

## ArevaEPRDCPEm Resource

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**From:** WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]  
**Sent:** Monday, October 01, 2012 1:50 PM  
**To:** Tesfaye, Getachew  
**Cc:** Hearn, Peter; LENTZ Tony (EXTERNAL AREVA); Darrell.Gardner@areva.com  
**Subject:** AREVA Presentation for Public Meeting with NRC to Discuss I&C Technical Specification Closure on October 3rd  
**Attachments:** NRC meeting\_IC Tech Specs.pdf

Getachew,  
Attached is AREVA's presentation for Wednesday afternoon's public meeting to discuss I&C Technical Specification closure for the U.S. EPR Design Certification. I assume that a projector will be made available for showing the slides for the presentation.

Thanks,  
Dennis

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***  
7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** BENNETT Kathy (RS/NB)  
**Sent:** Monday, October 01, 2012 12:09 PM  
**To:** WILLIFORD Dennis (RS/NB)  
**Cc:** LENTZ Tony (External RS/NB)  
**Subject:** RE: slides for NRC meeting on I&C Tech Specs

Kathy Bennett  
Corporate Regulatory Affairs  
X22729

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Monday, October 01, 2012 12:03 PM  
**To:** BENNETT Kathy (RS/NB)  
**Cc:** LENTZ Tony (External RS/NB)  
**Subject:** RE: slides for NRC meeting on I&C Tech Specs

Kathy,  
Can you please correct the footer on the last slide (Slide 19) ? it is different from the rest and references a meeting on Oct. 4<sup>th</sup> rather than Oct. 3<sup>rd</sup>. IT should be the same as the footer for the rest of the slides.

Thanks,  
Dennis

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**From:** LENTZ Tony (External RS/NB)  
**Sent:** Monday, October 01, 2012 11:50 AM  
**To:** WILLIFORD Dennis (RS/NB)  
**Cc:** GARDNER Darrell (RS/NB)  
**Subject:** FW: slides for NRC meeting on I&C Tech Specs

[Ready to go to nrc.](#)

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**From:** BENNETT Kathy (RS/NB)  
**Sent:** Monday, October 01, 2012 11:30 AM  
**To:** LENTZ Tony (External RS/NB)  
**Subject:** RE: slides for NRC meeting on I&C Tech Specs

[Here are the corrected files.](#)

Kathy Bennett  
Corporate Regulatory Affairs  
X22729

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**From:** LENTZ Tony (External RS/NB)  
**Sent:** Monday, October 01, 2012 10:39 AM  
**To:** BENNETT Kathy (RS/NB)  
**Subject:** RE: slides for NRC meeting on I&C Tech Specs

Thank you Kathy. But Darrell found an error in one of the figures, so please make the attached file the master and make me a pdf. 😊

Tony.

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**From:** BENNETT Kathy (RS/NB)  
**Sent:** Monday, October 01, 2012 9:51 AM  
**To:** LENTZ Tony (External RS/NB)  
**Subject:** RE: slides for NRC meeting on I&C Tech Specs

[Here it is and it passes preflight.](#)

Kathy Bennett  
Corporate Regulatory Affairs  
X22729

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**From:** LENTZ Tony (External RS/NB)  
**Sent:** Monday, October 01, 2012 9:06 AM  
**To:** GARDNER Darrell (RS/NB); BENNETT Kathy (RS/NB)  
**Cc:** WILLIFORD Dennis (RS/NB)  
**Subject:** RE: slides for NRC meeting on I&C Tech Specs

[One comment already. On page 17, 3<sup>rd</sup> red dot, change April 2013 to March 2013.](#)

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**From:** LENTZ Tony (External RS/NB)  
**Sent:** Monday, October 01, 2012 8:59 AM  
**To:** GARDNER Darrell (RS/NB); BENNETT Kathy (RS/NB)

**Cc:** WILLIFORD Dennis (RS/NB)

**Subject:** slides for NRC meeting on I&C Tech Specs

Kathy,

Please prepare these slides for sending to the NRC. You now are in charge of the master file. Darrell is doing his final review. If he has any comments, we'll send asap. These slides need to go to the NRC today.

