



Program Considerations for a DI&C Topical Report Maintenance Program (TRMP)

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NRC Digital I&C Website: <http://www.nrc.gov/about-nrc/regulatory/research/digital.html>



Agenda

- NRC Experience with Reviewing DI&C platform Topical Reports, including updates to approved License Topical Reports (LTRs)
- Statistics: NRC Resources & Schedules for LARs/LTR review and approval
- Current Topical Report review/approval process
- Considerations for developing a Digital Application LTR Maintenance Program
- Regulatory Issues Pertaining to a Digital Application TRMP
- Items requiring regulatory approval prior to implementation



License Applications / Topical Reports for Operating Reactors

- License Applications/Topical Reports Recently Approved by NRR for new and upgraded DI&C platforms
 - Oconee Reactor Protection / Engineered Safety Features System LAR
 - Wolf Creek Main Steam/Feedwater Isolation System LAR
 - Doosan-HF Controls Corp. Digital Safety Control System Topical Report
 - Invensys-Tricon V10 Platform Topical Report update (DCPP PPS)
 - AREVA SIVAT software emulation tool Topical Report
- Topical Reports/License Applications under review by NRR
 - RRCN Spline Safety Platform Topical Report
 - Lockheed Martin Digital Safety System Topical Report*
 - Westinghouse “Common Q” Platform Topical Report Update
 - W/CS Innovations ALS Topical Report (assoc. with DCPP PPS Platform)
 - GE-H Power Range Monitoring System Upgrade Topical Reports/LARs

Statistics: NRC Resources & Schedules for LARs/LTR Review

Platform Name	Vendor/Licensee	LAR/Platform LTR ML#	Date	SER ML#	Date	Staff Resources for Platform Approval	Plant Applications	Comments
Common Q	Westinghouse	ML003721641	May-98	ML003740165	Aug-00	2000 Hours (est.)	Calvert Cliffs/PAMS	Original LTR
		ML011580155	Supp1 May-00	ML011690170	Jun-01	500 Hours (est.)	Palo Verde /Core Protection Calc	LAR-Platform Updated
		ML030440264	Supp 2 Aug-02	ML030550776	Feb-03	500 Hours (est.)		LTR-Platform Update
Common Q	Westinghouse	ML103220240	Sept-10	ML103220240	4 th Qtr 2012	708 Hours		LTR Update—review in progress
Teleperm XS	Siemens / AREVA	ML003732662	Sep-99	ML003711856	May-00	2000 Hours (est.)		Original LTR
Teleperm XS	AREVA Software Program Manual	ML063610098	Dec-06	ML110660036/ML111801119	May-11	2422 Hours		Original LTR

Statistics: NRC Resources & Schedules for LARs/LTR Review

Platform Name	Vendor / Licensee	LAR/Platform LT R ML#	Date	SER ML#	Date	Staff Resources for Platform Approval	Plant Applications	Comments
Teleperm XS	Ocone	ML080730339	Jan-08	ML100220016	Jan-10	1000 Hours (estimate)	RPS/E SPS	LAR-Platform Updated via LAR Review/Approval.
Teleperm SIVAT	AREVA	ML091680619	Jun-09	ML12159A371	Jun-12	679 Hours		Original LTR
Tricon V9	Invensys	ML003757032/ML011790327	Sep-00	ML013470433	Dec-01	2000 Hours (est.)		Original LTR
		ML020730573	Mar-01	ML020730573	Dec-01	500 Hours (est.)		LTR Update (Amend 1/Rev1) from version 9.3.1 to 9.5.3

Statistics: NRC Resources & Schedules for LARs/LTR Review

Platform Name	Vendor/Licensee	LAR/Platform LTR ML#	Date	SER ML#	Date	Staff Resources for Platform Approval	Plant Applications	Comments
Tricon V10	Invensys	ML092870628/ML011790327, ML093370293, ML102040054, and ML110140444	Sep-09	ML12146A010	Apr-12	3664 Hours	DCPP PPS	LTR Update from V9 to V10.
Tricon V10	PG&E	ML11307A331	Oct-11	In Progress	Dec-13	TBD	DCPP PPS	Platform revised from V10.5.1 to V10.5.3. Approval will be via LAR Review/Approval.
HFC-6000	Doosan / HF Controls	ML080780170	Mar-08	ML103230016	Nov-10	2848 Hours		Original LTR

Statistics: NRC Resources & Schedules for LARs/LTR Review

Platform Name	Vendor/Licensee	LAR/Platform LTR ML#	Date	SER ML#	Date	Staff Resources for Platform Approval	Plant Applications	Comments
ALS	Wolf Creek/CSI innovations	ML070800193	Mar-07	ML090610317	Mar-09	1708 Hours	Wolf Creek MSFIS	LAR-Platform Approved via LAR Review/Approval. <i>The majority of resources were devoted to the ALS Processor Review.</i>
ALS FPGA	Westinghouse/CSI	ML11320A048	July-10	ML11307A331	Review in Progress	TBD	DCPP PPS	Original LTR
Spinline 3	Rolls Royce	ML092160047	July-09	ML10313016 (AR)	Review in Progress	TBD		Original LTR
NUPAC	Lockheed Martin	ML11201A323	June-11	ML12128A095(AR)	Review in Progress	TBD	San Onofre	Original LTR
System Plus 32	DRS/CCI	Not yet submitted					Lungmen ESFAS	



Current Topical Report Review Process Overview

- LIC-500, Rev 4, “Topical Report Process,” (ML091520370) over arching licensing process
- Follows guidance for LAR reviews in LIC-101, “License Amendment Review.” (ML113200053)
 - Pre-submittal meetings
 - Submitting the TR
 - Acceptance reviews (includes prioritization of incoming TR’s when appropriate)
 - Proprietary determinations
 - Requests for Additional Information (RAI)
 - Preparation and issuance of the draft and final Safety Evaluation (SE)
 - Approved version of the TR
 - Revisions or supplements to the approved version of the TR



Current Digital Platform LTR review process overview

- LIC-500, Rev 4, “Topical Report Process,” provides a process for Revision or a Supplement to an approved LTR
- A revision to a TR:
 - Provides additional information in the revised TR for the purpose of changing or removing portions of the limitations or conditions in the NRC staff’s SE.
 - When a revision to a TR is approved by the NRC staff, the NRC staff’s current SE supersedes the original SE.
- A supplement to a TR:
 - May provide current information to update code references or data that was provided in the approved version of the TR.
 - When a supplement to a TR is approved by the NRC staff, the NRC staff’s SE supplements the original SE.
- After the SE is issued, the applicant issues a revised approved version (-A) of the TR.



Other Licensing Process Information Related to Digital I&C Systems overview

- ISG-06, “Licensing Process for Digital I&C Systems,” (ML110140103) augments the LIC-101 and LIC-500 licensing processes
- Specifically, ISG-06 clearly defines a consistent licensing PROCESS for digital safety systems by:
 - 1) Identifying the regulatory requirements, guidance, and acceptance criteria, that should be addressed in a license amendment or Topical Report
 - 2) Defining the level of detail and timing for the information and documentation to be provided in a license amendment/LTR.
 - 3) Defining the protocols for development of a License application and detail how the staff review will be concluded.
- ISG-06 has been used informally to facilitate platform LTR reviews, albeit some improvements are in order for handling LTRs



Considerations for Developing a Digital Application LTR Maintenance Program

- Minimize regulatory burden on licensees.
- A Digital Platform/Application TRMP must be compatible with LIC-101/500 and ISG-06.
- Reduce staff resources needed to review/approve platform updates.
- Enable Platform Vendors to modify their platforms and efficiently obtain NRC approval when the scope of the changes are still within the bounds of the safety finding.
- Reduce the amount of platform design documentation submitted for staff review.



Regulatory Issues Pertaining to a Digital Application TRMP

- Application changes (hardware/software/development process) that invalidate the safety findings of the SER will require NRC approval.
- