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

November 2, 2011

MEMORANDUM TO: ACRS MEMBERS

FROM: Maitri Banerjee, Senior Staff Engineer **/RA/**
Advisory Committee on Reactor Safeguards

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS ABWR SUBCOMMITTEE MEETING, MARCH 8, 2011, ROCKVILLE, MARYLAND

The minutes of the subject meeting have been certified on September 6, 2011 as the official record of the proceedings for that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc via e-mail: C. Santos
A. Dias
E. Hackett
G. Wunder, NRO
S. Joseph

**UNITED STATES**
**NUCLEAR REGULATORY COMMISSION**
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**WASHINGTON, DC 20555 - 0001**

MEMORANDUM TO: Maitri Banerjee, Senior Staff Engineer
Technical Branch, ACRS

FROM: Said Abdel-Khalik, Chairman
Advanced Boiling Water Reactor (ABWR) Subcommittee
ACRS

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON ABWR REGARDING COL APPLICATION OF SOUTH TEXAS PROJECT (STP) ON MARCH 8, 2011

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting held on March 8, 2011, are an accurate record of the proceedings for that meeting.

*/RA* 09/06/2011

Said Abdel-Khalik, Chairman Date
ABWR Subcommittee, ACRS

Certified: September 6, 2011
By: Said Abdel-Khalik

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON
ADVANCED BOILING WATER REACTOR (ABWR) REGARDING STP COLA
ON MARCH 8, 2011, IN ROCKVILLE, MARYLAND

On March 8, 2011, the ACRS Subcommittee on ABWR held a meeting in Room T-2B1, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to receive a briefing from the NRC staff and the Nuclear Innovation North America (NINA, applicant), the applicant for a combined license (COL) for two ABWR units at their existing South Texas Project (STP) reactor site in Texas, regarding Chapters 4, 5, and 6 of the COL application (COLA) FSAR and staff's safety evaluation report (SER). These chapters were presented to the Subcommittee previously when the SER had open items. The meeting was convened at 8:30 AM. The meeting was open to the public except of parts that involved discussions of proprietary issues.

Attendees:

| | | |
|---|---|---|
| ACRS Members | NRO Staff Presenters | NRO Staff |
| Said Abdel-Khalik (Chairman) | Mark Tonacci | Tom Scarbrough |
| Dennis Bley | George Wunder | Michael Norato |
| Sam Armijo | Stacy Joseph | Chang-Yang Li |
| Michael Corradini | Hanry Wagage | NINA & Others |
| John Stetkar | Gregory Maker | Tom Daley, NINA |
| Charles Brown | James Gilmer | John E. Price, NINA |
| Michael Ryan | George Thomas | Brad Maurer, Westinghouse |
| ACRS Consultant | Tekia Govan | Karen Fujikawa, Westinghouse |
| Graham B. Wallis | NRO Staff | Robert Quinn, Westinghouse |
| ACRS Staff | Joe Donoghue | Jeremy King, Westinghouse |
| Maitri Banerjee (DFO) | Rocky Foster | Matthew Solmos, Westinghouse |
| NINA Presenters | John McKirgan | Timothy S. Andreychek, Westinghouse |
| Scott Head | Bob Davis | Mary Richmond, Bechtel |
| Jim Tomkins | Neil Ray | Alan Nakashima, Bechtel |
| Caroline Schlaseman, MPR | Yuken Wong | Kenji Arai, Toshiba |
| Martin Van Haltern, Westinghouse | Eric Miller | Al Gutterman, Morgan Lewis |
| Nirmal Jain, Westinghouse | Syed I. Haider | Dan Patton, Bechtel |
| Coley Chappell | Andre Drozd | |

The presentation slides and handouts used during the meeting are attached to the Office Copy of the meeting transcript. The presentation to the Subcommittee is summarized below.

Opening Statement

Chairman Abdel-Khalik convened the meeting by introducing the ACRS members. He noted that the briefing was to discuss the COLA FSAR and the corresponding staff SER for Chapters 4, 5 and 6, and some of the action items resulting from prior ABWR Subcommittee meetings. He

mentioned a 2008 Commission SRM mandating that the ACRS advise the staff and the Commission on the adequacy of the design-basis long-term cooling approach for each new reactor design based as appropriate on either its review of the design certification or the first license application referencing the reactor design. Hence, the long term cooling aspect of STP was to be discussed also. The meeting was to be continued into the next day when three more chapters of the SER, namely Chapters 11, 13 and 16 would be discussed. Chairman Abdel-Khalik asked the staff and the applicant to identify the need for closing the meeting before going into discussion of proprietary information. He noted that the telephone bridge line available to the stakeholders to listen to the proceeding would be opened in both directions for receiving comments and questions at the end of the meeting. He noted a small change in the agenda that would allow the applicant to discuss both Chapters 4 and 5 before the break, followed by the staff discussing Chapters 4 and 5 after the break. Chairman Abdel-Khalik invited the staff to begin the presentation.

Introduction

In his opening statements, Mr. Mark Tonacci, the NRO Branch Chief for STP COLA noted that much of the long term cooling features were based on the certified design with some modifications based on more recent work. Mr. Scott Head, the STP Regulatory Affairs Manager, introduced the STP staff and that their presentation would address Chapter 5 first.

NINA and NRO Staff Presentation on Chapters 5 and 4

Mr. Coley Chappell, NINA, started the STP presentation of COLA Chapter 5. He noted the major departures and that there was no follow-up action item resulting from past ACRS meetings. Regarding Chairman Abdel-Khalik's question on reactor unidentified leakage, Mr. Head noted that concerns regarding a potential LOCA and waste water management, in addition to the plant technical specifications (TS) control, would prevent any long term operation at the limit. The plant corrective action program and operating procedures would require a review and plant shutdown for trouble-shooting and repair if the leakage cannot be readily fixed.

Member Stetkar asked for clarification regarding the assumption of 100 vs. 77 degrees C suppression pool (SP) temperature in the net positive suction head (NPSH) calculation, and if it would require active SP cooling. He was concerned that apparent use of 100 degrees C SP temperature in the pump NPSH calculation would not meet the required margins, especially with sump screen head loss noted in staff SER. The staff took the question as an action item. Consultant Wallis noted that at 100 degrees C temperature, flashing at the debris bed needs to be considered.

Member Stetkar inquired about the qualification of the self lubricating RCIC pump (parts of the pump discharge is routed for lubrication of pump internals) under the SP water quality conditions post-LOCA. Mr. Tomkins of NINA noted that the strainer downstream effects of debris in the SP water are evaluated for components like RCIC pump in a WCAP report, and committed to get back with more details. This item was added to the ACRS Action Item List.

In his Chapter 4 presentation, Mr. Tomkins noted that the staff's questions regarding the downstream effects of SP debris on the reactor fuel were included in an RAI response (supplement 1 to RAI 04.04-4) to be added to Chapter 6 in revision 6 of the FSAR. Chairman Abdel-Khalik asked about the Part 21 report issued on February 15th by GEH on CRD cracking. Mr. Tomkins took the question for a later response. Later in the day, Jeremy King of Westinghouse reported that they had reviewed the issue for STP and found it not to be

applicable. Member Armijo noted that control blade swelling mechanism was not totally resolved and limiting the life of this component may be the only viable option. This question was closed when Mr. Head, NINA, noted the issue was still under review by Westinghouse for STP.