Tony

**Hearing Identifier:** AREVA\_EPR\_DC\_RAIs  
**Email Number:** 4058

**Mail Envelope Properties** (2FBE1051AEB2E748A0F98DF9EEE5A5D4E313B9)

**Subject:** AREVA Presentation for Public Meeting with NRC to Discuss I&C Technical Specification Closure on October 3rd  
**Sent Date:** 10/1/2012 1:49:34 PM  
**Received Date:** 10/1/2012 1:49:53 PM  
**From:** WILLIFORD Dennis (AREVA)

**Created By:** Dennis.Williford@areva.com

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Tracking Status: None

**Post Office:** auscharm02.adom.ad.corp

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	3186	10/1/2012 1:49:53 PM
NRC meeting_IC Tech Specs.pdf		2184874

**Options**

**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

# **Public Meeting to Discuss Issues Related To U.S. EPR™ Instrumentation Technical Specifications and Open RAI's**

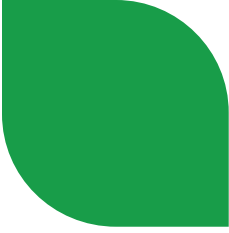
Rockville, Maryland  
October 3, 2012



# Purpose and Background

- ▶ **Purpose**
  - ◆ Come to agreement on a path forward for completion of U.S. EPR Instrumentation Technical Specifications in LCO 3.3
  - ◆ Review schedule for U.S. EPR Instrumentation Technical Specifications open RAI closure and opportunities for future interaction
  
- ▶ **Background - NRC identified a number of issues with the Instrumentation Technical Specifications in LCO 3.3 in RAI's and the 2011 NRC Audit**
  - ◆ U.S. EPR Instrumentation Technical Specifications in LCO 3.3 combine all Reactor Trip and ESFAS functions into one LCO
  - ◆ U.S. EPR Instrumentation Technical Specifications do not follow any Standard Technical Specifications format
  - ◆ U.S. EPR Instrumentation Technical Specifications are very complex



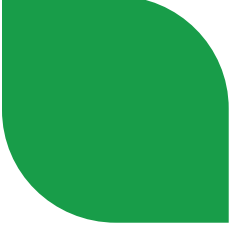


# Current Status

## ► SER Open Items Status

RAI QUESTION / PART	LAST SENT	DESCRIPTION	DRAFT DATE	FINAL DATE
RAI 300, Q16-311, Part 16-129(a)	Draft 6	Concerns regarding the wording of Required Action C if the incorrect LTSP is on the same APU as the EDG functions	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-131(d)	Draft Supp 5	Entry in Table B 3.3.1-1 for Permissive P8 appears incorrect	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-138(a)	Draft Supp 5	why are three monitors/sensors required in Modes 1 through 4 but only two required in Modes 5 and 6?	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-147(f)	Draft 6	Pressurizer Pressure (NR) instrumentation mode applicability	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-180(a)	Draft 6	Bases description of the Hot Leg Pressure (WR) sensor	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-182(b)	Draft 6	Wording of Footnoted (b) and (c) in Table 3.3.1-2 regarding TSTF-493 instrumentation surveillance requirements	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-190(c)	Draft 6	Presentation of RCP Current sensors in Bases Table B 3.3.1-1	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-193(a)	Draft 6	Rewording of SR 3.3.1.10, specifically the Reviewer's Note and the associated bracketed text	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-193(b)	Draft Supp 5	SR 3.3.1.5 should not be specified for signal processors in Table 3.3.1-1	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-193(d)	Draft Supp 5	For the manual actuation switches in Table 3.3.1-1, why is SR 3.3.1.5 (Sensor Operational Test) appropriate?	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-194	Draft 6	Use of term "channel" in the Bases	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-195	Draft Supp 5	Clarifications regarding the number of required RAUs	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-199	Draft Supp 5	Conditions A and C are not implementable as written with the Required Divisions column for instrumentation that is specified on a per loop or per quadrant basis	May 31, 2013	June 28, 2013
RAI 300, Q16-311, Part 16-203	Draft 6	Questions regarding the safety analysis regarding a boron dilution event coupled with a rod ejection or inadvertent rod withdrawal	May 31, 2013	June 28, 2013
RAI 300, Q16-312, Part 16-217(f)	Draft Supp 5	Revision of Table 15.0-8	May 31, 2013	June 28, 2013
RAI 300, Q16-312, Part 16-234(a)	Draft Supp 5	Clarify the Bases description of SR 3.3.2.1 to more accurately reflect the definition of CALIBRATION	May 31, 2013	June 28, 2013
RAI 300, Q16-313, Part 16-51	Draft 6	Revision of Bases B 3.8.9-3	May 31, 2013	June 28, 2013
RAI 300, Q16-315, Part 16-212	Draft Supp 3	Revise the Bases description of SR 3.3.2.1 to be consistent with the Definition of Calibration	May 31, 2013	June 28, 2013
RAI 315, Q16-320	Draft Supp 1	Addition of functions to the RSS LCO	May 31, 2013	June 28, 2013

