D-RAP ITAAC

Presentation to
ITAAC Closure Working Group

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Reliability Assurance Program

- RAP assures that systems, structures, and components are as reliable and as available as assumed at licensing

- RAP applies from receipt of license until decommissioning

- There are two phases, divided by initial fuel loading

    Design phase (D-RAP)

    Operational phase (OPRAAs)

D-RAP
Design Reliability Assurance Program

Definition: **All** reliability assurance activities

prior to initial fuel load
(Operational-phase programs are not yet in place)

Scope: **All** risk-significant SSCs (SR & NSR)

Purpose: Assure that **as-built** SSCs will be (at fuel load)
as **reliable** and as **available**
as **assumed** at licensing

Supporting Documents

- Plant-specific PRA (with COL application)

- SRP 17.4, "Reliability Assurance Program"

- RG 1.206: reasonable assurance that the plant is consistent with assumptions & risk insights
  - design
  - construction
  - operation

SRP 17.4 (2007)

DESIGN CERTIFICATION

A staff review verified the acceptability of the non-system-based RAP ITAAC for the design stage.

COL SER

A staff review verified the…procurement,

fabrication, and test specifications…reflect the reliability values assumed in the…PRA, deterministic analysis, or other methods.

NRC Expectations for ITAAC

D-RAP activities have ensured that design **as issued** is faithful to the licensed design (as described in the FSAR for a COL, based on the DCD)

D-RAP activities will also ensure that the plant **as built** will be faithful to the design as issued
- *Procurement*
- *Fabrication*
- *Construction*
- *Testing*

AP1000 D-RAP ITAAC (current)

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
The D-RAP provides reasonable assurance that the design of risk-significant SSCs is consistent with their risk analysis assumptions.	Inspection will be performed for the existence of a report which establishes the estimated reliability of as-built risk-significant SSCs.	A report exists and concludes that the estimated reliability of each as-built component identified in Table 3.7-1 is at least equal to the assumed reliability and that industry experience including operations, maintenance, and monitoring activities were assessed in estimating the reliability of these SSCs.

Proposed D-RAP ITAAC

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
The D-RAP provides reasonable assurance that the plant is designed and will be constructed in a manner that is consistent with the key assumptions and risk insights for risk-significant SSCs.	An analysis will confirm the adequacy of the D-RAP.	A report exists that includes the following three (3) major elements: • Identification of all SSCs in the scope of the plant-specific D-RAP • Description of the methodology used to identify the SSCs in scope of the plant-specific D-RAP • For the SSCs in scope of D-RAP, identify and describe the reliability assurance activities that are accomplished prior to the initial fuel load, which provide reasonable assurance that the plant is designed and constructed in a manner that is consistent with the key assumptions (including reliability and availability assumptions in PRA, when applicable) and risk insights for the risk-significant SSCs.

Example: Documentation of Methodology

DCD Table 17.4-1, "Risk-Significant SSCs Within the Scope of D-RAP," was incorporated in the FSAR by reference to the DCD.

In addition, an expert panel was convened to review the plant-specific PRA as well as any site-specific characteristics and features with the potential to affect the list of SSCs within the scope of D-RAP. On the basis of their recommendations, documented in…

Whatever method is used to make the D-RAP specific to the plant, the report should document the basis for the result. This is especially important if no SSCs have been added to the plant's D-RAP since design certification.

Example: List of D-RAP SSCs Identifying Reliability Assurance Activities

System	Equipment Name	Tag No.	Failure Modes	RAAs			
				Appendix B	Design control	Maintenance	etc.
Component Cooling Water System	Component Cooling Water Pumps	CCS-MP-01A/B	FS, FR		●	●	⋯
Containment System	Containment Vessel	CNS-MV-01	BF	●			
	Containment Isolation Valves Controlled by DAS	CVS-PL-V045 CVS-PL-V047 VFS-PL-V003 VFS-PL-V004 VFS-PL-V009 VFS-PL-V010 WLS-PL-V055 WLS-PL-V057	FO FO FO FO FO FO FO FO	●			
	Hydrogen Igniters	VLS-EH-1 through -64	FA		●		
Chemical and Volume Control System	Makeup Pumps	CVS-MP-01A/B	FS, FR		●	●	
	Makeup Pump Suction and Discharge Check Valves	CVS-PL-V113 CVS-PL-V160A/B	FO, FS FO, FS		●		
Diverse Actuation System	DAS Processor Cabinets and Control Panel	DAS-JD-001 DAS-JD-002 DAS-JD-004 OCS-JC-020	Note 1		●	●	
	Annex Building UPS Distribution Panels	EDS1-EA-1 EDS1-EA-14 EDS2-EA-1 EDS2-EA-14	Note 1		●	●	
	Rod Drive MG Sets	PLS-MG-01A/B	Note 1		●	●	
Main ac Power System	Ancillary Diesel Generators	ECS-MS-01, -02	FS, FR		●	●	
	6900 Vac Buses	ECS-ES-1, -2	FO		●		
	…						

Example: Reliability Assurance Activity Description

Similar to NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52"

Design Control Program

All design documents and products issued for [XYZ nuclear power plant] are developed under the [XYZ] design control program. These products include but are not limited to calculations, analyses, procurement specifications, test acceptance criteria, drawings, and databases. The [XYZ] design control program meets the requirements of 10 CFR 50 Appendix B, Section III, "Design Control."…

The extent of the program descriptions in the report should be at least as comprehensive and detailed as those used to describe operational-phase reliability activities (maintenance rule, QA, etc.) in the FSAR.

Next Steps

NRC staff

- Discussions with each design center
- Issue draft SRP 17.4 revision for public comment

Industry

- Certified Designs

    Action is not required

- DC Applications

    Revised application optional

    (May resolve RAIs)