In their presentations on Chapter 5, NRO staff members discussed closing of open items in their previous SER related to P-T limits, compliance with 10 CFR 50.55a, applicable code cases, and functional qualification and NPSH of the new RCIC turbine design. Upon Member Armijo's question regarding operating experience of the new RCIC turbine design, it was noted that most operating experience in nuclear power plants are with the auxiliary feedwater system for PWRs. Regarding the RCIC pump turbine modified steam admission system, Member Stetkar asked how the applicant would confirm cyclic (repeated on and off) operation of RCIC under design basis conditions absence a specific ITAAC for such operation. Tom Scarbrough, NRO, pointed to QME-1-2007, which RCIC would have to meet. This code would require functional testing for cyclic operation. NRC inspections would verify compliance, especially being a fist application to an US nuclear plant. He noted that the functional testing should also include qualification to the entrained material/debris in the process fluid consistent with the GSI-191 response.

In their Chapter 4 presentation, the staff noted that the only open item in their previous SER was on downstream fuel effects test to be addressed by a license condition. The staff planned to address it under their Chapter 6 long term cooling presentation later in the day.

<u>NINA and NRO Staff Presentation on Chapter 6 and Long Term Cooling</u>

NINA presentation primarily centered around the ECCS strainer qualification, downstream fuel effects and long-term cooling, in addition to responding to some related ACRS action items. In his opening statement Jim Tomkins noted the redundancy in cooling water sources and flow paths. With fiber and aluminum precluded from containment by design, only allowed piping insulation is stainless steel. Presence of zinc is limited to the coating primer. He discussed the resolution of the staff SER open items, including one on the toxic gas analysis. The issue was reconciled after staff audit found that containment features like a berm surrounding chemical tanks were not credited in previous staff analysis. A detailed discussion ensued about the different codes used by the applicant and the staff and analysis assumptions.

Mr. Tomkins addressed ACRS Action Item 46 regarding the boron concentration used in the STP chemical effects analysis. NINA slide 11 presents the TS controlled number, and that no credit was taken for solubility of any aluminum products (boron would affect pH and hence solubility). The NINA presentation followed by staff presentation discussed later in this meeting minutes closed this action item. The chemical effects analysis considered the concrete with qualified coatings within the zone of influence of the LOCA break to become exposed. Regarding ACRS Action Item 47b, the applicant was assuming that all of the fiber, the one cubic foot, would bypass the strainer, and would be reflected in the STP downstream effects analysis and testing. This change in assumption closed the action item.

Mr. Tomkins addressed ACRS Action Item 49 on vacuum breaker shield (NINA slides 13-17) and discussed its designed capabilities. Regarding Member Bley's question on what keeps the valve closed when not required to open, Mr. Tomkins explained that at the initial stages of a line break (main steam line break being the design basis), when the vacuum breaker is required to be closed, the design would prevent opening due to high pressure inside the containment. Regarding the impact of the SP swell force on the vacuum breaker, Bob Quinn of Westinghouse noted that the V-shaped shield design is very similar to the V-shaped plates that were installed

in the BWR Mark I containments underneath the primary header for pool swell deflection. It splits the flow of the pool around the plate, such that no water gets above the shield except for froth from the bubbles breaking through. The only water impact on the vacuum breaker will be the fallback of the froth that is insignificant. The Action Item 49 was closed.

Caroline Schlaseman of MPR (NINA consultant) briefly discussed the ECCS strainer sizing, and chemical effects test as a follow-up of the June 24, 2010 ABWR Subcommittee briefing. Given that the strainer design was evaluated for the Japanese reference plant against the JSME stress limits, the applicant is currently in the process of evaluating the design for the STP specific loads against the ASME stress limits (subject of FSAR Appendix 3B). ACRS Consultant Wallis questioned if the integrity of the perforated strainer would be maintained under the worst loads in the SP including the SRV discharge or chugging, condensation oscillation etc. This was taken as an action item.

The strainer sizing report is based on maximum fiber condition at the reference Japanese plant. Although, any fiber and aluminum use inside the containment is prohibited, thin bed effects are evaluated in that for the purpose of downstream effects analysis/testing the applicant assumed one foot cube of fiber. For the purpose of the downstream effects testing, all of the fiber is assumed to pass through the strainers. The strainer sizing evaluation goes through both the sizing analysis in accordance with Utility Resolution Guideline (URG) and the NUREG-6808 correlation for head loss. Confirmatory small-scale testing of a couple of pockets at the strainer vendor CCI showed the analytical result to be more conservative than required by the small scale test results. An action item was opened on Consultant Wallis' question regarding the rational for considering that the Japanese test on thin bed effects would bound the STP condition for thin bed where fiber is much less.

Regarding the treatment of latent aluminum for chemical effects, the applicant's position had changed in that all of the assumed aluminum corrosion products in the post accident environment were conservatively assumed to come out of solution. Ms. Schlaseman also discussed the treatment of the destroyed qualified coating and the exposed concrete within the zone of influence, and use of aluminum-oxy-hydroxide, considered more limiting, as a surrogate material to represent the corrosion products (including zinc) in the head loss effects test. Mr. Andreycheck of NINA explained that the treatment of zinc in the head loss considerations had been supported by testing discussed in WCAP 16530 (for PWR Owners Group), and their literature search. Member Armijo asked if simultaneous oxidation of aluminum and zinc were considered. Given that the assumed zinc was over two orders of magnitude higher than the assumed aluminum (an assumption different from the PWROG) the need for such consideration was rebutted. The treatment of zinc oxide as aluminum-oxy-hydroxide for the purpose of testing was taken as an action item for future presentation by NINA.

While discussing the resultant total debris assumptions (some from the URG), the experience of the plant Barseback was noted by Consultant Wallis, in terms of the synergistic effect of fiber and sludge. A discussion ensued regarding the Japanese ABWR experience related to sludge production and the SP cleanliness program committee by the applicant.

Mr. Andreycheck reported that based on a back of the envelope calculation, one cubic foot of fiber uniformly distributed over all of the surface area of the strainers would result in a thickness of less than 0.01 inch. Because this amount was very small, the STP assumption was that all of the fiber would go through the strainers, not creating a thin bed effect at the strainers. Hence, no additional STP specific strainer head loss testing was found necessary over and above the Japanese reports used for strainer sizing. It was also pointed out that unlike PWRs, personnel

access to a BWR containment is limited to outage conditions only with protective clothing. This practice limits accumulation of fiber debris inside the containment. Also, Japanese ABWR experience showed presence of very little fiber in containment. The question on future use of hydrogen water chemistry that uses zinc was taken by NINA as an action item. Also taken as an action item for NINA was to confirm the Nukon fiberglass fiber used in testing, given the thickness of the resulting bed, was an appropriate surrogate for the clothing fiber.