# AREVA Approach for Resolution



## ▶ Assigned Team to review Instrumentation Technical Specifications

- ◆ Team consists of representatives from Licensing, Operations, I&C, and Safety Analysis

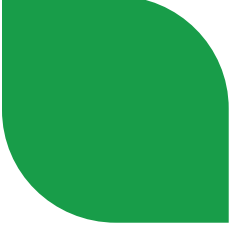
## ▶ Activities to be performed

- ◆ Review Open Items and Audit issues
- ◆ Revise shutdown modes evaluation
- ◆ Validate Functions
- ◆ Validate MODE Applicability
- ◆ Validate number of required OPERABLE divisions
- ◆ Validate Conditions & Required Actions
- ◆ Simplify Condition statements
- ◆ Validate Surveillance Requirements
- ◆ Validate PAMS, RSS, DAS Instrumentation
- ◆ Send revised Responses to NRC





# AREVA Approach for Resolution

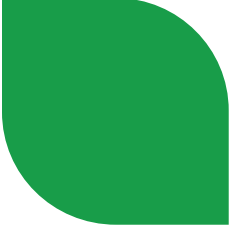


- ▶ **Results of Team Review**
- ◆ **Capture sensors as part of LCO function rather than separately as a component**
  - Addresses NRC comments on Function versus Component Technical Specifications
  - Provides consistency with existing Standard Technical Specifications
- ◆ **Re-Organize the Reactor Trip and ESFAS functions into multiple LCOs based on grouping of “like” functions**
  - Align more closely with existing Standard Technical Specifications organization such as NUREG-1431, Rev. 4
  - Provide separate ESFAS LCOs for functions based on use of similar architecture
    - Architecture that uses 4 APUs and 4 ALUs, e.g., SIS, EFWS
    - Architecture that uses 4 APUs and only 2 ALUs, e.g., Containment isolation, Main Control Room isolation, CVCS isolation
  - Provide separate LCO for Permissives because
    - Some Permissives are shared by RT functions and ESFAS functions
  - Provide separate LCO for RCP Trip and EDG Actuation
    - Architecture is unique
    - Reduces complexity of Condition Statements and Required Actions

◆ **Proposed re-organization is generally consistent with existing Standard Technical Specifications format such as NUREG-1431, Rev. 4**

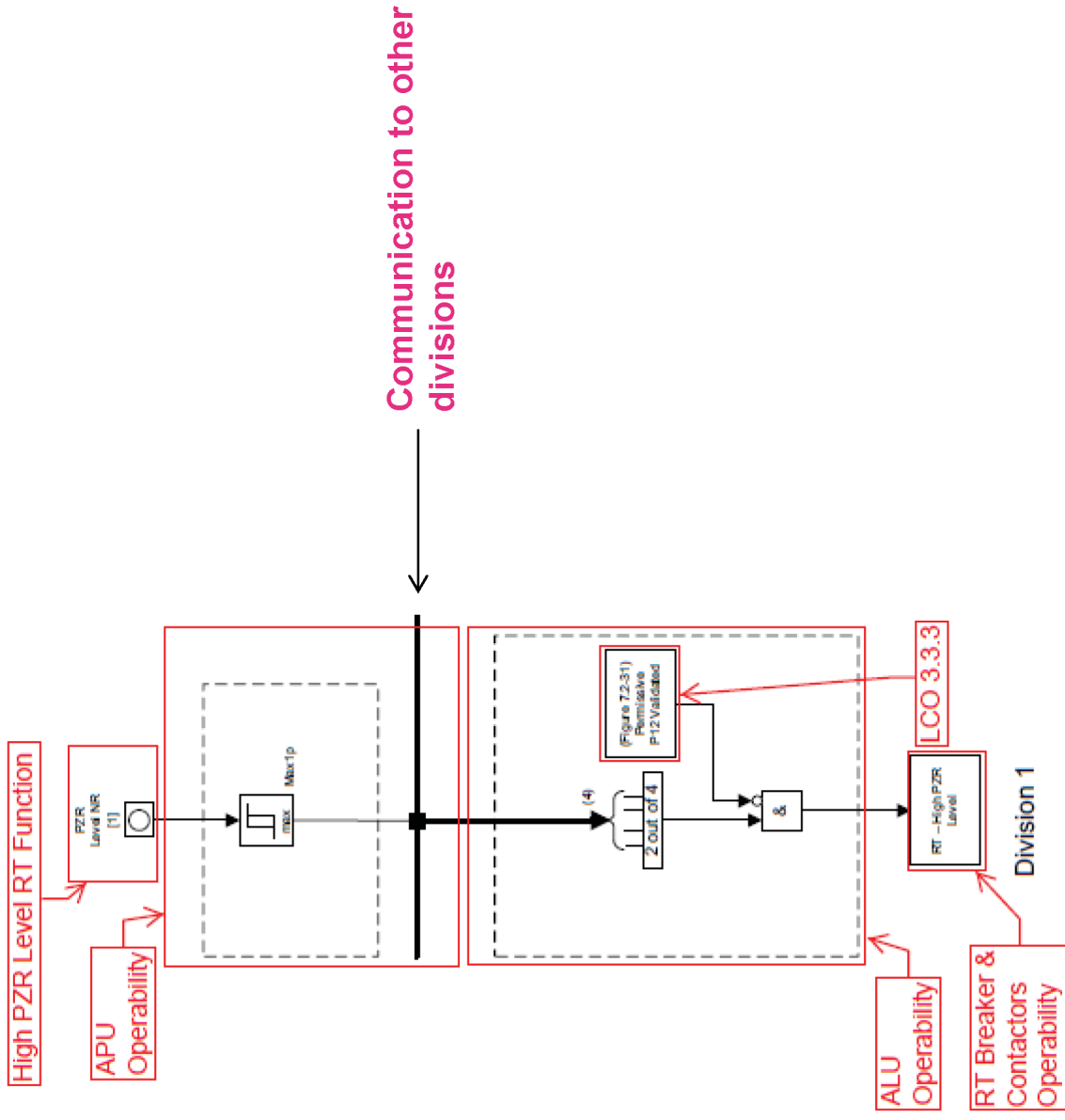
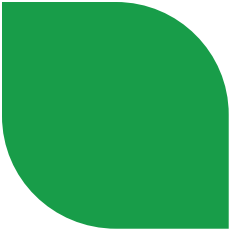


