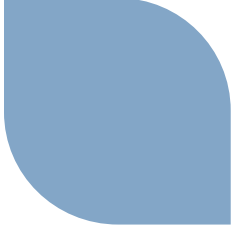


U.S. EPR™ Fukushima Mitigation Strategy Update

U.S. EPR™ Design Centered Working Group
Rockville, Maryland - 5 March 2013

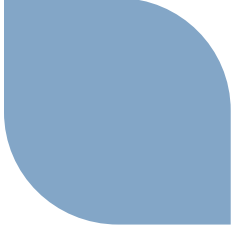




Agenda

- ▶ **Containment Analysis using GOTHIC**
- ▶ **Testing Overview**
- ▶ **DC Technical Report Outline**
- ▶ **Recommendation 4.2 COLA Response**
 - ◆ **Discussion of South Texas Project RAI**
- ▶ **NRC Interactions**

Containment Analysis using GOTHIC



- ▶ **Containment Analysis results presented by Jacoben Tone and Chris Molseed.**
- ▶ **See separate containment analysis presentation**

Testing Overview

CATEGORY	GENERAL APPROACH	DC LOAD SHEDDING EXAMPLE
<p>Separate Effects Testing</p>	<p>Separate effects testing of components and groups of components includes:</p> <ul style="list-style-type: none"> • Individual component testing (e.g., pumps, valves) in Initial Test Program and/or Surveillance Testing • Grouped component testing (e.g., pump lineups and starts/stops) in Initial Test Program and/or Surveillance Testing 	<p>Tech Spec Surveillance Testing</p> <ul style="list-style-type: none"> • Battery terminal voltage, battery discharge testing, and battery parameters • Battery charger amperage • Inverter voltage, frequency and alignment <p>Initial Test Program (EUPS, # 110)</p> <ul style="list-style-type: none"> • Battery modified performance discharge test per IEEE Standard 450-2002 as endorsed by RG 1.129 with exceptions. • Inverters and manual transfer switches function. • Inverter voltage, frequency and current from battery source.



Testing Overview

CATEGORY	GENERAL APPROACH	DC LOAD SHEDDING EXAMPLE
Integrated Plant Response Testing	<p>Integrated plant response testing is limited to frequent events (e.g., Anticipated Operational Occurrence vs. Postulated Accident) <u>and</u> restrictions to prevent damage plant equipment.</p> <p>Examples of integrated plant response testing performed in Initial Test Program include:</p> <ul style="list-style-type: none"> ● Loss of off-site power ● Turbine Trip <p>Integrated plant response testing is <u>not</u> performed for infrequent events (e.g., postulated accidents, beyond design basis accidents). Integrated plant response for these infrequent events is demonstrated by analysis.</p>	<p>Integrated plant response for dc load shedding is demonstrated analysis.</p>

Testing Overview

CATEGORY	GENERAL APPROACH	DC LOAD SHEDDING EXAMPLE
Operator Timeline Testing	<p>Operator timeline testing is performed for selected events that require time-critical operator actions.</p> <p>Examples of operator timeline testing performed per COL items include:</p> <ul style="list-style-type: none"> • Time to setup portable equipment (e.g. run hoses and cable) <p>Operator timeline testing is performed by COL applicant.</p>	<p>To support dc load shedding, operator action is required within 70 minutes:</p> <ul style="list-style-type: none"> • Shed all non-ELAP loads from Division 1 thru 4 • Remove EUPS Divisions 3 & 4 from service.
Portable Equipment Testing	<p>Portable equipment testing is performed by COL applicant for selected events. For example, 10 CFR 50.54 (hh) (2) equipment testing.</p>	<p>COL Applicant will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task to develop site specific procedures or guidelines to address the criteria in NEI 12-06.</p>



DC Technical Report Outline

- ▶ **Purpose – Introduction and Background**
 - ◆ Description of Fukushima Dai-ichi Accident
 - ◆ Near Term Task Force Response
- ▶ **Regulatory Criteria – Regulatory Bases Conformance**
 - ◆ NRC Order EA-12-049 (Interim Staff Guidance JLD-ISG-2012-01)
 - ◆ NEI 12-06, Rev. 0 – Diverse and Flexible Coping Strategies (FLEX) Implementation Guide
 - ◆ NRC Order EA-12-051 (Interim Staff Guidance JLD-ISG-2012-03)
 - ◆ NEI 12-02, Rev. 1 – Industry Guidance for Compliance with NRC Order EA-12-051
 - ◆ SECY-12-0095

DC Technical Report Outline (continued)