The meeting went into a closed session after the lunch break with Martin Van Haltern of Westinghouse presenting the plan and basis for STP downstream fuel effects test. He discussed the test plan, analysis done to determine the test acceptance criteria, test setup and the facility, and the license condition the applicant had agreed to. The license condition would require a test to verify that with conservative debris load assumptions the fuel assembly will meet the acceptance criteria and would be adequately cooled. It was noted that the acceptance criteria, developed in a conservative fashion, can be applied to multiple fuel designs, as the long-term cooling of the fuel was based primarily on the heat produced in the fuel bundle and the hydraulics within the reactor. This was an issue of discussion as the applicant plans to replace the GE-7 fuel approved in the DCD and incorporated in the COLA to a more current fuel design for the first fuel loading to be approved through a license amendment post COL. Additionally, the applicant had done a defense in depth analyses which assumed a hundred percent blockage of the fuel inlet and demonstrated core cooling (discussed later).

The applicant plans to test for downstream fuel effects with a partial length, single fuel bundle at room temperature (following the PWROG testing). Dr. Wallis and the members explored the conservativeness of such testing. Long discussions took place on debris distribution over the fuel length and variation of flow among different fuel assemblies in a reactor, and the impact of two phase vs. single phase flow. Although the applicant's protocol for debris introduction followed the NRC guidance and the recently done tests by the industry, Dr. Wallis and members were not convinced that the proposed protocol was indeed conservative. The applicant noted that the test results would be factored into a decision for redoing the test with different conditions, setup and protocol. Operating and test experience will also be factored in. Action items were opened to capture these issues.

The applicant assumed that all debris, except the RMI, would pass through the strainer. The amount of debris was then allocated per fuel assembly. To account for flow variability between the hotter and colder fuel bundles in a core, a factor of 1.7 would be applied to the test bundle debris allocation. The 1.7 factor is based on the allowed maximum peaking factor (hotter fuel demand more flow) and the approach was considered conservative by the applicant. Member Corradini suggested that to show availability of margin, testing could be continued with increasing amount of debris until the acceptance criteria are reached. It was pointed out that the k-factor (pressure drop vs. flow relationship) test acceptance criteria had a factor of four margin from the analysis number.

The determination of the downstream effects test acceptance criteria started with the feedwater line break analysis using the approved GOBLIN code without any credit for high pressure core flooder (HPCF) flow, a conservative application of all debris over a period of 60 sec. post LOCA, and a constant decay heat at 5 minute post LOCA. The analysis results provide the technical basis for the blockage limit that would keep the core cooled by two phase flow resulting in the hottest assembly void fraction below [----] (basis for test acceptance criteria). The change of PCT with time was also calculated. The test plan involves continued introduction of the debris-laden flow through the fuel assembly setup until the pressure drop across the assembly does not change anymore. The test acceptance criterion was based on fuel bundle pressure drop

due to hydraulic losses, a simulation of the flow blockage due to debris accumulation in the core, with the equivalent k (loss)-factor derived from the analysis. A long discussion ensued regarding the methodologies used to determine the k-factor test acceptance criterion. The members explored the effect of HPCF on flow distribution and debris accumulation at the bottom of the hot assembly, and if this effect could be appropriately represented in a test with partial length fuel, and accounted for in the 1.7 factor. Also, Dr. Wallis questioned the use of the square of the flow in the representation of the debris bed k-factor as the ratio of the pressure drop and square of flow. This was taken as an action item.

Mr. Van Haltern described the test setup and that pressure and flow measurements would be taken at multiple locations up the fuel bundle. He mentioned two defense-in-depth analyses with two assumptions performed by the applicant, one with complete blockage of the fuel inlet and only HPCF flow coming down the core from above, and the second one assuming only flow through the engineered bypass paths in the core. Both of these analyses resulted in sufficient flow to maintain core cooling under a two phase flow. Regarding the question of crud deposition on the fuel cladding, Mr. Van Haltern mentioned an analysis performed by Westinghouse for STP where all of the debris, except the RMI, was assumed to form layers onto the fuel. The fuel heatup model (CHACHA code) resulted in the PCT increase of about 30 degrees C. Informal sensitivity studies showed that the impact on the PCT would still be very small even with an increase of the layer thickness by a factor of five. Regarding the question of applicability of the analysis to newer fuel, the simultaneous use of Optima 2 and GE fuel in current reactor cores was mentioned. After a discussion of the range of instrumentation needed for the testing (due to a large k-factor), the meeting went into an open session.

Mr. Van Haltern started the remaining long term core cooling (LTC) presentation by describing the ABWR ECCS design and operational features that mitigate a range of LOCA and maintains long term core cooling. RCIC is not credited in the LTC analysis, and ECCS pump NPSH calculations do not credit the containment accident over-pressure with 100 degrees C SP water. SP temperature of 100 vs. 77 degrees C for pump NPSH calculation (action item), and 30 day design performance of the UHS for keeping the reactor service water below 35 degrees C were areas of interest to the members.

The additional LTC issue had to do with gas accumulation in ECCS. Mr. Van Haltern discussed the design features, like ECCS suction points below the minimum water level in the SP, high point vents in ECCS piping, some keep-fill systems with control room indications, TS controls to be implemented, and design controls like the three-dimensional modeling tools to minimize need for field modifications on ECCS piping. Additionally, the applicant plans to follow the industry guidelines on program implementation. Other than a general ITAAC and DAC on ECCS piping, there is no ITAAC that would verify specifically the piping slope. Tom Daley of NINA described the design review process and that the last design review before issuance for construction would verify appropriate piping slopes and high point vents. In addition, he mentioned the QC construction verification and the Code required walk-down for configuration verification.

With a recap of major points, Mr. Head completed the NINA presentation. Chairman Abdel-Khalik and member Armijo took exception to one statement on NINA slide 72 that said "Analyses performed for assumed latent fiber and debris and chemical effects demonstrate adequate core cooling is maintained." They felt it should be restated as "Analyses performed for assumed latent fiber and debris and chemical effects predict conditions under which adequate core cooling is maintained."

Ms. Stacy Joseph started the staff presentation on Chapter 6 and LTC by introducing the staff reviewers and a brief overview of the presentation. She provided an outline of how staff closed the prior SER open items, including the ones on containment vacuum breaker protection and control room habitability upon toxic gas release. Mr. Hanry Wagage provided an overview of staff review of ECCS suction strainer design, debris evaluation, and core cooling. He mentioned the alternate AC independent mode of RHR whereby the fire protection system is used as the water source. He noted the STP strainers, although designed based on Japanese prototype, would have higher head loss due to their design condition at the run-out flow vice design flow for Japanese strainers. The basis for one cubic foot of fiber insulation in the debris assumption was discussed (action item 47b). Consultant Wallis reiterated his concern on the use of Nukon fiberglass fibers in testing to replace actual fiber from human activities in containment. Variations used in PWR and AP-1000 testing were noted.

