

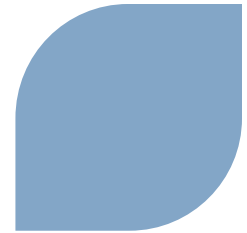
U.S. EPR – FSAR Group C Chapter Closure Plans

January 30, 2014

U.S. EPR Design Certification

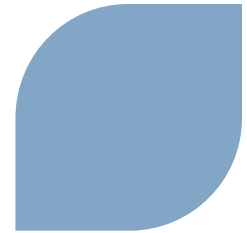


Meeting Purpose



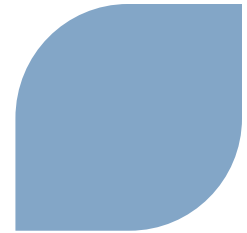
- ▶ **Continuation of closure plan discussions for the U.S. EPR design certification application**
- ▶ **Identify AREVA and NRC activities required for closure of the second set of Group C FSAR chapters (1, 3, 7, 14, 16, SMA) and confirm status of review**
- ▶ **Agreement on activities from this meeting will be documented in closure plan letters**

Meeting Agenda



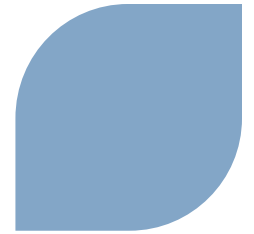
- ▶ **Introductory Remarks**
- ▶ **Project planning status**
- ▶ **Group C chapter closure activities**
 - ◆ **Chapter 16 – Technical Specifications**
 - ◆ **Chapter 14 – Verification Programs**
 - ◆ **Chapter 7 – Instrumentation and Controls**
 - ◆ **Seismic margin analysis (FSAR 19.1.5.1)**
 - ◆ **Chapter 3 – Design of Structures, Components, Equipment and Systems**
- ▶ **Next Steps**
- ▶ **Meeting Summary**

Project Planning Status



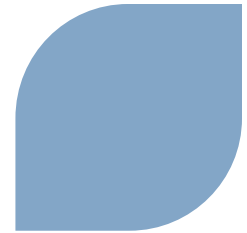
- ▶ **Closure plan meetings will establish a common agreement on remaining activities to close FSAR chapters. Results of these meetings and subsequent schedule discussions will be documented in closure plan letters that will govern project execution.**
- ▶ **Group A chapters**
 - ◆ Meeting on remaining activities Oct 24, 2013 (C)
 - ◆ Meeting on schedule Nov 15, 2013 (C)
 - ◆ Closure plan letter Dec 20, 2013 (C)
- ▶ **Group B chapters**
 - ◆ Meeting on remaining activities Nov 21, 2013 (C)
 - ◆ Meeting on schedule Feb 2014
 - ◆ Closure plan letter March 2014
- ▶ **Group C chapters**
 - ◆ 1st meeting on remaining activities Dec 17, 2013 (C)
 - ◆ 2nd meeting on remaining activities Jan 30, 2014
 - ◆ Meeting on schedule Feb 2014
 - ◆ Closure plan letter March 2014
- ▶ **AREVA has defined the work planned for CY2014, focused on Group A closure. Today's presentation will identify Group C work that is planned to be provided for NRC review in CY2014.**

Chapter Groupings



Group A	Group B	Group C
Chapter 2	Chapter 4	Chapter 1
Chapter 5	Chapter 6	Chapter 3
Chapter 8	Chapter 9	Chapter 7
Chapter 10	Chapter 15	Chapter 11
Chapter 13	Chapter 18	Chapter 12
Chapter 17 (exc. 17.4)		Chapter 14
AIA		Chapter 16
		Chapter 19 (and 17.4)
		Fukushima

