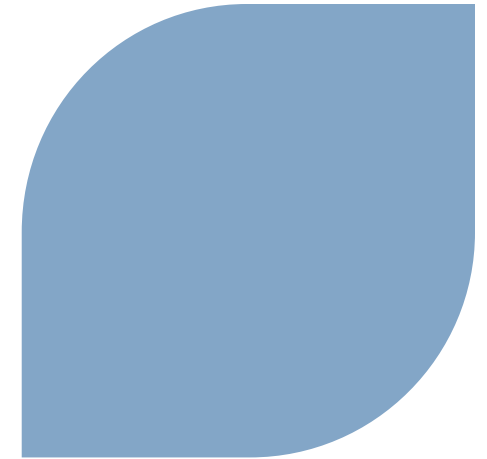


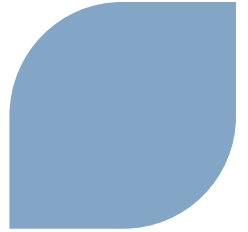
U.S. EPR – FSAR Chapter Closure Plans

October 24, 2013

Pedro Salas, Len Gucwa, Nathan Hottle
U.S. EPR Design Certification

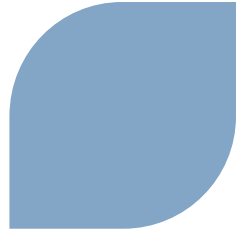


Meeting Purpose



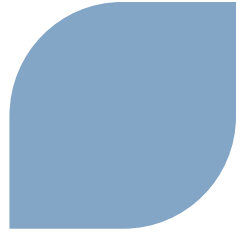
- ▶ **Define the path forward for completion of the U.S. EPR design certification project**
- ▶ **Describe AREVA's FSAR chapter closure approach to complete Review Phase 4 (SER with no open items)**
- ▶ **Identify AREVA and NRC activities required for closure of Group A FSAR chapters (2, 5, 8, 10, 13, 17)**
- ▶ **Discuss expected durations for Group A remaining AREVA and NRC activities so chapter completion schedules can be finalized**

Meeting Agenda



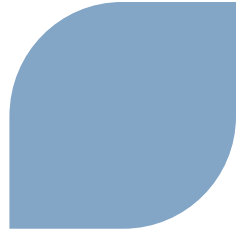
- ▶ **Introductory Remarks – NRC**
- ▶ **Executive Overview – Salas**
- ▶ **FSAR chapter closure process – Gucwa**
- ▶ **Chapter closure activities – Hottle**
 - ◆ **Chapter 2**
 - ◆ **Chapter 10**
 - ◆ **Chapter 5**
 - ◆ **Chapter 8**
 - ◆ **Chapter 13**
 - ◆ **Chapter 17**
 - ◆ **Aircraft Impact Assessment Inspection**
- ▶ **Near-term closure of key technical issues – Gucwa**
- ▶ **Meeting Summary**

Executive Summary



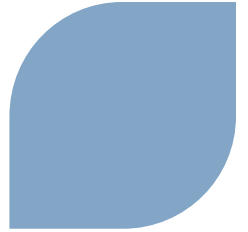
- ▶ **AREVA is restructuring project activities to focus on FSAR chapter closure.**
- ▶ **FSAR chapters are prioritized based on readiness for completion. AREVA's goal is to close FSAR chapters and support NRC chapter review completion as early as possible while retaining a focus on the longer-term technical challenges to design certification.**
- ▶ **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.**

Executive Summary



- ▶ **FSAR chapter groupings (prioritization)**
 - ◆ **Group A – Chapters with few or no open items**
 - ◆ **Group B – Chapters with open items but generally well understood paths forward, moderate level of effort**
 - ◆ **Group C – Last chapters to close due to technical challenges or dependencies on Group C chapters**
- ▶ **AREVA is establishing a design and FSAR freeze process based on industry precedent to enforce chapter closure and to manage emergent issues**
- ▶ **AREVA and UniStar are investigating opportunities to integrate schedules to improve efficiency**

FSAR Closure Process



▶ Chapter closure planning

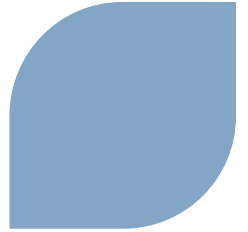
- ◆ AREVA and NRC to identify and concur on activities required for closure
- ◆ Establish integrated schedule for chapter progression through ACRS and beyond
- ◆ Document mutually established schedule in closure plan letters
- ◆ Review closure plans monthly with NRC project management to align expectations and manage emergent issues

