



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

April 6, 2010

MEMORANDUM TO: ACRS Members

FROM: Maitri Banerjee, Senior Staff Engineer */RA/*  
Reactor Safety Branch – A  
ACRS

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE  
SUBCOMMITTEE ON ABWR REGARDING COL APPLICATION OF  
SOUTH TEXAS PROJECT (STP) ON MARCH 2, 2010

The minutes for the subject meeting were certified on April 1, 2010 as the official record of the proceedings of that meeting. A copy of the certified minutes is attached. Also attached is a copy of the actions items resulting from the deliberation.

Attachment: As stated

cc: C. Santos  
A. Dias



**Certified: April 1, 2010**  
**By: Said Abdel-Khalik**

**Issued: April 6, 2010**

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON  
ADVANCED BOILING WATER REACTOR (ABWR) REGARDING STP COLA  
ON MARCH 2, 2010, IN ROCKVILLE, MARYLAND

On March 2, 2010, 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 South Texas Project Nuclear Operating Company (STPNOC), the applicant for a combined operating license (COL) for a two unit ABWR at the existing reactor site in Texas regarding Chapters 1, 4, 11, 12, 16 and 18 of the COL FSAR and staff's SER with open items. The meeting was convened at 8:30 AM. The meeting was open to the public.

**Attendees:**

**ACRS Members**

Said Abdel-Khalik (Chairman)  
J. Sam Armijo  
William Shack  
Mario Bonaca  
Jack Sieber  
Dennis Bley  
John Stetkar  
Charlie Brown  
Michael Ryan

**ACRS Staff**

Maitri Banerjee (DFO)

**NRC Staff Presenters**

Mark Tonacci, NRO  
George Wunder, NRO  
Tekia Govan, NRO  
James Gilmer, NRO  
Raj Anand, NRO  
Adrian Muniz, NRO  
Mike Eudy, NRO  
Robert Kellner, NRO  
Stephen Williams, NRO

**NRO Consultant**

John Larkins, ERI

**STNOC P Presenters**

Gordon Williams  
Coley Chappell  
Jim Tomkins  
Milton Rejcek  
Scott Head  
Steven Thomas

**NRC Staff**

Rockey Foster, NRO  
Joe Donoghue, NRO  
Steven Downey, NRO  
Jerry Wilson, NRO  
George Thomas, NRO  
Bob Davis, NRO  
Samuel Lee, NRO  
Dinesh Taneja, NRO  
Andrzej Drozd, NRO  
Diego Saenz, NRO  
Jaclyn Dorn, NRO  
Richard McIntyre, NRO  
Sara Bernal, NRO  
Rich Clement, NRO  
Ronald Lavera, NRO  
Edward Roach, NRO  
Todd Angel, NRO

Steve Schaffer, NRO

Robert Moody, NSIR

Don Dube, NRO

**STPNOC & Others**

Michael Murray, STPNOC  
Scot Stephens, STPNOC  
John E. Price, STPNOC  
Tooru Karasawa, TANE  
Craig Swanner, MPR/TANE  
Caroline Schlaseman, MPR/TANE  
Jay Phelps, STPNOC  
Linda Taylor, STPNOC  
Kyle Dittman, STPNOC  
Ryuji Iwasaki, Toshiba  
W. J. Johnson, S&L  
Robert Quinn, Westinghouse  
Brad Maurer, Westinghouse  
Nirmal Jain, Westinghouse  
Andrew Lang, Westinghouse  
Tom Daley, STPNOC  
Altheia Wyche, Bechtel  
Harry Moate, Bechtel  
Y. J. Lin, Bechtel  
Alvin Gutterman, Morgan Lewis  
Bernard Gilligan, HPSA

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 the past ACRS briefing in November 2009 on STP design, and that the current briefing was to discuss COLA FSAR and corresponding staff SER-with-open-items for Chapters 1, 4, 11, 12, 15 and 18. He then invited Mark Tonacci, Branch Chief NRO, to begin the staff presentation.

### Introduction

Mr. Tonacci introduced the NRO Lead Project Manager George Wunder, and noted that the staff presentation would concentrate on significant technical issues related to the chapters to be presented. In his short introduction, Mr. George Wunder noted that the NRO schedule for preparing the SER-with-open-items had slipped for Chapters 2 and 3. Hence these chapters will not be included in the ABWR Subcommittee meetings scheduled for the next few months.

### STPNOC Presentation

Mr. Scott Head, Regulatory Affairs Manager at STP 3&4, introduced the STP team present. After a short history of the COLA submittals, he turned over the presentation to Steve Thomas to discuss the STP process related to alternate vendor (Toshiba) selection.

Mr. Thomas discussed the significant aspects of review of Toshiba undertaken by STP that concluded that Toshiba was eminently qualified to supply the U.S. ABWR design. After a short discussion of "Americanization" and "tropicalization" of Toshiba's experience with ABWRs in Japan and a few probing questions from the members related to these and Westinghouse' ability to supply the engineering design applications, the presentation was turned over to Mr. Coley Chappell of STP.

### Chapter by Chapter Presentation by STP and NRO Staff

Mr. Chappell discussed the structure of the STP reference COLA, including a short discussion on Tier 1 and Tier 2 star departures. Upon member Armijo's question, Mr. Ryuji Iwasaki of Toshiba noted that the Japanese ABWRs maintained the MSIV closure and reactor scram function upon high radiation, while this feature has been removed in US BWRS. The staff noted the differences in pertinent US and Japanese occupational dose experience and that hydrogen water chemistry is not generally used in Japanese BWRs. Regarding qualification of emergency diesels to a higher temperature of 60 degrees C compared to 50 degrees C for the certified design, Mr. Mike Murray, STP I&C Manager, noted that the control system components are being located in an air conditioned area of the diesel building. Upon member Stetkar's observation that aging management program should start from day one, Mr. Thomas of STPNOC noted that the design basis in STP Units 3 and 4 engineering specifications is 60 years even when the COLA is for 40 years. Also, STP is looking at GALL for earlier implementation but not ready to make a commitment in the COLA yet. The staff noted that they are also reviewing this issue for generic COLA and higher level (policy) guidance.

The FSAR Chapter 4 fuel design currently follows the DCD, but STP plans to submit an amendment after the COL that would replace the now obsolete GE7 fuel with a more current fuel design. This was noted by several members as an item for interest. Chairman Abdel-

Khalik wanted to know how Part 21 issues on reactor stability analysis (detect and suppress methodology) are being addressed and STP stated that they would discuss the issue with Chapter 7 presentation at the May 20 meeting. Regarding the generic approach in resolving applicable Part 21 issues for STP, the staff and the applicant agreed to address it at a future meeting. Similarly GSI 191, downstream effects will be addressed during the May 20 ABWR Subcommittee meeting with the Chapter 6 discussion.

In Chapter 11 of the COLA, STP replaced the certified liquid and solid waste processing system design with current processing technology in line with the EPRI program for reducing waste and radiation dose. The STP Units 1 and 2 operating experience is also factored in to the program. For gaseous waste management, STP will use Japanese experience in designing the offgas system. Regarding underground leakage of radioactive material, member Ryan pointed out the need for being proactive. This item was deferred for discussion at a future meeting.

In the Chapter 12 presentation, upon members' questions, STP noted that they plan to use low hydrogen-water chemistry (although the impact of possible high radiation doses associated with various technologies is still being evaluated). Also, STP decided to wait before making a decision about zinc addition until a few of years of operating experience with STP Units 3 and 4 is obtained. Dr. Ryan asked for staff insights regarding the application of the current and proposed revision of the GALE Code, the very conservative nature of the Code, use of actual experience data, and lack of uncertainty analysis in the Code usage. The members wanted to know about the occupational dose experience of ABWRs in Japan and how they compare with Japanese and US BWRs. The staff agreed to address these items at a future meeting.

Regarding Chapter 15, it was noted that most of this material would be resubmitted with the fuel amendment post COL. Given that regular license amendment applications are not subjected to ACRS review, most of the members noted that the significance of the issue would probably justify such a review. The staff noted that the technical and topical reports related to the fuel amendment would be available for ACRS as they are being submitted. Also, there was an error in the staff's presentation slides related to the site specific X/Q values. Upon members' questions, the staff concluded that some site specific X/Q values were not bounded by the DCD numbers although the resulting dose values were.

Regarding STP presentation on Chapter 18, member Stetkar asked the staff to explain how a higher assurance of control room capability is achieved by adding the drywell pressure parameter on the control room safety parameter display system when that system is non-safety related. The resolution of this issue was not clear and the staff needs to address it at a later meeting. Upon member Bley's question, STP indicated that they would have a plant specific simulator available for training in early parts of 2013. His questions on verification of human factor engineering (HFE) design acceptance criteria (DAC) through the inspection process were deferred to the upcoming March 5 briefing of the Full Committee on I&C DAC. During discussion of the digital and hard-wired make up of the main control room (MCR) and the remote shutdown system (RSS), member Bley noted that if PRA is used as an input to generate the list of actions for task analyses, then one should look at operator actions considered very reliable also and not just the ones with high risk measures. His concern was that potential higher human error rates in transitioning from a digital MCR to a hard-wired RSS could affect operator actions due to different human interface with displays, alarms, procedures, etc. Further discussion on this issue was deferred to the future presentation on Chapter 19. Member Stetkar commented that given the evolving nature of the HFE process it is important for the staff and the applicant to retain a level of questioning attitude and not get focused on the

fact that as the applicant is following a staff approved process including the inspections, tests, analyses and acceptance criteria (ITAAC), hence everything will work as it should.