Group C FSAR Chapters



- ▶ **Group C includes chapters expected to be the last chapters to close due to technical challenges or dependencies on other Group C chapters. For example:**
 - ◆ **Closure of Chapter 19 PRA and Chapter 16 Tech Specs are dependent on resolution of digital I&C issues.**
 - ◆ **Chapter 1 does not contain original technical content. However, conforming changes will be required until other chapters are closed.**
- ▶ **This meeting will identify remaining RAIs, open technical issues, audits, and significant pending FSAR changes.**
- ▶ **Less significant pending FSAR changes and future FSAR changes will be managed through periodic meetings on closure plan progress and dedicated meetings on non-RAI FSAR changes. As Group C chapters advance toward closure, focus will increase on all potential FSAR changes.**
- ▶ **Material incorporated by reference (e.g., technical reports) will be revised and submitted as necessary prior to Group C chapter closure.**

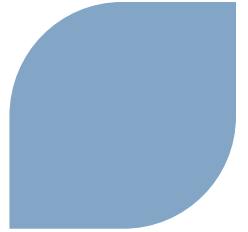
Chapter 1 – Introduction and General Description of the Plant

- ▶ Chapter 1 will be updated with conforming changes as FSAR chapters are closed
- ▶ ANP-10292 (SRP Conformance) will be updated as necessary to support the regulatory conformance discussion in Section 1.9

Chapter 16 – Technical Specifications

- ▶ Due to the dependence of Tech Specs on the FSAR as a whole, and the I&C design in particular, AREVA does not plan to work Tech Specs in CY2014 except to address design issues in other FSAR chapters (e.g., RAI 606).
- ▶ Instrumentation Tech Specs (3.3) and associated Bases
 - ◆ In 2012-13, AREVA revised Section 3.3 and associated Bases to align closer to standard technical specifications. Audit actions and written comments remain to be addressed.
 - Options for recording comments to facilitate resolution post-2014
 - ◆ Open RAIs
 - RAI 300 Q16-311, Q16-312, Q16-313, Q16-315
 - RAI 315 Q16-320
 - RAI 484 Q16-322

Chapter 16 – Technical Specifications



► Open RAIs (Non-I&C)

◆ RAI 606 Q16-324 – Steam generator blowdown system transfer valves

- AREVA will address as part of Chapter 10 RAI closure

◆ RAI 607 Q16-325 – EBS Tech Spec change

◆ Draft RAI 618 Q16-326 – FSAR Rev. 5 changes

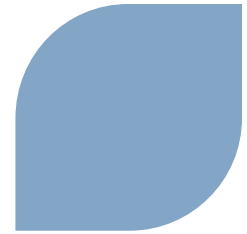
- Clarification call tentatively scheduled for Feb. 3

◆ Draft RAI 619 Q16-327 – FSAR Rev. 5 changes

- Clarification call tentatively scheduled for Feb. 3

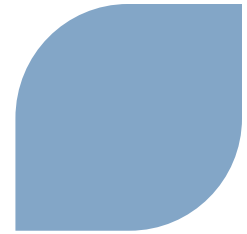
► Other significant changes

- ◆ AREVA is addressing conditions being tracked in the corrective action program related to inconsistencies in the fuel-related Tech Specs (Sections 3.1, 3.2)



Chapter 14 – Verification Programs

- ▶ Due to the dependence of ITAAC and the startup test program on the FSAR as a whole, AREVA does not plan to work Chapter 14 in CY2014 except to address design issues in other FSAR chapters.
- ▶ Open RAIs
 - ◆ RAI 527 Q14.02-163 – Test abstract consistency
 - AREVA will address NRC comments as part of Ch. 11 closure
 - ◆ RAI 613 Q14.02-164 – FOAK tests
 - AREVA will re-evaluate FOAK tests specified in Chapter 14
 - ◆ RAI 527 Q14.03.02-56 – Key dimensions for structures in Tier 1
 - AREVA response pending
 - ◆ RAI 527 Q14.03.02-58 – ITAAC for containment liner and penetration assemblies
 - AREVA will address NRC comments provided in 9/23/2013 teleconference related to Class MC components and revise response



Chapter 14 – Verification Programs

► Open RAIs (cont'd)