Mr. Gregory Maker discussed the staff review of containment qualified coating evaluation for inclusion in strainer testing, downstream effects on components, and closure of the SER open item on latent aluminum. Regarding the staff evaluation of downstream effects on ECCS components, and use of the WCAP that provided guidance, Member Stetkar wanted to know if that would resolve his concern on qualification of the self lubricating RCIC pump to debris in its suction water. It was pointed out that the WCAP provided a general methodology for the designer/analyst to follow, and that there was an ITAAC on RCIC design that may address his concern (action item). The treatment of latent aluminum in the chemical effects analysis, and the basis for the assumption of 4.5 sq ft of in-containment latent aluminum were the issues of a long discussion. (Writer's note: At the 3/9/11 meeting next day, Dr. Wallis noted the basis of the 4.5 sq ft number to be the applicant's assumption that a larger size piece would be identified and thus eliminated by the containment cleanliness program, i.e., containment walk-down inspections will locate any bigger size aluminum components prior to closure of the containment post outage).

Mr. Maker discussed the staff review of the treatment of in-containment zinc. The staff used the WCAP methodology for temperature and pH dependent release of zinc from the containment coating. He discussed the staff's basis for accepting the applicant's proposal that in fuel assembly downstream effects testing, the zinc oxide be represented by aluminum oxy-hydroxide surrogate used also for in-containment latent aluminum. Mr. Mike Norato of NRO pointed out the uncertainty involved in the assumption, that effects of aluminum oxy-hydroxide as a surrogate could be worse than that of zinc oxide, was balanced by the conservatisms involved in the assumptions (all zinc under the qualified coating in the zone-of-influence dissolves in the water and then precipitates), and provided the basis for the reasonable assurance determination. Additionally the staff would use the results of the planned BWROG testing, which uses the same approach, to inform their future evaluation of the test protocol.

Mr. Gilmer of NRO addressed the staff review of downstream effects fuel testing, and noted the test must be completed and the results submitted to NRC 18 months prior to fuel load (license condition). Regarding Dr. Wallis' question on square of flow relationship for the debris bed pressure drop, he noted that all of the staff's current tools, GOBLIN, RELAP, and other LOCA analysis codes, treat the BWR fuel bundles as essentially pipe flow. They inherently assume the square of flow relationship for the pressure drop. Regarding the use of the part length fuel assembly in the STP testing, he noted that the analysis resulted in choking off the flow, with the detailed GOBLIN model calculating the effects in the upper portion of the bundle. Regarding the question of flow distribution between the fuel bundles in the core affected by varying amounts of debris accumulation, he noted that during the time of high core power, the top of the fuel would

be fed by the HPCF with clean water from the condensate storage tank. He discussed the staff review of the assumptions in the analysis and bases for the test acceptance criteria.

The staff performed a series of audits at the Westinghouse office, one key issue of their concern being whether the Optima fuel used in the analysis could appropriately represent the certified GE-7 fuel used in the COL application. Based on Westinghouse's presentation on the design differences during the audits, and that the operating fleet uses mixed cores, the staff concluded that the hydraulic characteristics of the fuel designs were similar enough and that their analysis was appropriate. The staff accepted the applicant' position regarding the effect of the crud layer build-up on fuel elements. After a discussion of the basis for staff acceptance of the test setup, Mr. Gilmer noted the applicant was committed to applying the lessons learned from industry tests in the STP test protocol.

Mr. Hanry Wagage of NRO discussed the staff review of LTC. He noted the applicant's LOCA analysis using GOTHIC code showed acceptable peak containment pressure and temperature. The staff confirmed STP's results by using MELCOR to perform complementary analysis. The staff verified that the ABWR ECCS meets the performance criteria in 10 CFR 50.46, including the criterion on long-term cooling. He also re-iterated the staff review of the ECCS strainers. Mr. Gilmer addressed staff review of the applicant's program to resolve the issue of gas accumulation in ECCS.

Ms. Joseph noted the staff presentation addressing ACRS action items 47a and b, 48, and the information that addressed action item 50.

Chairman Abdel-Khalik asked for the public phone line to be opened to receive public comments and questions. As none were offered he asked the ACRS members for input or comments. Chairman Abdel-Khalik expressed thanks to both STPNOC and the staff for very informative presentations, and adjourned the meeting at 5:36 PM.

Attachment:

ACRS ABWR Subcommittee Action item list

# ACRS ABWR Subcommittee Action Items

| No. | MTG/ date generated | ACTION ITEM | CONTEXT | AREA | LEAD(s) | COMMENTS / ACTION / DISPOSITION | Date Resolved |
|---|---|---|---|---|---|---|---|
| March 2, 2010 Subcommittee Meeting | | | | | | | |
| 1 | 3/2/10 | Dr. Armijo expressed interest in the fuel related topical reports and the effect of the fuel change (amendment to COL) on the analyses in Chapters 4 and 15.<br>Communicate ACRS desire to review fuel amendment (first reload) application that replaces GE 7 fuel (DCD) to contemporary fuel (Armijo) | Chapter 4 | SER | ACRS<br>(Abdullahi/ Banerjee) | Potential impact to other areas including Chapters 6 and 15 in addition to Chapter 4.<br>Closed as Follows: A list of fuel amendment related technical/ topical reports has been provided. ACRS (Dr. Armijo lead) to determine which ones the Committee would like to review and the responsible Subcommittee(s). Proposal to be presented at the April P&P.<br>ACRS, with Member Banerjee's lead, will review the TRs. | 4/9/10 |
| 2 | 3/2/10 | Future presentation of staff and STP to address diesel qualification to 60 degrees C, related occupancy issues and HVAC changes. (Abdel-Khalik) | Chapter 9 | COLA/SER | STP/NRO | STP to provide additional discussion on habitability at future Subcommittee meeting on impact of higher temperature (departure T1 2.15-2) when Chapter 9 is presented to the Subcommittee. The issue of diesel qualification was addressed at 3/18/10 meeting and the issue of habitability was addressed at 10/20/10 meeting satisfactory to the members. | 10/20/10-closed |

# ACRS ABWR Subcommittee Action Items

| No. | MTG/ date generated | ACTION ITEM | CONTEXT | AREA | LEAD(s) | COMMENTS / ACTION / DISPOSITION | Date Resolved |
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| 3 | 3/2/10 | Part 21 reports issued on stability analysis post DCD need to be addressed (Abdel-Khalik) | Chapters 4 and 15 | COLA/SER | STP/NRO | STP and staff to address at March 18, 2010 meeting. Closed as follows:<br>STPNOC will provide an updated Stability Option III analyses including resolution of the Part 21 issues before fuel load (COM 4.4-3)<br>Staff will follow-up commitment through established processes. | 3/18/10 |
| 4 | 3/2/10 | Part 21 reports issued post DCD - how staff identifies, captures and addresses Part 21 issues that affect the ABWR design? (Abdel-Khalik) | | COLA/SER | NRO/STP | Staff plans to address it at a future meeting.<br>STP is preparing a list of all applicable Part 21 items since original design certification and will develop a process to address them in the COLA space. Staff to follow-up and address at a future ACRS meeting. STP provided additional information on 6/8/10 (slides 8 and 9) and at 10/20/10 (slides 9 -11, ACRS Action Items). STPNOC made changes to FSAR and TS bases to address 1988 Part 21 on BWR operation with a MSL isolated.<br>Also, how to address it process-wise. The EDO response dated 9/10/10 to ACRS interim letter, dated 8/9/10, committed to develop guidance for addressing Part 21 reports in new reactor licensing process. The staff will update ACRS when such guidance is completed. | This item is closed. See item 51. |