▶ Key elements of chapter closure process

◆ Pre-closure activities

- Systematic closure readiness reviews
 - All known FSAR changes have been incorporated
 - Chapter RAIs are closed. RAIs supporting conclusions in the draft SER will be reconciled if necessary.
 - Design basis information supporting FSAR chapter is properly identified and complete

FSAR Closure Process



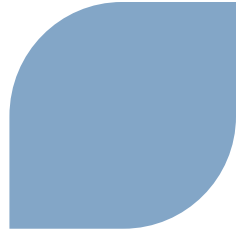
◆ Pre-closure activities (continued)

- Chapter freeze point established – formal change evaluation process gives NRC confidence to finalize SER
- Final revisions to material incorporated by reference
- Options for FSAR chapter revisions
 - Full FSAR revision
 - FSAR revision incorporating final changes associated with specific chapters
 - Chapter submittal

◆ Post-closure activities

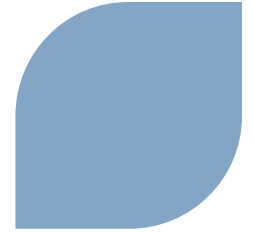
- Evaluation, tracking, and reporting of changes identified after freeze point
 - Process based on DC/COL-ISG-011 and lessons learned from industry precedent
 - Objective criteria will determine whether change is to be incorporated into DC
 - Potential changes could result from NRC reviews of remaining chapters, emergent safety issues, or corrective actions
- Changes that meet criteria for notification will be promptly communicated to NRC to minimize impact on review schedule

FSAR Chapter Prioritization



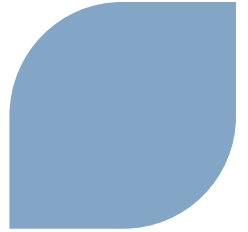
- ▶ **Chapters grouped based on readiness for closure**
- ▶ **Group A**
 - ◆ **Closure plan meeting will identify all anticipated changes to final FSAR chapter**
 - ◆ **FSAR Chapters**
 - Chapter 2 – Site Characteristics
 - Chapter 5 – Reactor Coolant System and Connected Systems
 - Chapter 8 – Electric Power
 - Chapter 10 – Steam and Power Conversion System
 - Chapter 13 – Conduct of Operations
 - Chapter 17 – Quality Assurance
- ▶ **Groups B and C**
 - ◆ **Initial closure plan meetings will develop schedule for remaining RAIs, technical issue resolution, audits, and significant FSAR changes.**

Chapter 2 – Site Characteristics



- ▶ **No key technical issues exist for Chapter 2**
- ▶ **Chapter 2 open RAIs**
 - ◆ **RAI 541 Question 02-3 – Final response submitted 9/5/2013 to address hurricane winds and missiles per RG1.221**
 - NRC Status: In Evaluation (based on eRAI report dated 9/24/2013)
 - ◆ **RAI 274 Q02-1 and RAI 288 Q02-2**
 - NRC Status: Confirmatory Action. AREVA believes these RAIs are closed. FSAR changes were incorporated into FSAR Rev. 2.
- ▶ **Other pending FSAR changes**
 - ◆ **COL Information Item 2.5-5 – “demonstrate that no capable faults exist at the site...”**
 - NRC recommends “potential for surface deformation” to align with draft SRP – public telecon 10/7/13
 - AREVA plans to use NRC-recommended wording
 - ◆ **Potential impact as a result of ongoing COL Information Item revisions on R-COLA project**

Chapter 2 – Site Characteristics



▶ Audits, inspections, or public meetings required for Phase 4

◆ None

▶ Actions to achieve closure

◆ AREVA

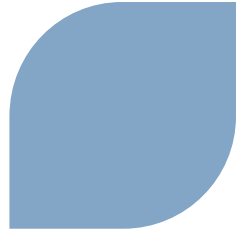
- Respond to NRC request on COL Information Item 2.5-5
- Submit final FSAR Chapter 2 after closure readiness review

◆ NRC

- Close review of RAI 541 Q02-3
- Status RAI 274 Q02-1 and RAI 288 Q02-2 as closed
- Complete R-COLA review of COL Information Item wording that impacts Group A chapters
- Complete SER and schedule ACRS meeting

▶ Duration for remaining actions

Chapter 10 – Steam and Power Conversion System



▶ Key technical issues

- ◆ Ongoing Fukushima review has the potential to impact Chapter 10

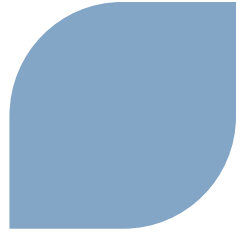
▶ Chapter 10 open RAIs

- ◆ RAI 605 Question 10.04.09-14 deals with potential for water hammer from fire protection system to EFW (ELAP event mitigation)
 - NRC Status: Issued / Waiting for Response
 - AREVA will evaluate the current EFW piping analysis. If it is not bounding, further analysis will be performed to confirm the acceptability of injecting fire water into the EFW system.

▶ Other pending FSAR changes

- ◆ Design change related to MFW flow control in accident analyses (ATWS analysis and FSAR Rev. 5 meeting Action #18)
- ◆ FSAR Rev. 5 Action #10: SGBD classification in evaluation
- ◆ FSAR Rev 5 Action Item #19: Superseded by RAI 605
- ◆ Minor impacts from consistency reviews

Chapter 10 – Steam and Power Conversion System



▶ Audits, inspections, or public meetings required for Phase 4

◆ None

▶ Actions to achieve closure

◆ AREVA

- Respond to RAI 605 and FSAR Rev 5 action items
- Submit final FSAR Chapter 10 after closure readiness review

◆ NRC

- Issue RAI 605
- Complete SER and schedule ACRS meeting

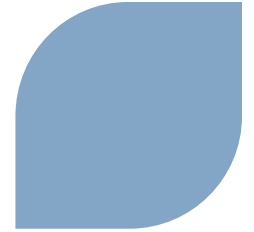
▶ Duration for remaining actions

Chapter 5 – Reactor Coolant System and Connected Systems



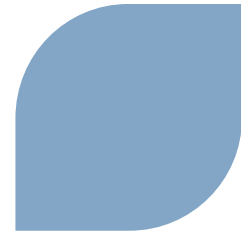
- ▶ **No key technical issues exist for Chapter 5**
- ▶ **Chapter 5 open RAIs**
 - ◆ **RAI 560 Question 05.02.01.01-7 – Justification for Code Case N-782**
 - NRC Status: Confirmatory action. AREVA believes this RAI is closed. Final response submitted 11/1/2012 and changes incorporated into FSAR Rev. 5.
- ▶ **Other pending FSAR changes**
 - ◆ **Minor change to Figure 5.1-2 – RCS Layout – no impact on RCS design review**
 - ◆ **Add new Table 5.3-8 to support ITAAC – RPV acceptable dimension variations (Tier 1 Table 2.2.1-6)**

Chapter 5 – Reactor Coolant System and Connected Systems



- ▶ **Audits, inspections, or public meetings required for Phase 4**
 - ◆ **None**
- ▶ **Actions to achieve closure**
 - ◆ **AREVA**
 - Submit final FSAR Chapter 5 after closure readiness review
 - ◆ **NRC**
 - Close RAI 560 Q05.02.01.01-7
 - Complete SER and schedule ACRS meeting
- ▶ **Duration for remaining activities**

Chapter 8 – Electric Power



▶ Key technical issues

- ▶ Bulletin 2012-01 – Design Vulnerability in Electric Power System (Byron)
 - ▶ AREVA believes the RAI response is acceptable with revised COL Information Item and ITAAC wording
 - ▶ COL Information Item 8.2-9 and ITAAC will be revised to require determination of system setpoints to detect open phase condition
- ▶ Ongoing Fukushima review has the potential to impact Chapter 8

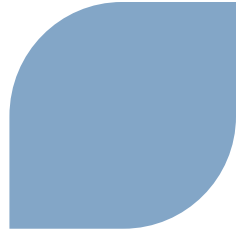
▶ Chapter 8 open RAIs

- ◆ **RAI 564 Question 08.02-8 (Byron Bulletin) – Supplemental response will address COL Information Item and ITAAC wording**
 - NRC Status: In Evaluation. See above.

▶ Other pending FSAR changes

- ◆ **Minor clarification under consideration in Section 8.3 to fully support ITAAC – no change to technical information**

Chapter 8 – Electric Power



▶ Audits, inspections, or public meetings required for Phase 4

◆ None

▶ Actions to achieve closure

◆ AREVA

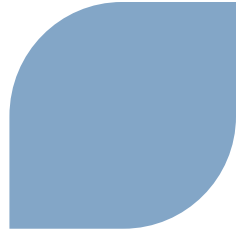
- Submit supplemental response to RAI 564
- Submit final FSAR Chapter 8 after closure readiness review

◆ NRC

- Complete review of RAI 564
- Complete SER and schedule ACRS meeting

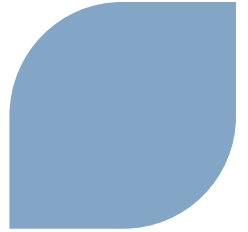
▶ Duration for remaining activities

Chapter 13 – Conduct of Operations



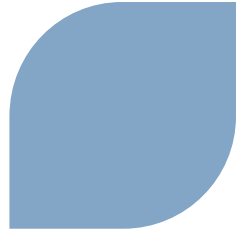
- ▶ **No key technical issues exist for Chapter 13**
- ▶ **Chapter 13 open RAIs**
 - ◆ **RAI 549 Question 13.03-8 –NTTF Recommendation 9.3 – Emergency Planning**
 - NRC Status: In Evaluation. AREVA believes this RAI is closed. Supplemental response submitted 3/7/13.
- ▶ **Other pending FSAR changes**
 - ◆ **None**

Chapter 13 – Conduct of Operations



- ▶ **Audits, inspections, or public meetings required for Phase 4**
 - ◆ **None**
- ▶ **Actions to achieve closure**
 - ◆ **AREVA**
 - Submit final FSAR Chapter 13 after closure readiness review
 - ◆ **NRC**
 - Close RAI 549 Question 13.03-8
 - Complete SER and schedule ACRS meeting
- ▶ **Duration for remaining activities**

Chapter 17 – Quality Assurance



▶ Key technical issues

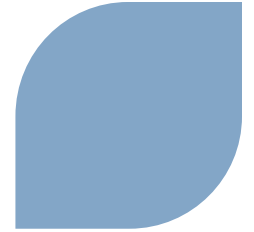
- ▶ None. (D-RAP impact from updated PRA not expected.)

▶ No open RAIs exist for Chapter 17

▶ Other pending FSAR changes

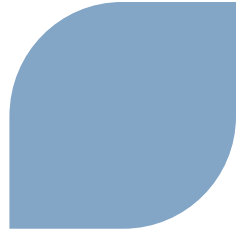
- ◆ None

Chapter 17 – Quality Assurance



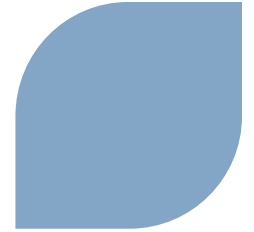
- ▶ **Audits, inspections, or public meetings required for Phase 4**
 - ◆ **Questions at July FSAR Rev. 5 meeting and PRA audit action regarding finalization of D-RAP list**
 - Design changes are reviewed by D-RAP program representative. As necessary, expert panels determine changes to system risk significance.
 - No anticipated changes to D-RAP list.
 - ◆ **PRA audit action item #5 – Add RSS transfer switches to D-RAP table**
 - RSS system is identified in D-RAP list – risk-significant function as a backup to the MCR
 - U.S. EPR D-RAP list is system-based
 - No change required to Section 17.4
- ▶ **Actions to achieve closure**
 - ◆ **AREVA**
 - Close FSAR Rev 5 mtg and PRA audit action items
 - Submit final FSAR Chapter 17 after closure readiness review
 - ◆ **NRC**
 - Complete SER and schedule ACRS meeting
- ▶ **Duration for remaining activities**

Aircraft Impact Assessment Inspection

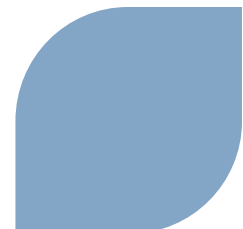


- ▶ **AIA inspection conducted 7/22/2013 – 7/26/2013 and inspection report issued 9/6/2013 with no violations**
- ▶ **AREVA recommends scheduling ACRS meeting in early 2014**
 - ◆ **No open items related to AIA Inspection remain**

Key Technical Issues



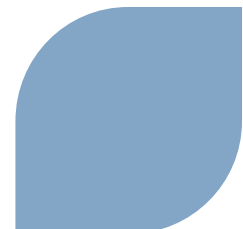
- ▶ **Previously-identified technical focus areas for the design certification review**
- ▶ **AREVA's DC closure strategy organized around FSAR chapters**
 - ◆ **FSAR chapter closure schedule drives timing of key technical issue resolution**
 - ◆ **However, AREVA will maintain focus on key technical issues that are primary drivers for design certification**



P – Primary
S – Secondary (potential for conforming changes)
 Gray shading – Closed
 Green shading – Near term closure

Key Technical Issues

Key Technical Issue	FSAR Chapter																		
	2	5	8	10	13	17	1	3	4	6	7	9	11	12	14	15	16	18	19
Seismic / Structural								P											
Seismic Margins Analysis								S											P
NAB II / I Approach								P											
Severe Accidents										S									P
Updated PRA						S													P
Fuel Seismic									P										
SBLOCA Boron Dilution																	P		
ATWS				S													P		
GSI-191 Open Items										S							P		
Single Failed SPND											P					S			
Digital I&C											P				S		S		S



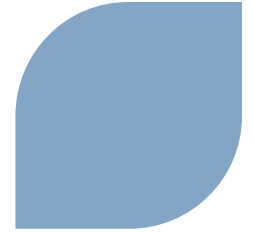
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Key Technical Issues

Key Technical Issue	FSAR Chapter																		
	2	5	8	10	13	17	1	3	4	6	7	9	11	12	14	15	16	18	19
I&C Technical Specifications											S							P	
Spent Fuel Cask Transfer Facility												P		S					
Design Specifications								P											
Blast Wave Effects Methodology								P											
Fukushima			S	S															P
AIA Inspection *																			P
Byron Bulletin *			P																
Radiological *										S		S	P	P	S		S		
Fuel Racks *								P				S							
ECCS NPSH Analysis *										P									
ITAAC *															P				

***Added after 26 Feb meeting**

Key Technical Issues



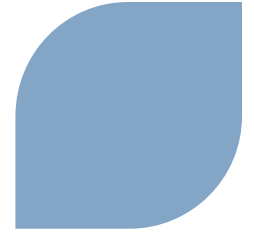
▶ Resolved technical issues

- ◆ NAB II/I Approach – Issue closed with submittal of RAI 587 (9/30/13)
- ◆ SBLOCA Boron Dilution – Issued closed with submittal of RAI 403 (7/15/13)
- ◆ AIA Inspection – Completion of July 22-26, 2013 inspection

▶ Near-term (2013) resolution

- ◆ ATWS
 - Pending closure of audit related to RAI 582
- ◆ Blast Wave Effects Methodology
 - AREVA has submitted all RAI responses and additional information to support confirmatory calculations. Awaiting confirmation of issue closure.

Key Technical Issues



▶ Near-term resolution (continued)

◆ Byron Bulletin

- AREVA to supplement response to RAI 564 (discussed further in Chapter 8 context)

◆ ECCS NPSH Analysis

- AREVA to supplement response to RAI 553 and GSI-191 technical report markups

◆ Severe Accidents

- AREVA to resolve audit action items

▶ Group A impacts

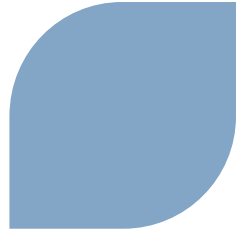
◆ Byron Bulletin – Primary impact on Chapter 8

◆ Fukushima – Risk of impact on Chapter 8, Chapter 10

◆ PRA – Impact to D-RAP not expected

◆ ATWS – Secondary impact on Chapter 10

Next Steps



- ▶ **Follow-on meeting to establish integrated schedules for Group A chapters**
- ▶ **AREVA to document activities and schedule in formal closure plan letter for Group A chapters**
- ▶ **Schedule Group B closure plan meeting**
 - ◆ **Chapter 4 – Reactor**
 - ◆ **Chapter 6 – Engineered Safety Features**
 - ◆ **Chapter 9 – Auxiliary Systems**
 - ◆ **Chapter 15 – Transient and Accident Analyses**
 - ◆ **Chapter 18 – Human Factors Engineering**

Meeting Summary

