

June 26, 2009

APPLICANTS: AREVA NP
PROJECT: U.S. EPR
SUBJECT: SUMMARY OF APRIL 29-30, 2009, PUBLIC MEETING WITH AREVA NP TO DISCUSS TECHNICAL SOLUTIONS RELATED TO ISSUES OF CONCERN FOR DIGITAL INSTRUMENTATION AND CONTROLS

On April 29 and 30, 2009, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) staff and representatives of AREVA NP. The April 29, 2009, portion of the meeting was held at the Rockville Civic Center, Rockville, Maryland, and the April 30, 2009, portion of the meeting was held at NRC Headquarters, Two White Flint North, 11545 Rockville Pike, Rockville, Maryland. The purpose of this meeting was to discuss AREVA NP's approach regarding technical issues resolution for the Defense-in-Depth and Diversity (D3) Topical Report, the Protection System (PS), and the Priority and Actuator Control Systems (PACS). The meeting notice with the agenda can be found in the Agencywide Documents Access and Management System (ADAMS) (Accession No. ML091040327). The agenda included designated times for discussion of proprietary information related to the topics of discussions, and also for public interactions with the staff. Enclosure 1 lists the meeting attendees on both days, which includes members of the public.

Day 1 (April 29, 2009):

The meeting started at 8:30 a.m. (Eastern Time). After the opening remarks and introductions of the attendees, meeting ground rules and logistics were announced. The staff then briefly reviewed the agenda items, and emphasized that members of the public will be asked to leave immediately prior to AREVA NP and the staff beginning discussion of proprietary information. Closed discussion of proprietary information was the last item on the day's agenda. AREVA NP began the business portion of the meeting by introducing three objectives: (i) present resolution to docketed NRC issues with Topical Reports "D3," "PS," and "AV42," and receive NRC's initial feedback on the proposed approaches; (ii) present I&C architecture changes and receive NRC's initial feedback on the proposed changes; (iii) present ITAAC mapping methodology and receive NRC's initial feedback on methodology.

Following the introduction, AREVA NP made a formal presentation on "Defense-in-Depth and Diversity (D3)" [Slides 3 through 9]. AREVA NP presented that NRC letter dated January 23, 2009, contained concerns involving (i) "Lack of information in topical report" which was addressed in AREVA NP's response letter to the NRC dated March 30, 2009, describing AREVA NP's approach to address this concern; (ii) "Compliance with BTP 7-19 Position 4" which AREVA NP was addressing through design changes; in conjunction with this, AREVA NP displayed schematics of the current and proposed designs and described the proposed changes. At one point during the presentation, the staff briefly discussed the expectations laid out in Interim Staff Guidance 4 (ISG 4) that is applicable to this issue. The staff also mentioned that a NUREG/CR on diversity attributes, developed by the Office of Research (RES), is out for public comment. The staff referenced request for additional information (RAI) 57 and

AREVA NP's response, and discussed staff's further expectations in the response. As AREVA NP confirmed that the D3 Topical Report will be converted to a technical report and then incorporated by reference (IBR) into U.S. EPR, the staff commented that schedule adjustment would be necessary.

Finally, AREVA NP discussed the following D3 path forward: submit in May 2009, the revised D3 technical report to include initial evaluation of D3 events, as well as the proposed markup/changes to Sections 7.1 and 7.8 of the Final Safety Analysis Report (FSAR) based on RAI responses; submit in August 2009, the revised FSAR changes based on design changes; and submit in November 2009, the revised D3 technical report to include confirmatory analysis and any DAS changes.

At the conclusion of the above presentation and discussions, the public was given an opportunity to interact with the NRC staff. There were no formal comments or questions from members of the public.

After a short break, AREVA NP made a formal presentation on "Protection System (PS)" [Slides 10 through 26]. AREVA NP outlined the NRC concerns which involve the "Manual System Level Initiation – PS Topical Report," and which were communicated to AREVA NP in RAI 39. AREVA NP listed the following items on which the NRC concerns were focused: (i) BTP 7-19 Point 4, (ii) ISG 02, (iii) IEEE 603 Clause 5.14, (iv) IEEE 603 Clause 6.2.1, (v) RG 1.62 Position 4. AREVA NP described its approach to resolution of NRC concerns by utilizing schematics of current design, modifications to current design, and proposed design. In modifying the current design, AREVA NP chose to eliminate "Typical #1," retain "Typical #2" which would become "Proposed Typical #1," and modify "Typical #3" which would yield "Proposed Typical #2." In this context, AREVA NP discussed the key points of the "Proposed Typical #1" and "Proposed Typical #2." AREVA NP then demonstrated an example of each of the current and the proposed designs.