# ACRS ABWR Subcommittee Action Items

| No. | MTG/ date generated | ACTION ITEM | CONTEXT | AREA | LEAD(s) | COMMENTS / ACTION / DISPOSITION | Date Resolved |
|---|---|---|---|---|---|---|---|
| 5 | 3/2/10 | Deletion of MSIV closure and scram on hi radiation | Chapters 7 & 19 | DCD | - | BWROG Topical Report reviewed and approved by NRC. Closed | 3/2/10 |
| 6 | 3/2/10 | FW line break mitigation – This accident is not described in Chapter 15 (Abdel-Khalik). | Chapter 6 | COLA/SER | STP/NRO | The applicant stated that this accident does not affect Chapter 15 doses and that the entirety of the accident and its effects will be discussed in the presentation on Chapter 6.<br>Addressed during 6/24/10 meeting. Refer to Sections 6.2, 6.3 and 15.6. | 6/24/10 |
| 7 | 3/2/10 | FPGA – address in more detail (e.g., inter-channel communication, determinancy)<br>Application of Common Q platform (Brown) | Chapter 7 | COLA/SER | STP/NRO | Staff to discuss at 5/20 meeting. NRO to provide documents to Subcommittee in advance of briefing on this topic as needed.<br>Based on 5/20 meeting FPGA is closed. Application of Common Q platform, independence and determinancy are being considered by Member Brown.<br>Based on the applicant's presentation on Chapter 7 at 2/8/11 SC meeting this item is closed. | 2/8/11 |
| 8 | 3/2/10 | Address GSI-191 flow blockage (not just for fuel) (Abdel- Khalik) | Chapter 6 | COLA/SER | STP/NRO | Staff and STP to discuss this issue during presentation on strainers and downstream effects testing as part of Chapter 6 on 6/24, 2010.<br>This item is part of item 47. | 6/24/10 |

# ACRS ABWR Subcommittee Action Items

| No. | MTG/ date generated | ACTION ITEM | CONTEXT | AREA | LEAD(s) | COMMENTS / ACTION / DISPOSITION | Date Resolved |
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| 9 | 3/2/10 | Address how underground release is handled (e.g., H3) in STP design and operational programs. Address if underground piping carrying radioactive liquids run through tunnels, designed for zero leakage, or above/ below the water table. (Ryan) | Chapter 11 | COLA/SER | STP | To be discussed at a future meeting. Implementation of commitments made in STP RAI response, letters U7-C-STP-NRC-100156, 6/30/10 and U7-C-STP-NRC-090121, 8/26/09, and staff follow-up will be the subject.<br>AT 10/20/10 ABWR SC - STPNOC slide 12 on Action Items, committed to NEI 08-08A. More details about corrosion resistance of material, coatings, wrappings and types of connection (flanged?) were asked. | 3/9/11<br>Closed per NINA briefing (slide # 7 under Chapter 11 |
| 10 | 3/2/10 | GALE code – impact of the very conservative approach used by the staff and need for uncertainty analysis and use of actual experience data. (Ryan) | Chapter 12 | SER | NRO | Dr. Ryan asked if staff has any insights on how results from the new GALE code will compare to results from the old GALE code. What impact is this likely to have on the application? He also expressed concern regarding the effect on the applicant of making significant changes to RGs in the middle of a review?<br>Staff to address this issue generically at a future meeting.<br>Staff discussed the issue at 3/18/10 SC meeting to Committee's satisfaction. The issue is closed. | 3/18/10 |

# ACRS ABWR Subcommittee Action Items

| No. | MTG/ date generated | ACTION ITEM | CONTEXT | AREA | LEAD(s) | COMMENTS / ACTION / DISPOSITION | Date Resolved |
|---|---|---|---|---|---|---|---|
| 11 | 3/2/10 | Disparity between staff and STP presentation related to all x/q values being bounded by DCD. | Chapter 15 | SER | NRO | Staff acknowledged error in presentation slides. Issue closed. | 3/2/10 |
| 12 | 3/2/10 | Related to HFE, how specific DAC acceptance criteria be amenable to staff inspection (Bley) | Chapter 18 | SER | ACRS | DAC issues will be closed after the issuance of the COL. This means that the Committee will not be able to track the closure of DAC-related technical issues before they are requested to write a letter on the staff's SER.<br>ACRS to receive briefing on digital I&C DAC at 570 ACRS meeting on 3/5/10, and decide if further follow-up is needed.<br>Also see item 17. At 10/20/10 ABWR SC meeting members decided that this issue will be rolled into the generic ACRS comments on the DAC process. This item was closed. | 10/20/10 |
| 13 | 3/2/10 | Subcommittee would like a better understanding of how adding dry/wetwell pressure indication on SPDS gives higher assurance of control room capability post accident when SPDS is non-safety related (Stetkar) | Chapter 18 | SER | NRO | Staff to provide additional information to ACRS.<br>Staff presentation at 10/20/10 ABWR SC meeting. See meeting minutes. This item was closed based on information provided and the application of the HFE process. | 10/20/10 |

# ACRS ABWR Subcommittee Action Items

| No. | MTG/ date generated | ACTION ITEM | CONTEXT | AREA | LEAD(s) | COMMENTS / ACTION / DISPOSITION | Date Resolved |
|---|---|---|---|---|---|---|---|
| 14 | 3/2/10 | EDG qualification to increased ambient temperature (Stetkar) | Chapters 8, 9 | FSAR/SER | STP/NRO | STP to discuss at next meeting. DG qualified to room temperature and electronics are located in cabinet outside room. This item is closed. | 3/18/10 |
| 15 | 3/2/10 | Subcommittee would like a better understanding of the basis for SER conclusion related to MCR and RSS and operator ability in switching from a digital MCR to analog RSS (Stetkar) | Chapter 18 | SER | NRO | Staff to address this question in the context of the Chapters 7 and 18 discussions on RSS. Staff presentation at 10/20/10 ABWR SC meeting. See meeting minutes. This item was closed based on information provided and the application of the HFE process through design and operator training. | 10/20/10 |
| 16 | 3/2/10 | May need more aggressive staff review of HFE. Dr. Bonaca indicated that he might have questions on Chapter 18 (human factors engineering) after he reflected on the presentation. (Bonaca) | Chapter 18 | SER | ACRS/NRO | Staff to address:<br>Dr. Bonaca referring to questions from Dr. Stetkar above – Treatment of SPDS, core cooling display parameters and their bases. Closed-refer to item 15 above. | Closed |
| 17 | 3/2/10 | Staff needs to formalize handling of DAC | Chapter 18 | NRO Programs | ACRS/NRO | ACRS comments in their 7/24/09 letter applies, plus another letter is expected to be drafted in July 2010. At 10/20/10 ABWR SC meeting members decided that this issue will be rolled into the generic ACRS comments on the DAC process. This item was closed. | 10/20/10 |