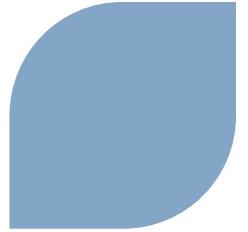
- ◆ **RAI 615 Q14.03.05-43** – SAS ITAAC markups
- ◆ **RAI 527 Q14.03.07-38** – ITAAC for radiation monitoring
 - AREVA will address NRC comments in parallel with resolution of Tier 2 radiological issues
- ◆ **RAI 557 Q14.03.07-39** – ITAAC for RG1.143 commitments
 - AREVA will address NRC comments in parallel with resolution of Tier 2 radwaste issues
- ◆ **RAI 614 Q14.03.07-41** – SCWS temperature range

► AREVA requests confirmation of RAI status*

- ◆ **RAI 604 Q14.03.07-40** – CCWS / SCWS ITAAC discrepancies
 - AREVA submitted a final response January 15, 2014
- ◆ **RAI 411 Q14.03.03-49** – ASME Section III ITAAC
 - Issued – AREVA submitted final response July 2012
- ◆ **RAI 501 Q14.03.03-53** – EQ ITAAC
 - Confirmatory action – FSAR markups have been incorporated
- ◆ **RAI 577 Q14.03.03-54** – Pump and valve qualification ITAAC
 - In Evaluation – AREVA submitted final response May 2013

* NRC status based on 12/3/2013 eRAI report

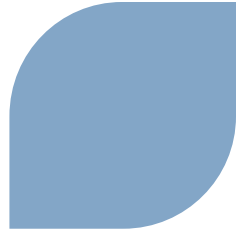
Chapter 7 – Instrumentation and Controls



► Key technical issues

- ◆ Digital I&C / software common cause failures
- ◆ Single failed SPND
- ◆ I&C Tech Specs (addressed under Chapter 16)

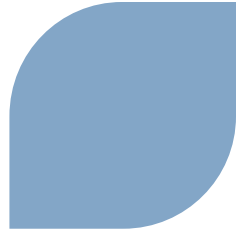
Chapter 7 – Instrumentation and Controls



► Digital I&C

- ◆ Resolution of digital I&C issues is a global AREVA priority. Global consistency in the design solution is important. Once the global path forward becomes clearer, AREVA will be able to discuss details of the U.S. EPR solution.
- ◆ AREVA is carefully reviewing NRC feedback and will engage NRC staff to provide plans for resolution of technical issues. The result of these reviews may be additional evaluations, analyses, or design changes.
- ◆ AREVA recognizes the importance of having clear alignment on the regulatory criteria. The next NRC-AREVA meeting should focus on how AREVA will address the regulatory criteria to ensure that the solutions are comprehensive, provide the proper level of detail, and provide reasonable assurance of adequate protection.

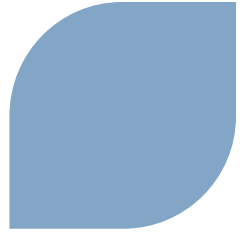
Chapter 7 – Instrumentation and Controls



► Open RAIs

- ◆ **RAI 555 Q07.01-53 – Non-safety failures affecting safety systems / SWCCF**
 - Closure of Q07.01-53 is dependent on the resolution of digital I&C key technical issue
- ◆ **RAI 505 Q07.01-33 – Single failed SPND**
 - Advanced response submitted June 28, 2013
 - AREVA and NRC were preparing for an audit in September 2013
 - AREVA plans to perform SPND work and support audit in 2014
 - A draft audit plan should be prepared to support planning
- ◆ **RAI 505 Q07.01-35 – SAS failure modes and effects**
 - In Evaluation – Final response submitted May 2013
 - An audit has been proposed. AREVA does not anticipate support for this audit in CY2014.
- ◆ **RAI 608 Q07.01-56–63, RAI 609 Q07.01-64-83, RAI 611 Q07.01-84**
 - RAIs 608 and 609 issued January 14, 2014 to document open NRC questions
 - RAI 611 still in draft status
 - AREVA does not anticipate answering these RAIs in CY2014

Chapter 7 – Instrumentation and Controls



► AREVA requests confirmation of RAI status

◆ RAI 505 – Digital I&C

- Confirmatory action for 12 questions submitted in 2011 and 2012

◆ RAI 542 Q07.01-52 –watchdog timer

- In Evaluation – Final response submitted April 2013
- Related to Draft RAI 611

◆ RAI 414 Q07.03-30 – PS response time testing

- In Evaluation – Final response submitted March 2013

◆ RAI 555 Q07.01-54 – Priority logic scheme

- In Evaluation – Final response submitted April 2013

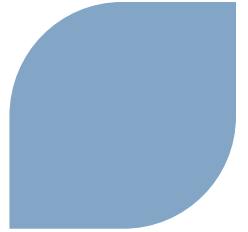
◆ RAI 555 Q07.01-55 – Operational I&C disable switches

- In Evaluation – Final response submitted April 2013

Seismic Margin Analysis (FSAR 19.1.5.1)

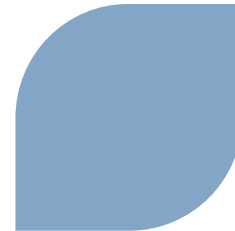
- ▶ SMA audit conducted July 2013. Audit actions remain to be addressed by AREVA, including providing the Fuel Building fragility analysis for audit.
- ▶ Open RAIs
 - ◆ RAI 455 Q19-341 – Seismic margin analysis
 - ◆ RAI 596 Q19-371 – Shear capacity of pier walls
- ▶ Based on current planning, work related to seismic margin analysis will be available for review in late CY2014 / early CY2015

Chapter 3 – Design of Structures, Components, Equipment and Systems



- ▶ **Seismic / structural design**
- ▶ **Seismic design of fuel storage racks**
- ▶ **Blast wave effects**
- ▶ **Design specifications**
- ▶ **Other Chapter 3 RAIs**

Chapter 3 – Design of Structures, Components, Equipment and Systems

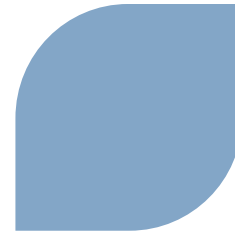


► Seismic / structural design

◆ AREVA seeks approval of the time history analysis methodology in early CY2014 to allow critical sections work to proceed with confidence

- AREVA is addressing NRC comments on the time history study placed in the electronic reading room. A revised calculation will be posted to address the comments.
- AREVA intends to revise the response to RAI 376 Q03.08.03-24 to formally docket the revised time history analysis methodology to gain acceptance prior to critical sections analysis.
- Critical sections work will not be completed in CY2014. However, AREVA proposes a final audit in late CY2014 to allow NRC to review one complete critical section using the revised time history approach and the final SMA fragility calculation.

Chapter 3 – Design of Structures, Components, Equipment and Systems

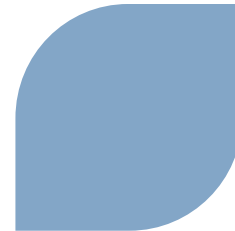


► Seismic / structural design (cont'd)

◆ Open RAIs

- RAI 155 Q03.08.04-6 – Analysis of critical sections
 - NRC comments on Advanced Response received 9/11/2013
 - AREVA will submit a final response once critical sections design work is complete
- RAI 155 Q03.08.01-13, Q03.08.01-20 – Structural design software, critical section selection methodology
 - AREVA will address NRC comments dated 9/9/13 and 9/11/13 as part of revised critical sections submittal
- RAI 155 Q03.08.01-24, Q03.08.03-15 – Critical sections
 - Responses are dependent on Q03.08.04-6 and will be submitted as part of revised critical sections submittal

Chapter 3 – Design of Structures, Components, Equipment and Systems

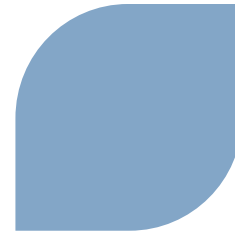


► Seismic / structural design (cont'd)

◆ Open RAIs (cont'd)

- RAI 376 Q03.08.05-31 – EPGB and ESWB stability and SSI
 - AREVA will clarify and supplement SSI and stability data for the EPGB and ESWB to address comments on the Advanced Response
- RAI 580 Q03.08.04-28 – Vent stack
 - AREVA will address comments on the Advanced Response received 8/28/2013 by providing information to demonstrate that the tuned mass damper can perform its intended design function
- RAI 580 Q03.08.04-29 – Containment liner plate
 - AREVA will address comments on the Advanced Response received 8/28/2013 by providing numerical comparison to demonstrate that critical sections design loads bound hydrogen burn load combination

Chapter 3 – Design of Structures, Components, Equipment and Systems

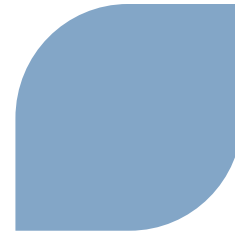


► Seismic / structural design (cont'd)

◆ AREVA requests confirmation of RAI status

- RAI 587 Q03.07.02-79
 - Issued – Final response submitted January 27, 2014
- RAI 381 Q03.07.04-6 – Seismic instrumentation
 - In Evaluation – Final response submitted June 2010
- RAI 489 Q03.07.02-75 – SASSI subtraction method
 - Confirmatory action – Final response submitted January 2013.
Response references pending responses to RAI 376 Q03.08.05-31 and RAI 445 Q03.08.04-20 for EPGB and ESWB.
- RAI 508 Q03.07.03-41 – Buried pipe
 - Confirmatory action – FSAR markups have been incorporated

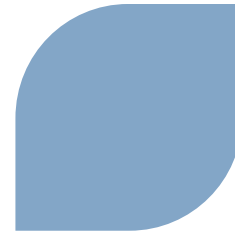
Chapter 3 – Design of Structures, Components, Equipment and Systems



► Seismic design of fuel storage racks

- ◆ AREVA plans to generate multiple (5) time histories from the updated design response spectra at both pool elevations to address conformance with SRP Section 3.7.1 and concerns raised at the June 2013 audit and July 2013 public meeting.
 - CY2014 scope of work is still being determined. AREVA does not expect that detailed rack analyses will be completed in CY2014.
 - NRC-AREVA technical meeting is recommended to discuss the revised approach
 - A final audit is anticipated after seismic analyses have been completed (post-CY2014)
 - TN-Rack.0101 (Fuel Storage Rack Technical Report) will be revised to incorporate revised analyses

Chapter 3 – Design of Structures, Components, Equipment and Systems



► Seismic design of fuel storage racks (cont'd)

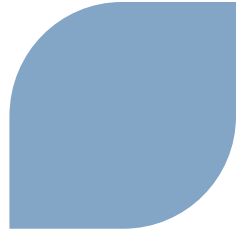
◆ Open RAIs

- RAI 589 Q03.08.04-31, RAI 445 Q03.08.04-20 – Time history analyses
 - AREVA will revise the seismic analyses with the updated design response spectra
- RAI 445 Q03.08.04-21 – Rack structural analysis
 - AREVA will address comments received on 12/16/2013 teleconference and will re-submit the RAI response
- RAI 335 Q03.08.04-10 – Spent fuel pool loads
 - AREVA will address comments received on 9/3/2013 and will re-submit the RAI response

◆ AREVA requests confirmation of RAI status

- RAI 445 Q03.08.04-15, 17, 19, 26, 27
 - Confirmatory action – Final responses submitted June/July 2013

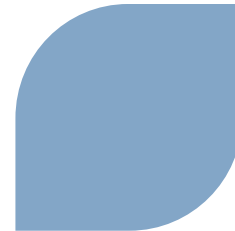
Chapter 3 – Design of Structures, Components, Equipment and Systems



► Blast wave effects

- ◆ Based on 11/4/2013 teleconference, issue is resolved pending resolution of comments resulting from confirmatory analyses performed by NRC contractor
- ◆ RAI 354 Q03.06.02-35 and ANP-10318P Revision 2 submitted to NRC on 12/19/2013 to address comments from confirmatory analyses
- ◆ AREVA requests confirmation that the blast wave effects key technical issue has been resolved

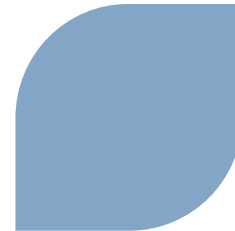
Chapter 3 – Design of Structures, Components, Equipment and Systems



► Design specifications

- ◆ **An audit of ASME Section III Class 1, 2, and 3 design specifications was performed July 8-11, 2013.**
 - Resulting actions are documented in the draft audit report
 - Plan for follow-up audit in the electronic reading room to confirm action closure
- ◆ **RAI 404 Q03.09.03-25**
 - Confirmatory action associated with design specifications and incorporation of requirements to demonstrate functional capability
- ◆ **RAI 594 Q03.09.03-27**
 - Audit follow-up request related to the RPV closure head equipment specification
 - AREVA response is pending
- ◆ **Based on current planning, AREVA will not perform any work related to design specifications in CY2014**

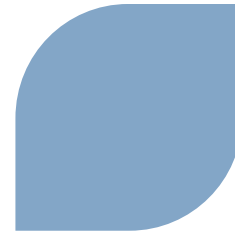
Chapter 3 – Design of Structures, Components, Equipment and Systems



► Other Chapter 3 RAIs

- ◆ Except as noted, AREVA does not plan to perform additional work on Chapter 3 RAIs in CY2014
- ◆ NRC awaiting AREVA response
 - RAI 612 Q03.09.06-21, 22 – Inservice testing provisions for new equipment in FSAR Rev. 5
 - RAI 612 Q03.09.06-23 – ITAAC corrections in FSAR Rev. 5
- ◆ AREVA response pending resolution of comments on Advanced Response
 - RAI 590 Q03.09.02-171, 172 – S/G fluid-elastic instability
 - RAI 583 Q03.08.03-25 – Tier 2* for key structural design codes
 - AREVA expects to submit final RAI response in Feb. 2014

Chapter 3 – Design of Structures, Components, Equipment and Systems



► Other Chapter 3 RAIs (cont'd)

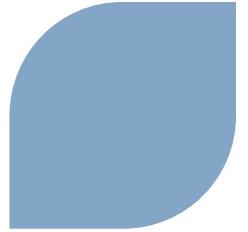
◆ AREVA requests confirmation of closure status

- RAI 48 Q03.06.03-12 – LBB flaw stability analysis method
 - Confirmatory Action – FSAR markups have been incorporated
- RAI 547 Q03.06.01-14 – COL Information Item wording
 - In Evaluation – Final response submitted April 2013
 - Associated FSAR markups impact Group A chapters preparing for closure
- RAI 585 Q03.09.06-20 – Tier 2* for ASME QME-1-2007
 - In Evaluation – Final response submitted May 2013
- RAI 588 Q03.08.03-26 – Relocate FSAR information on radiation protection doors
 - Confirmatory action – Final response submitted July 29, 2013, FSAR markups to be incorporated into FSAR Rev. 6

► Other significant FSAR changes

- ◆ AREVA intends to incorporate the content of ANP-10264P Rev. 1 (Piping Topical) into FSAR Chapter 3 as an appendix to resolve issues with embedded COL information items and Tier 2* markings

Next Steps



- ▶ **AREVA and NRC to meet in February 2014 to discuss schedule for Group B and C chapters**
- ▶ **AREVA to submit closure plan letters for Groups B and C to re-establish review schedule**

Meeting Summary