The staff and AREVA NP agreed that (i) information in the topical report that AREVA NP requested not to be evaluated should not be deleted; instead, (ii) the reviewer would make a statement in the Safety Evaluation Report (SER) that the information was not reviewed; (iii) this approach would be supported by regulations. The staff expressed that it would like to conduct an audit to understand all functions that were schematically displayed on slide 21 ("Modifications to Current Design"). AREVA NP suggested that staff could have a telecon or an audit during which AREVA NP would discuss/clarify how it plans to meet RG 1.62 expectations; the staff indicated it would prefer an audit. With reference to RAI 25 involving Sections 13.2 and 13.3 of the topical report, the staff maintains that the written clarification provided by AREVA NP needed to be expanded. The staff agreed to formulate questions resulting from the review of AREVA NP's response to RAI 25, and communicate these questions to AREVA NP. Regarding addressing Interim Staff Guidance 4 (ISG 4) expectations by AREVA NP, the staff expressed that it would issue a follow-up RAI.

Finally, AREVA NP discussed the following "Protection System (PS) Topical Report" path forward: submit in May 2009, response to RAI 39 to include identification of any previous RAI responses that are affected by PS design change; and submit in August 2009, the proposed revision of FSAR 7.3 based on design changes.

At the conclusion of the above presentation and discussions, the public was given an opportunity to interact with the NRC staff. There were no formal comments or questions from members of the public.

Following the lunch break, AREVA NP made a formal presentation on "Priority and Actuator Control System (PACS)" [Slides 27 through 55]. AREVA NP outlined the NRC concerns which involve the "Priority and Actuator Control System (PACS) Topical Report AV-42." AREVA NP listed the following items on which the NRC concerns were focused: (i) Susceptibility to CCF (common cause failures), (ii) Classification (IEEE 603 Clause 5.6.3.1). AREVA NP described its approach to resolution of NRC concerns by utilizing schematics of current design, and proposed design of the PACS; in this context AREVA NP discussed its Proof-of-Design Testing Approach, and covered these subtopics: (i) Types of Inputs to Priority Module (Actuation Signal, Infrastructure Signal), (ii) Types of Actuation Signals (Non-Memorized Actuation Signal, Memorized Actuation Signal, Delayed Actuation Signal, Time-limited Actuation Signal), (iii) Testing of Actual Signals, (iv) "State-Based" Considerations, (v) Infrastructure Signal Definition, (vi) Infrastructure Signal Testing, (vii) Basis for Infrastructure Signal Testing Approach, (viii) Invalid Signal Definition and Testing, (ix) Test Apparatus Definition and Test Apparatus, (x) Verification of Test Results, (xi) Test Machine Software Development. AREVA NP also provided "Actual Signal Testing Examples," and "Comparison of AREVA NP Proof of Design Approach to ISG 4". While describing slides 39 through 43, AREVA NP claimed that testing of actuation signals would meet or exceed the ISG 04 expectations. AREVA NP mentioned that it would include the detail testing requirements in Tier 2 and appropriate FSAR Section, and also reflect in the FSAR its agreements in January 2009, with the staff on two NRC concerns.

Finally, AREVA NP discussed the following "PACS" path forward: In May 2009, withdraw AV-42 Topical Report, as well as modify FSAR to reflect design changes and testing requirements.

The staff commented that while AV-42 is being withdrawn by AREVA NP, there were important items covered in this document that would need to be captured in the FSAR. The staff wanted to know (i) if it would have to review the new submittal (May 2009) in its entirety, (ii) if AREVA NP would withdraw RAIs and responses associated with AV-42, (iii) if AREVA NP would take credit for what has been done. AREVA NP asserted that it would map all the changes and provide to the NRC with references to RAIs, etc.

At the conclusion of the above presentation and discussions, the public was given an opportunity to interact with the NRC staff. There were no formal comments or questions from members of the public.

After a short break, "Closed Discussion of Proprietary Information related to above topics" began between the NRC staff and AREVA NP. Members of the public were asked to leave prior to beginning of this closed discussion. Items of this closed discussion included RAI 37, RAI 38, and RAI 39, and AREVA NP's responses to these RAIs.

Day 1 presentation slides (1 through 55), as part of all presentation slides (1 through 76), are included in Enclosure 2 to this meeting summary, and can be found in ADAMS (Accession Number ML091270906).

Day 1 of the meeting was adjourned at 4:11 p.m. (Eastern Time).

Day 2 (April 30, 2009):

Day 2 of this public meeting started at 8:30 a.m. (Eastern Time). After the opening remarks and introductions of the attendees, meeting ground rules and logistics were announced. The staff then briefly reviewed the agenda items, including recapping Day 1 agenda, and emphasized that members of the public will be asked to leave immediately prior to AREVA NP and the staff beginning discussion of proprietary information. Closed discussion of proprietary information was the last item on the day's agenda.

AREVA NP began the business portion of the meeting with a formal presentation on "ITAAC Mapping" [Slides 62 through 71]. AREVA NP mentioned its commitment made at the October 22, 2008, Public meeting to "Map ITAAC to SRP 14.3, Appendix C, I&C ITAAC Checklist," and outlined that it had mapped existing ITAAC to SRP 14.3 guidance, modified or added ITAAC as necessary to address SRP 14.3 guidance, and created mapping and justification tables. AREVA NP informed that Tier 1 Sections for PS, SICS, SAS, and PACS were revised to include modified ITAAC commitments and added new ITAAC commitments, each SRP 14.3 requirement was mapped to one or more ITAAC commitment, and explanation was provided on how each ITAAC commitment supported the SRP 14.3 requirements to which an ITAAC was mapped. AREVA NP displayed a sample ITAAC mapping table, a sample ITAAC table, and a table with ITAAC mapping justification, and explained their structure.

AREVA NP emphasized that the ITAAC mapping table was to assist the staff with its review, but will not be a part of FSAR; that there would be a mapping table for each ITAAC. These tables would be helpful in demonstrating how IEEE requirements were met. Further, AREVA NP told that DAC would not be closed before rulemaking, in order to accommodate developing technology. The staff emphasized on the need for clear language for ITAAC closure, and reiterated that AREVA NP was required to differentiate between DAC and ITAAC, and asked AREVA NP to provide the staff with clarity on what would be closed as ITAAC and how it would be closed. AREVA NP agreed with the staff. To answer staff's question whether "Acceptance Criteria" would change, AREVA NP responded that the revision would contain mark-up of the changes, and some new "Acceptance Criteria" might be added. AREVA NP provided insight on Safety System ITAAC, and maintained that there would be no need to have ITAAC on all non-safety systems, and agreed with the staff that non-safety related systems should be reviewed on a case-by-case basis for ITAAC needs.

Finally, AREVA NP discussed the following "ITAAC" path forward: In June 2009, submit mapping for Tier 1 Sections 2.4.1 (Protection System [PS]), 2.4.2 (Safety Information and Control System [SICS]), 2.4.4 (Safety Automation System [SAS]), 2.4.5 (Priority and Actuator Control System [PACS]); submit mapping as a response to RAI 78 (Chapter 14); and that most of remaining Chapter 7 RAIs will reference the RAI 78 submittal.

AREVA NP then made a formal presentation to cover "General I&C Topics for Discussion" [Slides 56 through 61]. AREVA NP discussed these changes of its overall I&C architecture: 1) Separate DAS from PAS – the reasons for change (i) NRC issue impact mitigation, and (ii) design simplification; 2) Remove Direct Connection from SICS to PACS - the reason for change is to eliminate seven hardwired inputs to priority module. AREVA NP then described the "Revised US EPR I&C Architecture Design" by utilizing a schematic. "Allocation of Functions" was displayed in a table.

AREVA NP pointed out that the expected details on function of TELEPERM XS (TXS) are in D3 Topical Report (TR) which is TXS platform TR. In response to staff's inquiry during functional

clarification of the PS and SAS, AREVA NP explained that in normal condition (“Open”), there would be no “active” signal from PS to a valve; PS provides “active” signal to a valve to shut, and this is how PS is designed to fail “as-is”. However, AREVA NP agreed to revisit ISG 04. With reference to BTP 17-19, AREVA NP agreed to provide more detail in response to RAI 17 of D3 1st round of RAIs as D3 TR did not provide sufficient detail; however, AREVA NP would need more clarifications from the staff.

Finally, AREVA NP discussed the following Path Forward for I&C Architecture Changes: Update FSAR in August 2009; submit revised D3 technical report including I&C architecture in November 2009.

In response to staff’s comment regarding the basis for the “Proposed Design,” (refer to slides 24 and 25), AREVA NP maintained that it had provided a seven-page justification as a basis. In response to staff’s question on “Internal State,” AREVA NP concluded that the definition of “Internal State” in the NRC guidance is vague, and affirmed that AREVA NP had provided its understanding and justification. To staff’s suggestion for AREVA NP to come up with a demonstration system, AREVA NP could not commit since this would be a “significant effort,” but would follow up and inform the NRC.

At the conclusion of the above presentation and discussions, the public was given an opportunity to interact with the NRC staff. There were no formal comments or questions from members of the public.

AREVA NP ended formal presentation with the following:

Summary:

AREVA NP has addressed (i) documented NRC concerns with the following areas for the US EPR I&C design: D3, PS, and PACS; and (ii) request for ITAAC mapping.

Summary of Path Forward:

- Defense-in-depth and diversity: (i) in May 2009, submit revised D3 technical report to include initial qualitative evaluation of D3 events, as well as submit proposed FSAR (markup) changes to 7.1 and 7.8 based on RAI responses; (ii) in August 2009, submit revised FSAR changes based on design changes; (iii) in November 2009, submit revised D3 technical report to include confirmatory analysis and any DAS changes;
- Protection system: (i) in May 2009, submit response to RAI 39, to include identification of any previous RAI responses that are affected by PS design change; (ii) in August 2009, submit proposed revision of FSAR 7.3 based on design changes;
- Priority and actuator control system: in May 2009, withdraw AV-42 Topical Report, as well as modify FSAR to reflect design changes and testing requirements;
- I&C Architecture Changes: (i) in August 2009, update FSAR; (ii) in November 2009, submit revised D3 technical report including I&C architecture changes;

- ITAAC Mapping: in June 2009, (i) submit mapping for Tier 1 Sections; (ii) submit mapping as a response to RAI 78 (Chapter 14); (iii) most of remaining Chapter 7 RAIs will reference the RAI 78 submittal.

The staff proposed that the revised D3 technical report include confirmatory analyses and any DAC changes. In response to staff's inquiry, AREVA NP agreed to provide the draft revised D3 technical report for the staff to do an informal review.

After a short break, the topic of "Closed Discussion of Proprietary Information related to above topics" was announced. Members of the public were asked to leave prior to beginning this closed discussion. The staff and AREVA NP identified no proprietary information to discuss.

At this point, the staff proposed that it would be appropriate for the staff and AREVA NP to independently caucus to identify and record all drafted follow-up items resulting from this meeting, and reconvene to discuss these items to reach an agreement on a general path forward in order to address these items. At the conclusion of the individual caucuses, the staff and AREVA NP reconvened and discussed the drafted follow-up items, and recorded the agreed-upon items as follows:

FOLLOW-UP ITEMS

Defense-in-Depth and Diversity (D3)

Need a description of how DAS self test works, frequency, what is self-tested. This is from response to RAI 57. This will be a follow-up RAI that can be addressed in report revision. AREVA to address common cause failure (CCF) of TXS to support system-based priority. **[Candidate for a follow-up session?]**

Protection System (PS)

- Question on information that do not want SER, Section 9 on "permissives," **[Candidate for a follow up call, or to discuss during an audit?]**
- Refer to "Typical #3" on slide 21 ("Modifications to Current Design"). Staff suggested an audit to understand all functions described on this slide;
- Permissives – not clear what failures could occur that would require operator actions (PICS). AREVA NP explained that the NRC had requested to add detail to that section on how to address Section 6.6 (safety function). An RAI may be issued regarding this matter;
- Service unit interface – key switch (ref. to RAI 25) is per processor, not division. ISG-4 and point 10 may require additional information. Follow-up RAI on RAI 25; **[This will be handled through an RAI]**
- It was agreed that AREVA NP could demonstrate how PS design addresses the criteria for interdivisional communication within ISG 4. As a reference, this was done on the Oconee project; **[This will be handled through an RAI]**
- AREVA NP would like to know if an interim version of the report with the RAIs was needed. The staff could review one before the final version;

- AREVA NP suggested the withdrawal of the D3 topical report and resubmittal as a technical report to be incorporated by reference within the FSAR.

Priority and Actuator Control System (PACS)

The staff maintained that, when withdrawing the topical report, some information needed to be available for the staff to make their determination on AREVA NP's approach to meeting IEEE-603; EQ description, O&M interface, inputs and outputs. The staff needs to review topical and RAI responses to see what needs to be in 7.1. AREVA NP will talk to the staff and agree on what this population is.

Proprietary Session

The staff needs to know, with reference to remote acquisition unit (RAU), how one would detect a trip if the redundant RAU is out of service. Figures in PS topical report and FSAR do not match. The staff and AREVA NP discussed on how to detect seven SPND failures at length - fail out of range. AREVA NP will follow up on recent responses on "Incore Setpoint Instrumentation" topical to see if this was covered. Discussion on 2nd/min and 2nd/max will be needed.

Refer to PACS. AREVA NP has draft FSAR language, and would like to forward to the staff the interim Rev. 2 with DRAFT watermark, for further discussion, then have a phone call with the staff a week later;

The staff proposed that at the June meeting, the staff would go through RAIs and provide feedback on responses. AREVA NP will get pre-meeting feedback to prepare.

Overall I&C Architecture Changes

The staff maintains that D3 report does not provide sufficient information on common cause failures. AREVA NP will look at what it needs to add to clarify the design in this area;

The staff and AREVA NP will look into ISG 4 concerns that were discussed. A phone call or other follow up action will be arranged.

General Discussion

AREVA NP will provide an update to the March letter to clarify/document what was heard at this meeting. AREVA NP and staff to meet following submittal of the D3 report in May;

Refer to Slide 39. The staff asked if "internal states" are tested. AREVA NP provided a response; then the staff provided additional explanation of "internal states." AREVA NP and staff to meet later on this to discuss in more detail;

As the session's last item, the staff emphasized that the current schedule was based on the latest information from AREVA NP as of end of March 2009, but now the NRC will get the latest information from AREVA NP at the end of August 2009; this will impact the schedule.

The meeting was officially closed at 12:30 p.m. (Eastern Time).

Questions regarding this meeting can be directed to Prosanta Chowdhury at 301-415-1647 or via email at Prosanta.Chowdhury@nrc.gov.

Sincerely,

/RA/

Prosanta Chowdhury, Project Manager
US EPR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket No.: 52-020

Enclosures:

1. List of Attendees
2. Meeting Slides (ML091270906)

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ADAMS ACCESSION Number: ML091320516 (Pkg) ML091320522(Summary) *Previous concurrences NRO-002

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Meeting with AREVA NP to Discuss Technical Solutions Related to Issues of Concern for Digital Instrumentation and Controls
April 29-30, 2009

April 29, 2009 Attendance Lists

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Hany Farag	AREVA NP
Louis-Charles Brintet	AREVA NP
George Punnell	AREVA NP
Shelby Small	AREVA NP
Paul Schmugge	AREVA NP
James Steckel	U.S. NRC
Prosanta Chowdhury	U.S. NRC
Jean-Luc Begon	UNISTAR
Jim McQuighan	UNISTAR
Jeremy Shooch	AREVA NP
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Instrumentation and Controls
April 29-30, 2009

April 30, 2009 Attendance Lists

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Christian Clement	UNISTAR
Shelby Small	AREVA NP
Terry Jackson	U.S. NRC
Eugene O. Eagle Jr.	U.S. NRC
James P McQuighan	UNISTAR
Deanna Zhang	U.S. NRC
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Kenneth Mott	U.S. NRC
Prosanta Chowdhury	U.S. NRC
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Deirdre Spaulding-Yeoman	U.S. NRC
George Punnell	AREVA NP
Louis-Charles Brintet	AREVA NP
Vic Fregonese	AREVA NP
Norbert Carte	U.S. NRC
Sean Smith	Lockheed Martin NSGS
Brian A. McIntyre	AREVA NP
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Jeremy Shooh	AREVA NP
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(Revised 05/13/2009)

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