- ▶ **Scope**
 - ◆ Applicable Tier 1 and Tier 2 NTTF Recommendations
 - ◆ Responses to RAls 549, 550, and 563
- ▶ **NTTF 4.2, Mitigation of Beyond Design Basis External Hazards (Tier 1)**
 - ◆ **Scope**
 - Overview of Order EA-12-049
 - Phase 1 Event Mitigation and Phase 2/3 Performance Requirements
 - ◆ **Codes and Methods**
 - S-RELAP5
 - GOTHIC
 - Criticality Evaluation

DC Technical Report Outline (continued)

▶ **NTTF 4.2, Mitigation of Beyond Design Basis External Hazards (continued)**

◆ **Acceptance Criteria**

- Core Cooling
- Containment Integrity
- Spent Fuel Cooling

◆ **Design Bases**

- Core Cooling in Modes 1 – 4 - Secondary Side Feed and Bleed
- Core Cooling in Modes 5 and 6
- RCP Seal Leakage
- Containment Integrity and Cooling
- Spent Fuel Pool Time to Boil and Makeup Analysis
- DC Load Shedding
- Reasonable Protection of Installed and Portable Equipment

DC Technical Report Outline (continued)

▶ NTTF 4.2, Mitigation of Beyond Design Basis External

Hazards (continued)

◆ Plant Modifications

- DC Load Shedding
- Secondary Side Feed and Bleed
- Core Cooling in Modes 5 and 6
- Containment Cooling

◆ Mitigating Strategies

- Core Cooling
- Containment
- Spent Fuel Cooling
- Instrumentation and Controls
- Support Functions

◆ Sequence of Events /Critical Operator Actions

- Events Initiated in Modes 1 – 4
- Events Initiated in Modes 5 and 6

DC Technical Report Outline (continued)

▶ NTTF 4.2, Mitigation of Beyond Design Basis External Hazards (continued)

◆ FSAR References and Changes

- Supporting Sections Identified
- Revised Sections Identified

▶ NTTF 7, Enhancing Spent Fuel Pool Makeup & Instrumentation

◆ Scope

- Overview of Order EA-12-051 and response to RAI 550 (NTTF 7.1) (Tier 1)
- Safety-related AC Power for Spent Fuel Pool Makeup (NTTF 7.2) (Tier 2)
- Plant Technical Specification (NTTF 7.3) (Tier 2)
- Seismically Qualified Spent Fuel Pool Spray System (NTTF 7.4) (Tier 2)

DC Technical Report Outline (continued)

▶ NTTF 7, Enhancing Spent Fuel Pool Makeup & Instrumentation (continued)

- ◆ **Design Basis**
 - Spent Fuel Pool Level Instrumentation (NTTF 7.1)
 - Safety-related AC Power for Spent Fuel Pool Makeup (NTTF 7.2)
 - Plant Technical Specification (NTTF 7.3)
 - Seismically Qualified Spent Fuel Pool Spray System (NTTF 7.4)

◆ **Plant Modifications**

- Spent Fuel Pool Level Instrumentation
- Spent Fuel Pool Spray System

◆ **Mitigating Strategies**

- Included in NTTF 4.2 discussion

◆ **Sequence of Events /Critical Operator Actions**

- Included in NTTF 4.2 discussion

◆ **FSAR References and Changes**

- Supporting Sections Identified
- Revised Sections Identified

DC Technical Report Outline (continued)

- ▶ **NTTF 9.3, Enhanced Emergency Preparedness**
 - ◆ **Scope**
 - Response to RAI 549 (NTTF 9.3, Tier 1)
 - NTTF 9.3 (Tier 2)
 - ◆ **Design Bases**
 - Enhanced Emergency Plan staffing and communications
 - Enhanced Emergency Plan (e.g., multi-unit dose assessments, training)
 - ◆ **Mitigating Strategies**
 - Included in NTTF 4.2 discussion
 - ◆ **Sequence of Events /Critical Operator Actions**
 - Included in NTTF 4.2 discussion
 - ◆ **FSAR References and Changes**
 - Supporting Sections Identified
 - Revised Sections Identified



Recommendation 4.2 - COLA Response

- ▶ **Discussion of South Texas Project RAI**
- ▶ **See separate COL License Condition presentation**

NRC Interactions

Proposed Date	Scope	Interaction Type
Monday 03/25/2013	<ul style="list-style-type: none"> Core Cooling in Modes 1 thru 4 and Core Cooling in Modes 5 & 6 Discussion on Reasonable Protection 	Public telecon, or Public meeting, or Audit
Tuesday 4/16/2013	NRC Pre-Submittal Public Meeting on Draft Technical Report	Public Meeting
Tuesday 4/16/2013	DCWG Meeting	Public Meeting
Monday 6/10/2013	NRC Public Meeting to Provide Feedback on Technical Report	Public Meeting