# Comparison with Standard Technical Specifications

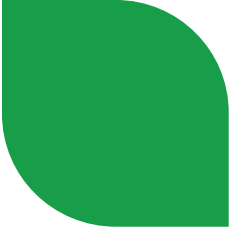


NUREG-1431	U.S. EPR
3.3.1 Reactor Trip System (RTS) Instrumentation	3.3.1 Reactor Trip Instrumentation
3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation	3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation
N/A	3.3.3 Permissive Instrumentation
3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation	3.3.4 Emergency Diesel Generator (EDG) Actuation Instrumentation
3.3.6 Containment Purge and Exhaust Isolation Instrumentation	3.3.5 Containment Isolation Instrumentation
3.3.7 Control Room Emergency Filtration System (CREFS) Actuation Instrumentation	3.3.6 Main Control Room (MCR) Filtration and Isolation Instrumentation
3.3.9 Boron Dilution Protection System (BDPS)	3.3.7 Chemical and Volume Control System (CVCS) Charging Isolation Instrumentation
N/A	3.3.8 Reactor Coolant Pump (RCP) Trip Instrumentation
N/A	3.3.9 Engineered Safety Feature (ESF) Control Instrumentation
N/A	3.3.10 Essential Auxiliary Support (EAS) Instrumentation
3.3.3 Post Accident Monitoring (PAM) Instrumentation	3.3.11 Post Accident Monitoring (PAM) Instrumentation
3.3.4 Remote Shutdown System	3.3.12 Remote Shutdown Station (RSS)
N/A	3.3.13 Diverse Actuation System (DAS) Instrumentation

# Example RT 3.3.1



# Example RT LCO 3.3.1



## 3.3.1 Reactor Trip Instrumentation

LCO 3.3.1 The Reactor Trip instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

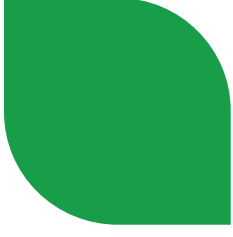
### ACTIONS

Separate Condition entry is allowed for each Function.

NOTE

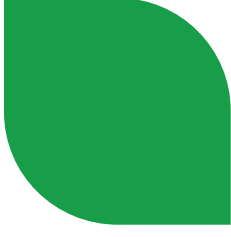
CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required division inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the division(s).	Immediately
B. One or more RT Functions with one required division inoperable.	B.1 Verify OPERABILITY of RT Function in other required divisions.	X hours
	<u>AND</u> B.2 Verify ALU voting logic for RT Function is modified in other required divisions.	X hours
C. One or more RT Functions with two required divisions inoperable.	C.1 Restore RT Function in one required division to OPERABLE status.	72 hours

# Example RT LCO 3.3.1



CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One Reactor Trip Breaker inoperable. <u>OR</u> One Reactor Trip Contactor in a set inoperable.	D.1 Restore to OPERABLE status.	72 hours
E. Two or more Reactor Trip Breakers inoperable. <u>OR</u> Two or more Reactor Trip Contactors in a set inoperable.	E.1 Be in MODE 3.	6 hours
F. One required APU division inoperable.	F.1 Verify OPERABILITY of other required APU divisions. <u>AND</u> F.2 Verify ALU voting logic is modified for other required APU divisions.	X hours  X hours
G. Two required APU divisions inoperable.	G.1 Restore one required APU division to OPERABLE status.	72 hours

# Example RT LCO 3.3.1



CONDITION	REQUIRED ACTION	COMPLETION TIME
H. One required ALU division inoperable.	H.1 Verify OPERABILITY of other required ALU divisions.	X hours
I. Two required ALU divisions inoperable.	I.1 Restore one required ALU division to OPERABLE status.	72 hours
J. Required Action and associated Completion Time of Condition B, C, D, F, G, H or I not met.	J.1 Be in MODE 3.	6 hours

# Example RT LCO 3.3.1

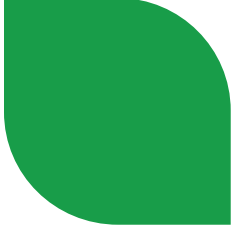
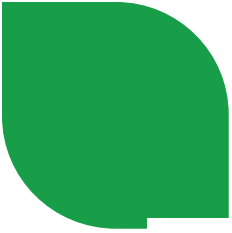
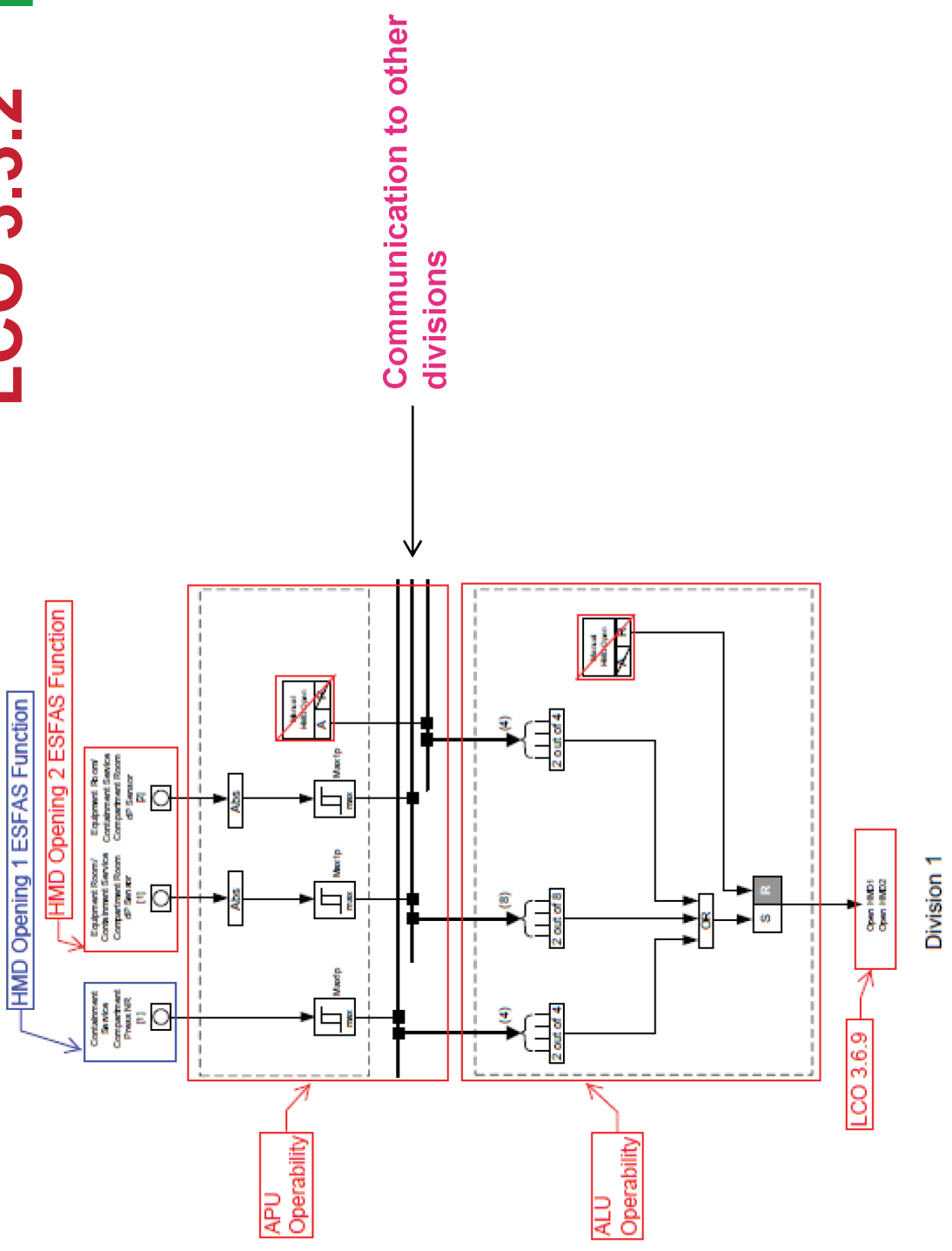


Table 3.3.1-1  
Reactor Trip Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED DIVISIONS	CONDITIONS	SURVEILLANCE REQUIREMENTS	NOMINAL TRIP SETPOINT
<b>REACTOR TRIPS</b>					
12. High Pressurizer Level	1,2	4 divisions	B,C	TBD	[ 75% measuring range ]
<b>FUNCTION PROCESSORS</b>					
1. Acquisition and Processing Units (APUs)	1,2	4 divisions	G,H	TBD	[ N/A ]
2. Actuation Logic Units (ALUs)	1,2	4 divisions	J,K	TBD	[ N/A ]
<b>TRIP ACTUATION DEVICES</b>					
1. Reactor Trip Breakers	1,2	2 per division, (Divisions 2 and 3)	D,E	TBD	[ N/A ]
2. Reactor Trip Contactors	1,2	4 per set, 23 sets, (Divisions 1 and 4)	D,E	TBD	[ N/A ]

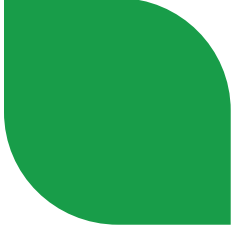


# Example ESFAS LCO 3.3.2





# Example ESFAS LCO 3.3.2



3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1.

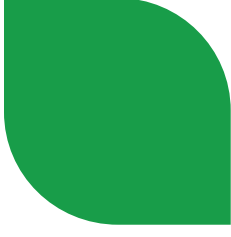
**ACTIONS**

Separate Condition entry is allowed for each Function.

-----NOTE-----

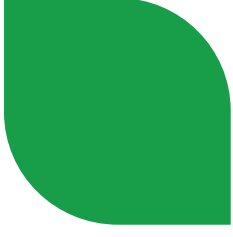
CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required division inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the division(s).	Immediately
B. One Hydrogen Mixing Dampers Opening on High Containment Pressure Function in one required division inoperable.  <u>OR</u> One Hydrogen Mixing Dampers Opening on High Containment Compartments Delta Pressure Function in one required division inoperable.	B.1 Verify OPERABILITY of Function in other required divisions.  <u>AND</u> B.2 Verify ALU voting logic for Function is modified in other required divisions.	X hours  X hours

# Example ESFAS LCO 3.3.2



CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. One or more Hydrogen Mixing Dampers Opening on High Containment Pressure Functions in two required divisions inoperable.</p> <p><u>OR</u></p> <p>One Hydrogen Mixing Dampers Opening on High Containment Compartments Delta Pressure Function in two required division inoperable.</p>	<p>C.1 Restore Function in one required division to OPERABLE status.</p>	72 hours
<p>D. One required APU division inoperable.</p>	<p>D.1 Verify OPERABILITY of other required APU divisions.</p> <p><u>AND</u></p> <p>D.2 Verify ALU voting logic is modified for other required APU divisions.</p>	<p>X hours</p> <p>X hours</p>
<p>E. Two required APU divisions inoperable.</p>	<p>E.1 Restore one required APU division to OPERABLE status.</p>	72 hours

# Example ESFAS LCO 3.3.2



CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One required ALU division inoperable.	F.1 Declare associated Hydrogen Mixing Dampers Inoperable.	Immediately
	<u>AND</u> F.2 Verify OPERABILITY of other required ALU divisions.	X hours
G. Required Action and associated Completion Time of Condition B, C, D, E, or F not met.	G.1 Be in MODE 3.	6 hours
	<u>AND</u> G.2 Be in MODE 5.	36 hours