# ACRS ABWR Subcommittee Action Items

| No. | MTG/ date generated | ACTION ITEM | CONTEXT | AREA | LEAD(s) | COMMENTS / ACTION / DISPOSITION | Date Resolved |
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| 18 | 3/2/10 | Related to SER open item 1-3 on aging management, it was noted that detailed technical review is conducted under license renewal process when it should be an issue to consider from the first day on. Dr. Stetkar noted that additional guidance in the area may be helpful. | Chapter 1 | Aging managemen t | ACRS/NRO | Staff plans to close this issue in the staff's final SER with no open items. | |
| 19 | 3/2/10 | Occupational doses received from ABWRs and how they compare to occupational doses at other reactors. Can we compare ABWR to other Japanese BWRS as well as to U.S. BWRs? (Ryan) | Chapter 12 | ABWR occupational dose | NRO | Staff to address this issue at a future meeting.<br>At 3/18 SC meeting, NRO and STP provided occupational dose data for Japanese and US BWRs since 1993 and the average dose for the Kashiwazaki-Kariwa plants, two of which are ABWR units, from 1997 thru 2002. | 3/18/10 |

# ACRS ABWR Subcommittee Action Items

| March 18, 2010 Subcommittee Meeting | | | | | | | |
|---|---|---|---|---|---|---|---|
| 20 | 3/18/10 | Number of times RCIC is expected to cycle on and off during an 8 hour SBO event (Stetkar) | Chapter 5 | RCIC | STP | RCIC qualification and Operator response may be challenged due to repeated cycling (Response-4 times during 8 hr. SBO-STP slide 18 and 19, 6/8/10 ABWR SC-Closed) | 6/8/10 |
| 21 | 3/18/10 | Rx vessel EOL fluence value and error band (Abdel-Khalik/Armijo) | Chapter 5 | Rx Vessel Material | STP | COLA uses DCD value, will be updated once PTLR is finalized/approved | 3/18/10 |
| 22 | 3/18/10 | Ensure all documents (engineering, design, procedures, PTS etc) at the plant use a consistent set of units (either British or Metric). (Abdel-Khalik) | All | All | STP | Too may number of problems and near misses happen when operators and technicians at the plant have to take action based on inconsistent units.<br>Closed per STP slide 8&9 presented at 6/24/10 meeting. | 6/24/10 |
| 23 | 3/18/10 | Address how K6 and K7 RCS leakage TS limits compare with proposed STP numbers, and justify STP limits, if higher.<br>Also address instrument sensitivity and how it compares with 1 gpm number. (Armijo) | Chapter 5 | PTS | STP | Unidentified leakage limit was increased from 1 gpm DCD value to 5 gpm STP TS as STP is not using LBB.<br>Closed per STP slide 10&11 presented at 6/24/10 meeting. | 6/24/10 |
| 24 | 3/18/10 | Confirm that East transmission lines are capable of supplying all 4 units' safety loads when other lines are lost. (Stetkar/Sieber) | Chapter 8 | FSAR | STP | Concern was that given shared transmission right of way and towers, all other lines could be lost under a storm situation. Closed per STP slide 10, ABWR SC meeting 6/8/10. | 6/8/10 |

# ACRS ABWR Subcommittee Action Items

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| 25 | 3/18/10 | State if there are single or double closing coils on switchyard breakers. (Stetkar) | Chapter 8 | FSAR | STP | There may be additional questions if the answer is "single." 6/8/10 ABWR SC – STP slide 11, answer is "single closing coil." Stetkar question-demonstration of capability to reclose upon (single?) failure of DC power under worst switchyard fault to restore one offsite power supply.<br><br>Closed per STP slide page 12 presented at 6/24/10 meeting. | 6/24/10 |
| 26 | 3/18/10 | Provide switchyard control system backup battery discharge time. (Stetkar/Sieber) | Chapter 8 | FSAR | STP | Breakers may not close after LOOP clears if battery exhausted. Batteries sized to operate 10 hrs, expected life 15-20 yrs.- re: STP slide 12 at 6/8/10 ABWR SC. | 6/8/10 |
| 27 | 3/18/10 | Performance of switching logic under various electrical transients. (Stetkar) | Chapter 8 | FSAR | STP | STP may a want to address it beyond COL while detailed design is finalized. STP slides 14-16, 6/8/10 ABWR SC meeting. Stetkar to review and decide if sufficient to close action item. See STP slides 7-11 on Chapter 8 at 10/20/10 ABWR SC. | 10/20/10-closed |
| 28 | 3/18/10 | NRO to address how the SBO rule requirements are being ensured after operator action time is factored into the scenario with STP specification of "less than 10 minutes CT startup time." (Stetkar) | Chapter 8 | SER | NRO | As STP chose not to do SBO coping analysis, they have to demonstrate that the CTs are capable of powering shutdown buses within 10 minutes of the onset of SBO (10 CFR 50.63 (c)(2)). The scenario involves needed operator action to shed/load buses before breaker can be closed.<br><br>EDO letter, 9/1/10 – discuss at next Chapter 8 briefing | 10/20/10 – See NRO slides on Chapter 8, page 4 and backup-closed. |

# ACRS ABWR Subcommittee Action Items

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| 29 | 3/18/10 | Address qualification of submerged 345 KV cables. (Brown) | Chapter 8 | FSAR | STP | High water table prompted question on qualified life. STP slide 13, 6/8/10 ABWR SC meeting. | 6/8/10 |
| 30 | 3/18/10 | Address when DRAP list will be effectively populated and staff review is completed.<br>How does staff ensure the DRAP list and the process (COLA vs. ITAAC) related to it are acceptable? (Stetkar) | Chapter 17 | FSAR/SER | STP/NRO | With evolving plant PRA and DRAP, members were concerned that ITAAC may not be an appropriate closer mechanism for DRAP list. STP slide 20 6/8/10 ABWR SC meeting –List and justifying analysis to be available to ACRS 3rd quarter 2011. Staff to address the ACRS review timing question.<br>At the 6/24/10 ABWR SC meeting the staff discussed their review of evolving DRAP list thru an audit (3rd quarter of 2010 and inspection late 2011. STP/NRO will brief ABWR SC in future, time to be determined.<br>10/20/10 ABWR SC STP slide 14 – Provided draft DRAP list, staff to provide audit report when available. Future presentation by STP on process with examples. | |
| 31 | 3/18/10 | 4.16 kV winding in CTG1 bus could carry two PIP buses together with one safety bus (Stetkar) | Chapter 8 | FSAR/SER | STP | STP to confirm at a future meeting. STP slide 17 6/8/10 ABWR SC - confirmed | 6/8/10 |

# ACRS ABWR Subcommittee Action Items

| May 20, 2010 Subcommittee Meeting | | | | | | | |
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| 32 | 5/20/10 | During the presentation on preoperational testing, members Stetkar and Brown noted that they had identified “overlap testing” requirements for various systems but could not identify end-to-end testing requirements. | Chapter 14 | FSAR | STP | STP to address at a future meeting. Closed per STP slide page 13 &14 presented at 6/24/10 meeting. | 6/24/10 |
| 33 | 5/20/10 | Dr. Abdel-Khalik wanted to know the steam velocity and how it compares to other plants that have undergone extended uprate. | Chapter 14 | FSAR | STP | STP to address at a future meeting. Re: STP slide 15 of 10/20/10 ABWR SC presentation on Action items. | 10/20/10- closed |
| 34 | 5/20/10 | Dr. Abdel-Khalik wants the staff to provide reports submitted regarding reactor flow induced vibration for review by the Committee, and a briefing on their review of the predictive analysis. | Chapter 14<br>Section 3.9.2 | Tech. Report | NRO | This technical report is due from STPNOC in later 2010. | |
| 35 | 5/20/10 | Member Brown raised the issue of cyber-security ITAAC and whether or not it should be included in Chapter 14. | Chapter 14 | ITAAC | NRO | NRO staff to address at a future meeting | |
| 36 | 5/20/10 | Dr. Stetkar pointed out a possible inconsistency between the diagram of the backup SCRAM control circuit and the description of that circuit in the text. | Chapter 14 | FSAR/SER | STP/NRO | STP and NRO staff to address at a future meeting. Text clarification withdrawn by STP. Re: Slide 16, 17 of 10/20/10 ABWR SC briefing on Action Items. | 10/20/10- closed |

# ACRS ABWR Subcommittee Action Items

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| June 8, 2010 Subcommittee | | | | | | | |
| 37 | 6/8/10 | Compile ABWR SSAR in a CD and provide to members. | | DCD | ACRS Staff | CD mailed to the members during the week of 6/13/10 | Closed |
| 38 | 6/8/10 | STP White paper on PRA screening process for plant changes – provide to members. | Chapter 19 | FSAR | STP | E-mailed to members on 6/10/10 and a CD provided on 6/11/10. | 6/10/10 |
| 39 | 6/8/10 | 2006 MCR dam failure screening assessment. | Chapter 19 | FSAR | STP | E-mailed to members on 6/10/10 and a CD provided on 6/11/10. | 6/10/10 |
| 40 | 6/8/10 | Dam failure risk – Baecher paper, US Bureau of Reclamation data and Army Corps of Engineer report used in SER. | Chapter 19 | SER | NRO | E-mailed to members on 6/10/10 and a CD provided on 6/11/10 | 6/10/10 |
| 41 | 6/8/10<br>10/20/10 | DW flooder valve failure modes other than failure of fusible links considered in FSAR. Operating experience? A small leak during normal operation would go undetected thus accumulating water in the lower drywell. Toshiba test results. (Bley) | Chapter 19<br>Section 9.5.12 | FSAR | STP | STP Slide 18, ABWR SC 10/20/10 provided results of a FEMA. Additional question on valve leak during normal operation (10/20/10). | |
| June 23-24, 2010 Subcommittee Meeting | | | | | | | |

# ACRS ABWR Subcommittee Action Items

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| 42 | 6/23/10 | Main turbine missile analysis and maintenance program will be submitted to the NRC within 3 years after issuance of COL. ACRS wanted to be informed about staff's decision-making regarding adequacy of program. | Chapter 10, 3 | SER | STP/NRO | The turbine design will meet acceptance criteria of SRP 3.5.1.3 and RG 1.115, will meet the minimum requirements in Table 3.5-1, STP Commitment. 3.5-1. Expected to be addressed in next Chapter 10 presentation. | At the 10/20/10 ABWR SC meeting STPNOC noted that documents may be submitted sooner. |
| 43 | 6/23/10 | Documented basis for adequacy of turbine rotor integrity related to FATT and Cv departure | Chapter 10 | FSAR/SER | STP/NRO | EDO letter, 9/1/10 – discuss resolution at future briefing. | |
| 44 | 6/23/10 | NRO process for review of Tier 2 departures (review if qualifies as T2, not the technical adequacy) | Generic | SER | ACRS | ACRS to decide if they want to raise any issue regarding it. | |
| 45 | 6/23/10, ACRS Letter 8/9/10 | Provide RAI response regarding redundancy and diversity of turbine overspeed sensors including power supply – ITAAC very general in scope<br><br>Staff to provide RAI response with or before the SER. | Chapter 10 | RAI resp. | STP/NRO | EDO letter 9/10/10 – Resolution will be presented with final SE with no OI.<br><br>Update provided by STP at 2/8/11 ABWR SC meeting. NINA will submit additional details on redundancy and diversity and on ITAAC. | |
| 46 | 6/24/10 | Identify and justify assumptions regarding ppm Boron in solution used in chemical effects analysis (GSI 191 ECCS Strainer) | Chapter 6 | FSAR | STP/NRO | Important contributor regarding concentration of Al in SP (ECCS recirculating water). Closed per NINA slide#11/staff briefing at 3/8/11 ABWR SC meeting | 3/8/11 |

# ACRS ABWR Subcommittee Action Items

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| 47 | 6/24/10 | a.Downstream effects: Future briefing on test and analysis (Lic. Condn.)<br><br>b.Basis for assuming destroyed fiber (10% of 1 $ft^{3)}$ reaching fuel | Chapter 6<br>Chapter 4 | FSAR/SER | STP/NRO | ~~STP to brief by 4/2011~~<br><br>At 3/8/11 ABWR SC meeting NINA noted that the assumption of 10% has been changed to 100% (Chapter 6 Slide#12) | 3/8/11-Item 47b is closed |
| 48 | 6/24/10 | Provide three ERI reports used in staff review of containment analysis | Chapter 6 | SER | NRO | Provided by NRO and included in background documents CD for 3/8/11 ABWR SC meeting to members. | Closed |
| 49 | 6/24/10 | Future briefing on design of vacuum breaker shield | Chapter 6 | FSAR | STP | To address loading and height of water level. Closed per NINA briefing (Slides# 13-17) at 3/8/11 SC meeting. | 3/8/11 |
| 50 | 6/24/10,<br><br>EDO letter 9/10/10 | Presentation on Toshiba Technical reports - strainer design and pool swell analyses | Chapter 6 | FSAR | STP/NRO | NRO and ACRS staff to schedule.<br><br>Closed per staff briefing at 3/8/11 SC meeting | 3/8/11 |
| 51 | EDO letter 9/10/10 | Staff to update ACRS after developing guidance on the process of addressing Part 21 reports in new reactor licensing. | ACRS Letter dated 8/9/10 | COLA/DC review process | NRO | NRO to advise ACRS staff when such briefing can be scheduled. | |
| 52 | EDO letter 9/10/10 | Staff to brief ACRS on Long term cooling | SRM dated 5/8/08 | COLA | NRO | NRO and ACRS staff to schedule | |
| | | | October 20, 2010 Subcommittee Meeting | | | | |
| 53 | 10/20/10 | NRO to submit for ACRS review technical report on reactor flow induced vibration. | Section 3.9.2 | SER | NRO | This technical report is due from STPNOC in later 2010. | Closed, duplicate of 34 |

# ACRS ABWR Subcommittee Action Items

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| 54 | 10/20/10 | Basis for STP being bounded by the DCD wind loading and design basis hurricane, i.e., basis for 3 second gust wind loading and the 100 year history record of hurricane within 50 miles of site (Stetkar). | Section 3.3<br>Chapter 2 | FSAR | STP | STPNOC to address at 11/30 ABWR SC meeting. See Slide 41 | Closed |
| 55 | 10/20/10 | Basis for the use of Regulatory Guide 1.76 Region II parameters. | Section 3.3<br>Chapter 2 | FSAR | STP | STPNOC to address at 11/30 ABWR SC meeting. See Slides 42-44 | Closed |
| 56 | 10/20/10 | Confirm rail/truck large equipment access bay door in reactor building is water tight. (Stetkar) | Section 3.4<br>Chapter 2 | FSAR | STP | STPNOC to address at 11/30 ABWR SC meeting. See Slides 45 | Closed |
| 57 | 10/20/10 | Confirm levels of water-proofing of foundation of RSW pump house. (Stetkar) | Section 3H.6.6.4 | FSAR | STP | STPNOC to address at 11/30 ABWR SC meeting. See Slides 46 | Closed |
| 58 | 10/20/10 | Clarify various water level parameters discussed in Chapter 3 and how they were derived. (Stetkar) | Section 3.4 | FSAR | STP | STPNOC to clarify FSAR (11/30/10 meeting slide 40) | |
| 59 | 10/20/10 | A value of $1 \times 10^{-2}$ per year per plant was chosen as a conservative value for the product of strike and damage probabilities-provide basis. | Section 3.5,<br>Chapter 10 | FSAR | STP | STP to address at next Chapter 10 briefing. | |
| 60 | 10/20/10 | Types of commercial aircraft and frequency considered. (Stetkar) | Sections 3.5, 2.3 | FSAR | STP | RAI response dated 9/14/09 provided to members. | 10/25/10 |
| 61 | 10/20/10 | Justify deviation from SRP related to wave height. | Chapter 2 | FSAR | STP | Open item in SER | |

# ACRS ABWR Subcommittee Action Items

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| 62 | 10/20/10 | The basis and application of the 30 minute response time upon a single passive failure of the RSW piping and how the analysis justify a 30 day supply for the UHS while accounting for the pipe failure. (Stetkar) | Section 9.2.5.5.2 | FSAR | STP | |
| 63 | 10/20/10 | The basis for approx. 17 meter RSW pump NPSH and how it was calculated (specifically at end of 30d). | Section 9.2.15.2 | FSAR | STP | |
| 64 | 10/20/10 | Generation of spurious signals in digital I&C cabinets containing only fiber optic cables due to heat related to fire in the room. (Stetkar) | Section 9.5.1 | FSAR | NRO | |
| November 30, 2010 Subcommittee Meeting | | | | | | |
| 65 | 11/30/10 | How MCR breach width derived from Froehlich's equation used in the FLDWAV model compare with the value used in confirmatory BREACH model | Section 2.4.4 | FSAR/SER | STPNOC | |
| 66 | 11/30/10 | Comparison of staff's confirmatory SLOSH and STPNOC's ADCIRC at Gulf Coast | Section 2.4.4 | FSAR/SER | STPNOC/NRO | The requested information provided by NRO staff was e-mailed to the members present at the 11/30 ABWR SC meeting on 12/1/10. |
| February 8, 2011 Subcommittee Meeting | | | | | | |

# ACRS ABWR Subcommittee Action Items

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| 67 | 2/8/11 | Add to FSAR a statement regarding hardware for the watchdog timer that is independent and diverse from FPGA | Chapter 7 | FSAR | NINA | Closed per NINA presentation slide #4 on ACRS Action items at 3/9/11 ABWR SC Meeting | 3/9/11 |
| 68 | 2/8/11 | a. Provide qualification test of Common Q platform at 70% loading.<br>b.Confirm FSAR App. 7D maintains design to <70% loading. | Chapter 7 | FSAR | NINA | | |
| 69 | 2/8/11 | During Chapter 16 presentation to ABWR SC (3/9/11) address bypass of combination of sensors and channels of ELCS. | Chapter 7 | | NINA | Closed per NINA presentation slides #6-12 on Chapter 16 at 3/9/11 ABWR SC Meeting | 3/9/11 |
| | | | March 8, 2011 Subcommittee Meeting | | | | |
| 70 | 3/8/11 | NPSH for RCIC at 100 C (vice 77C) – number used for vapor pressure head needs to be justified (Stetkar) | Chapter 5, Table 5.4-1a | FSAR | NINA | | |
| 71 | 3/8/11 | RCIC pump qualification w.r.t internal components and quality of lube water (Stetkar) | Chapter 5 | FSAR | NINA | | |
| 72 | 3/8/11 | How hydrodynamic load definition are developed and evaluated for ECCS strainers also at 100C? (Wallis) | Chapters 6, 3 | FSAR | NINA | STP to cover this at Chapter 3 meeting | |
| 73 | 3/8/11 | Does analysis for Japanese plant bound thin bed effects? (Wallis) | Chapter 6 | FSAR | NINA | | |

# ACRS ABWR Subcommittee Action Items

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| 74 | 3/8/11 | Justify use of Nukon fiberglass fiber vs. textile fiber, and as a surrogate. (Wallis) | Chapter 6 | FSAR/SER | NINA/NRO | |
| 75 | 3/8/11 | Al-oxy-hydroxide an appropriate surrogate for ZnOxide? Experimental verification? (Wallis) | Chapter 6 | FSAR | NINA/NRO | |
| 76 | 3/8/11 | Will STP use Zn injection? (Armijo) | Chapter 6 | FSAR | NINA | |
| 77 | 3/8/11 | Justify use of partial length fuel assembly in test (Abdel-Khalik, Wallis) | Chapter 6 | FSAR | NINA | Analyze post COL test data and determine need for future ACRS briefing |
| 78 | 3/8/11 | Justify use of unheated test | Chapter 6 | FSAR | NINA | See item 77 above |
| 79 | 3/8/11 | NRC-accepted protocol for addition of debris-introduction of debris in different sequence may provide worse results (Wallis) | Chapter 6 | FSAR/SER | NINA/NRO | See item 77 above |
| 80 | 3/8/11 | RE: pressure drop modeling of the debris bed in test acceptance criteria, justify use of 2 power of flow rate in test acceptance criteria vs. use of other exponent such as 1.2. (Wallis) | Chapter 6 | FSAR | NINA | |
| 81 | 3/8/11 | Multiple tests at same condition to demonstrate margin. | Chapter 6 | FSAR | NINA | |

# ACRS ABWR Subcommittee Action Items

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| 82 | 3/8/11 | Justify shorter transient loop time in test vs. actual debris deposition time. (Wallis) | Chapter 6 | FSAR | NINA | |
| 83 | 3/8/11 | Justification that 1.7 factor is bounding given uneven distribution of debris at lower plenum, downward flow of HPCF thru core (Wallis) | Chapter 6 | FSAR | NINA | Need to show margin |
| 84 | 3/8/11 | Parametric study of K-factor vs. flow rate (AK, Wallis) | Chapter 6 | FSAR | NINA | |
| March 9, 2011 ABWR Subcommittee Meeting | | | | | | |
| 85 | 3/9/11 | STP Cyber Security program (safeguards document) | Chapter13 COLA Part 8 | FSAR/COLA | ACRS | Members to review program document provided by NRO and decide need for briefing, also see item 35 |