technology for performing them at this time, but there is an evaluation providing a technical basis for not performing the inspections. He noted that there is an effort at EPRI to develop better technology for performing these inspections.

- Consultant Barton asked if cracks were found in the steam dryers during refuel 17. Mr. Pecachek responded that they did find a several inch long crack in the southwest quadrant, near one of the guide rods. It is not intergranular stress corrosion cracking (IGSCC), but is a fatigue crack through the middle of the weld. It was ground out and repaired. They also found a crack in a startup testing block in the skirt of the steam dryer. It is believed to have existed before, based on a review of 2004 tape records, and has not changed in size. They will review all of these indications again.

- Chairman Bonaca asked if the cracks in the core shroud vertical welds are stable. Mr. Pechacek responded that the core shroud repair tie rods made it difficult to perform visual inspections, but that they were able to inspect them with UT.

- Member Shack and Member Maynard asked if the applicant had the same benchmarking problem with the RAMA code which occurred at Pilgrim. Mr. Bono and Mr. George Rorke responded that RAMA is well benchmarked for a BWR-4 such as FitzPatrick, but there was some difficulty in meeting the latest RG 1.190.

- Member Armijo and Member Shack asked if the vessel fluences changed as a result of the most recent analysis. Mr. Rorke responded that the calculated fluences are less than in the previous analysis for 54 EFPY. There are some peak locations that are higher but they are not limiting in for ART or USE. Member Armijo then asked what were the discrepancies which the staff found in the initial application. Mr. Rorke responded that the staff's questions were about the methodology used to arrive at the fluence estimates. Mr. Lambros Lois of the NRR staff also responded that the narrowing of the uncertainties from 20% in the old RAMA code to 7% or 8% in the later code has been approved for BWR-4s, but has not been adequately benchmarked for BWR-3s, such as Pilgrim, and that there is no substantive problem at FitzPatrick for 54 EFPY.

- Member Armijo asked what is the criteria for USE at 54 EFPY in Table 4.2-2 of the application. Mr. Barry Elliot of the NRR staff responded that for the low copper plate material at FitzPatrick, the limiting value is 50 ft-lb in the irradiated condition. Member Armijo also asked about the toughness data for the vessel welds. Mr. Elliot responded that the plant was built before there were requirements for USE, so there is no data on the welds. There was a generic evaluation performed for all similar BWRs which addressed this issue.

- Member Shack asked why no SAMAs were implemented to improve the fire events contribution to core damage frequency (2.56E-5/reactor-year), but acknowledged that could be very expensive regarding cable, main control room, and relay room design changes. Mr. Pechcek responded that they would review how they had evaluated SAMAs for fire events in the PRA analysis.

- Member Shack asked what is in the air gap between the concrete and drywell shell. Mr. Moskalyk responded that the original ethafoam material was removed and only an air gap is there.

- Consultant Barton and Member Maynard asked if bellows drain flow switches are tested and how. Mr. Bono and Mr. Larry Leiter with Entergy responded that they are tested by pouring water into the drains to obtain an enunciation for greater than 1 gpm flow.

- Member Wallis asked how recent was the drywell monitoring performed. Mr. Bono responded that various activities were performed during 2006 and 2007.

- Member Shack asked and Mr. Bono verified that the containment coating is original.

- Member Wallis asked for the orientation of the ECCS suction strainers. Mr. Moskalyk responded that the RHR suction strainers are oriented horizontally. The Core Spray suction strainer is also a horizontal strainer, and the HPCI strainer is a vertical strainer. All have stacked disks.

- Consultant Barton asked if the applicant had found biistering of the containment coating. Mr. Moskalyk responded that the torus coating was blistered in some places below the waterline, and these areas were monitored during 2004 and 2006 refuelings. A

thorough UT was performed in 1998 where there was any pitting. Currently, they UT those areas that had the most pitting.

- Chairman Bonaca, Member Shack, and Member Abdel-Khalik asked about various details of the containment inspection and groundwater environment. Mr. Pechacek responded that the drywell is inspected visually, the sand bed area receives boroscopic inspection, the caulk seal at the interface between the drywell shell and the concrete floor is original, and the bottom of the drywell is about 12 feet about the lake level, Mr. Meyer with Region I also added that the drywell and torus are in solid rock, vs. Pilgrim which is built in soft sand.

- Member Wallis and Member Shack asked for information about the fatigue analysis performed on the HPCI steam exhaust area crack. Mr. Moskalyk responded that they performed both testing and analysis in evaluating the fatigue condition (4.5 inch long crack). They postulated the alternating stress and number of cycles and estimated the number of hours that HPCI could run to cause the crack. They had an extended loss of offsite power condition which they believe contributed to the fatigue, but did not know how much.

- Member Wallis and Member Armijo asked how unique is the FItzPatrick HPCI steam exhaust. Mr. Bono responded that they found only one other BWR which had the exhaust open end discharge line pointing toward the torus shell.

- Member Abdel-Khalik and Member Armijo asked about the corrosion of the wetwell surface. Mr. Moskalyk indicated that there is a significant amount of area having surface corrosion, but that there is not much metal loss where the surface corrosion is observed.

- Chairman Bonaca asked if there is any history of similar problems with fatigue cracking of the torus in other BWRs. Mr. Bono responded no, but said that other plants may be susceptible to the same problem.

- Chairman Bonaca asked if Pilgrim and Vermont Yankee are planning future modifications to their HPCI steam discharge pipes. Mr. Bono responded that these plants already have spargers installed.

- Member Shack asked if enough wall thickness remained after grinding out the flaws in the other less significantly cracked areas. Mr. Bono and Mr. Pechacek responded that only 3/8 inch of the thickness was removed, which left enough material without further repair.

- Member Abdel-Khalik asked about the nature and extent of the pitting observed in the torus shell Mr. Moskalyk responded that the more significant pitting results in reducing the nominal wall thickness from 0.632 inches to 0.566 inches. The required general thickness of 0.503 inches which indicates there is quite a bit of margin.

- Chairman Bonaca asked how it was determined which areas of the torus shell to monitor. Mr. Moskalyk responded that it is based on the 1998 inspection when it was

found that 10 areas in four of the 16 torus bays had significant pitting. Chairman Bonaca, Member Shack, and Member Armijo asked why no other areas were being monitored, since a coating defect could occur in other places. Mr. Moskalyk responded that the 1998 inspection occurred after 23 years of operation, which would establish where problem areas would be. Mr. Pechacek stated that the immediate 2 feet adjacent to the known problem areas is also being inspected. The only areas where there is any recoating are the torus shelll repair areas, and they assume the rate of corrosion at the pitting is for the overall torus. This results in the torus being acceptable until 2028, which they believe is a conservative estimate since localized corrosion is allowed by ASME code case N-460 to be even greater. Member Shack indicated that the pitted areas should be a leading indicator of the worst corrosion.

- Consultant Barton, Chairman Bonaca, Member Armijo, and Member Abdel-Khalik expressed concern about the appearance of the torus surface corrosion shown in photographs and the basis for the inspection program. Mr. Moskalyk responded that they have a qualified ISI inspector look at the water line and above the water line area every refueling outage to monitor further corrosion and that UT measurements are made from the outside of the torus in prioritized areas every outage.

- Member Wallis asked about the nature of the debris that accumulates on the bottom of the torus and how often it is cleaned. Mr. Bono responded that the silt is analyzed for its content and then it is removed, but not during each outage.

- Member Maynard asked if there has been any history of leakage, bellows failure, or water getting between the liner and the concrete, in the sandbed region, or on the torus room floor. Mr. Bono responded no, based on their boroscopic examination and based on the absence of water on the floor.

- Member Abdel-Khalik and Member Shack asked if there had been RCS leakage from any locations and if it is quantified. Mr. Bono responded that most of the ongoing leakage is from the recirculation pump seals and the total RCS leakage is about 2 gallons/hour, which is very small.

- Chairman Bonaca and Member Armijo asked if there is a requirement to periodically drain the torus, which would allow a more thorough inspection of the surface for indications of corrosion. Mr. Pechacek and Mr. Bono responded that there is no requirement to do so, but that it had been drained three times in the plant history. Mr. Art Smith added that if there is any other area corroding, the rate of corrosion would not be as great as for the pitting which is being monitored. Member Shack noted that this is based on the corrosion being caused by coating defects.

- Member Wallis asked about the weld overlays in the recirculation piping. Mr. Smith responded that the plant has 24 weld overlays which repair cracks found by UT during a time beginning in about 1987. These areas are currently being inspected in accordance with the industry performance demonstration initiative (PDI) using qualified inspectors, equipment, and procedures. He added that this provides a high degree of confidence in the quality of the examinations.

- Consultant Barton asked when was the last recirculation piping weld overlay made and why have there been none since then. Mr. Smith responded that the last one was in 1987 or 1988, and they subsequently started making weld stress improvements and implemented hydrogen water chemistry and noble metal addition programs which are believed to have mitigated stress corrosion cracking. He also added that the weld overlays are inspectible.

- Member Wallis asked about the condition of the steam dryers. Mr. Pechacek responded that they found 10 indications during refuel 14 in 2000, and then in 2004, they completed the GE service information letter 644, supplement 1, inspections. These flaws are IGSCC. The remaining ligament is enough to maintain structural integrity for all of them. They have not seen any growth of these flaws in the last two cycles. Member Armijo questioned that the flaws are due to IGSCC since the environment is not water with electrolytes, but just wet steam. Mr. Pechacek responded that one of the flaws was fatigue related, but only because the weld was undersized. Mr. Jim Medoff with NRR also added that the applicant had committed to follow VIP 39 aging management criteria inspections and steam flow evaluation criteria. The commitment is that they are going to use the NRC approved version of VIP 39, which is currently under the last stages of review.

- Member Shack asked about the cracks in the core shroud vertical welds and top guide. Mr. Pechacek responded that they have not identified any cracking in the top guide, but that the core shroud has very long cracks (up to 100 inches long) partially through the 1.5 inch wall. The remaining ligament is as small as 2 inches in length in one weld.

- Member Shack asked when they renew noble metal addition and if they measure electrochemical potential (ECP) continually. Mr. Bono responded that they follow GE recommendations regarding when to renew noble metal addition, which he thought is to renew it every two cycles. He also thought that the ECP measurements had been reliable on a continuous basis.

- Member Armijo asked if there is any indication that the core shroud cracks are continuing to grow even though the plant uses hydrogen water chemistry. Mr. Pechacek responded that there was no previous UT inspection information to form a comparison, but that they will be performing inspections of the core shroud each outage, even though the access is poor.

- Chairman Bonaca commented that he was pleased that the inspections at FitzPatrick, Pilgrim, and VY had been performed by an experienced team for consistency, but asked if the staff was confident that the determination of the scope for the non-safety related components was adequate. Mr. Bill Rogers with NRR responded that there are actually three parts of the review which help ensure that the scope is adequate: the initial review by the NRR staff, the onsite audit, and the regional inspection. He further stated that it is not uncommon for items to be added during the review process. Member Maynard indicated he would expect some differences in the findings among different inspectors regarding determination of the non-safety related scope, but that would not necessarily be unacceptable.

- Chairman Bonaca asked why the soil chemistry at FitzPatrick had not been determined. Mr. Meyer with Region I responded that the applicant used the soil results from the adjacent Nine Mile Point plant.

- Consultant Barton asked why the programs that are enhanced for the extended period of LR, such as the structural monitoring program, are not currently implemented. Mr. Meyer responded that the structural monitoring program is in the scope of the maintenance rule.

- Member Maynard and Member Abdel-Khalik asked how the original neutron fluence calculation was not in accordance with RG 1.190. Mr Lambros Lois with NRR responded that the original calculation was performed before GE had an approved method. RG 1.190 was issued in 2001, and the applicant is recalculating the fluence in accordance with it and will submit it in September 2007. In general, the original calculations have been found to be conservative. Mr. Cox with Entergy added that the initial application for LR included an extrapolation of the old fluence estimate using the earlier draft RG, and the new calculation will be made using RAMA. Mr. Lois also indicated that when considering the uncertainties within the two methods, there is about 10 or 15% difference between them.

- Member Armijo asked about the recirculation inlet nozzle thermal sleeve which has a calculated fatigue usage factor of 4.93. Mr. Medoff responded that one of the commitments addresses this issue. There are several options for components with excessive fatigue usage, such as this one, ranging from repair or replacement to increased inspection.

- Consultant Barton asked why only a few heat exchangers were included in the AMP B1-15 program. Mr. Leiter with Entergy responded that these heat exchangers were included in this program because they are cooled by fluids other than water. Service water heat exchangers are included in another program.

- Consultant Barton commented that if the open items are resolved satisfactorily, he had no additional issues regarding LR for FitzPatrick. The application is very similar to other BWR applications he has seen.

- Member Maynard commented that he had no major issues for FitzPatrick LR. He felt it may be helpful if the applicant could perform sampling UT of the torus shell and that this may be a proper topic for the BWR VIP group to address. He also felt that there may be a better way, in general, to categorize how programs meet GALL, such that exceptions are more easily distinguished. He also felt that the information sharing by the staff with the applicant may help with consistency in scoping issues. He felt there may need to be workshops or some form of guidance provided to assist applicants.

- Member Abdel-Khalik commented that he was not entirely convinced that the torus shell would not degrade excessively with the applicant's programs. He was not sure that the areas being sampled by UT were adequately representative of the worst locations. Chairman Bonaca, Member Armijo, and Member Maynard agreed and wanted this discussed again at the full Committee presentation.

- Member Armijo agreed with Member Abdel-Khalik regarding the torus shell degradation issue and felt that the coating may be in the process of degrading.

- Member Wallis commented that he had no additional issues and felt the applicant and staff had performed a good evaluation of the issues.

- Member Shack agreed with Member Armijo that if the coating is porous, there may be other randomly occurring areas of corrosion, but he felt it more likely that the areas where corrosion has been found are the weak areas in the coating. He thought UT sampling may be impractical where corrosion is due to the pitting which occurred at FitzPatrick.

- Consultant Barton recalled having used divers to perform visual inspection of the torus inside surface. Member Maynard commented that such inspections would cause some risk to the divers.

- Chairman Bonaca was impressed by the staff and regional inspection effort in identifying the issues, especially at VY. He felt that the torus corrosion issue was more generic than plant-specific in nature and felt a BWR VIP effort may be appropriate. He felt that the torus shell monitoring should be presented at the full Committee. (Members Armijo and Wallis suggested more presentation of photos and data regarding the torus corrosion.) Chairman Bonaca also felt the open issues would eventually be adequately addressed.

SUBCOMMITTEE DECISIONS AND ACTIONS

Following the staff and applicant presentations and discussions, Chairman Bonaca asked if anyone had any further questions, thanked everyone for their presentations, and then adjourned the meeting at 3:51 pm.

BACKGROUND MATERIALS PROVIDED TO THE SUBCOMMITTEE PRIOR TO THIS MEETING

1. Entergy Nuclear Operations, Inc. License Renewal Application for James A. FitzPatrick Nuclear Power Plant, dated July 31, 2006.
2. Safety Evaluation Report with Open Items Related to the License Renewal of the James A. FitzPatrick Nuclear Power Plant, dated July 2007.
3. Audit Summary Report for Plant Aging Management Reviews and Programs for the James A. FitzPatrick Nuclear Power Plant on License Renewal Application, dated June 19, 2007.
4. James A. FitzPatrick Nuclear Power Plant - NRC License Renewal Inspection Report 05000333/2007007, dated August 2, 2007.

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Note: Additional details of this meeting can be obtained from a transcript of this meeting available for downloading or viewing on the Internet at

http://www.nrc.gov/reading-rm/doc-collections/acrs/tr/subcommittee/2007/ or purchase from Neal R. Gross and Co., Inc., (Court Reporters and Transcribers) 1323 Rhode Island Avenue, NW, Washington, DC 20005 (202) 234-4433.