# Example ESFAS LCO 3.3.2

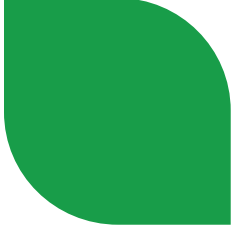


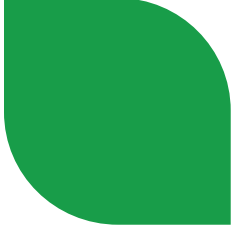
Table 3.3.2-1  
ESFAS Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED DIVISIONS	CONDITIONS	SURVEILLANCE REQUIREMENTS	[ NOMINAL TRIP SETPOINT ]
<b>14. HYDROGEN MIXING DAMPERS</b>					
1. Hydrogen Mixing Dampers Opening on High Containment Pressure	1.2,3,4	4 divisions	B,C	TBD	[ 17.4 psia ]
2. Hydrogen Mixing Dampers Opening on High Containment Compartments Delta Pressure	1.2,3,4	4 divisions	B,C	TBD	[ 0.5 psi ]
<b>FUNCTION PROCESSORS</b>					
1. Acquisition and Processing Units (APUs)	1.2,3,4	4 divisions	D,E	TBD	[ N/A ]
2. Actuation Logic Units (ALUs)	1.2,3,4	4 divisions	F	TBD	[ N/A ]

# Interaction Opportunities

- ▶ **NRC/AREVA Interaction Opportunities**
- ◆ **AREVA provides draft LCOs for NRC review**
  - Submit revised LCO Section 3.3 – Dec 2012 (Bases will not be submitted)
  - NRC & AREVA coordinate an Audit in January 2013 to address NRC staff comments
- ◆ **AREVA provides revised LCO Section 3.3 and Bases – March 2013**
  - NRC & AREVA coordinate an Audit in April 2013 to address NRC staff comments
- ◆ **Submit draft RAI 300 & 315 responses with LCO Section 3.3 and Bases – May 31, 2013**
- ◆ **Submit final RAI 300 & 315 responses with LCO Section 3.3 and Bases – June 28, 2013**

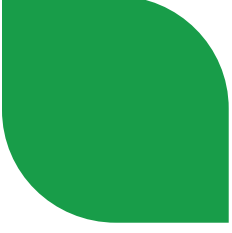




## Summary

- ▶ **Resolution of NRC identified issues with the U.S. EPR Instrumentation Technical Specifications**
  - ◆ U.S. EPR Instrumentation Technical Specifications will re-organize Reactor Trip and ESFAS functions into separate LCOs
  - ◆ U.S. EPR Instrumentation Technical Specifications will be more closely aligned with Standard Technical Specifications organization
  - ◆ U.S. EPR Instrumentation Conditions and Required Actions will be simplified

# Acronyms



<b>ALU</b>	<b>Actuation Logic Unit</b>
<b>APU</b>	<b>Acquisition and Processing Unit</b>
<b>DAS</b>	<b>Diverse Actuation System</b>
<b>EDG</b>	<b>Emergency Diesel Generator</b>
<b>EFWS</b>	<b>Emergency Feedwater System</b>
<b>ESF</b>	<b>Engineered Safety Feature</b>
<b>ESFAS</b>	<b>Engineered Safety Feature Actuation System</b>
<b>I&amp;C</b>	<b>Instrumentation &amp; Control</b>
<b>LCO</b>	<b>Limiting Condition of Operation</b>
<b>PAMS</b>	<b>Post-accident Monitoring System</b>
<b>RAI</b>	<b>Request for Additional Information</b>
<b>RCP</b>	<b>Reactor Coolant Pump</b>
<b>RSS</b>	<b>Remote Shutdown System</b>
<b>RT</b>	<b>Reactor Trip</b>
<b>SIS</b>	<b>Safety Injection System</b>
<b>STS</b>	<b>Standard Technical Specifications</b>