After a short discussion of prior members' questions on Japanese and US BWR/ABWR experience related to occupational dose and the higher diesel room temperature for STP, Chairman Abdel-Khalik opened the telephone bridge line in order to allow the public who were listening to the deliberation an opportunity to ask questions or make comments. But there was no response. At that point Chairman Abdel-Khalik opened the floor for members' deliberation.

#### Closing Statements

Members pointed out the HFE to be an area of further review. Several members noted the process of DAC as an area of high interest. The post COL fuel design, related topical reports and impact on Chapter 15 accident analyses was another area of interest. Member Ryan reflected positively to the STP approach to waste management. He also noted his prior comments on a very conservative GALE code and its potential design and implementation impacts.

After thanking the staff and the applicant, Chairman Abdel-Khalik closed the meeting at 3:54 PM.

#### Action Items List

A copy of the follow-up action items for the staff, applicant or the ACRS, resulting from this meeting is attached.

## ACRS ABWR Subcommittee Action Items

No.	MTG/date generated	ACTION ITEM	CONTEXT	AREA	LEAD(s)	COMMENTS/ ACTION / DISPOSITION	Date Resolved
<b>March 2, 2010 Subcommittee Meeting</b>							
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.  Communicate ACRS desire to review fuel amendment (first reload) application that replaces GE 7 fuel (DCD) to contemporary fuel (Armijo)	Chapter 4	SER	ABWR SC	At the 5/20/10 meeting the staff will tell the Subcommittee which topical reports will be presented to them and when. The staff will also answer the question of whether or not the amendment will go before ACRS.  Potential impact to other areas including Chapters 6 and 15 in addition to Chapter 4.	
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	STP	STP is to provide additional discussion at future Subcommittee meeting on impact of higher temperature (vs. DCD) when Chapter 9 is presented to the Subcommittee.	
3.	3/2	Part 21 reports issued on stability analysis post DCD need to be addressed (Abdel-Khalik)	Chapters 4 and 15	SER	STP/NRO	STP and staff to address at March 18, 2010 meeting.	
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)	Chapters?	COLA/SER	STP/NRO	STP and staff plan to address at March 18, 2010 meeting.	
5.	3/2/10	Deletion of MSIV closure and scram on hi radiation.	Chapters 7 and 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.  Address during 5/20/10 meeting.	

## ACRS ABWR Subcommittee Action Items

No.	MTG/date generated	ACTION ITEM	CONTEXT	AREA	LEAD(s)	COMMENTS/ ACTION / DISPOSITION	Date Resolved
7.	3/2/10	FPGA – address in more detail (e.g., interchannel communication, determinancy) (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.	
8.	3/2/10	Address GSI-191 flow blockage (not just for fuel)	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 May 20, 2010.	
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 future meeting	
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?  Staff to address this issue generically at a future meeting.	
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

## ACRS ABWR Subcommittee Action Items

No.	MTG/date generated	ACTION ITEM	CONTEXT	AREA	LEAD(s)	COMMENTS/ ACTION / DISPOSITION	Date Resolved
12.	3/2/10	Related to HFE, how specific DAC acceptance criteria to 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.  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.	
13.	3/2/10	Related to HFE, how specific DAC acceptance criteria to 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.  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.	
14.	3/2/10	EDG qualification to increased ambient temperature (Stetkar)	Chapters 8, and 9	FSAR/SER	STP/NRO	STP and staff to address at March 18, 2010 meeting.	
15.	3/2/10	Subcommittee would like a better understanding of the basis for SER conclusion related to MCR and RSS and HFI issues 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 19 discussions on RSS.	
16.	3/2/10	May need more aggressive staff review of HFE (Bonaca)	Chapter 18	SER	ACRS/NRO	Staff to address:  Dr. Bonaca referring to questions from Dr. Stetkar above – Treatment of SPDS, core cooling display parameters and their bases.	
17.	3/2/10	Staff needs to formalize handling of DAC	Chapter 18	NRO Programs	ACRS/NRO	Future ACRS Briefings to address. Also, see item 12.	

## ACRS ABWR Subcommittee Action Items

No.	MTG/date generated	ACTION ITEM	CONTEXT	AREA	LEAD(s)	COMMENTS/ ACTION / DISPOSITION	Date Resolved
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 Management	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.	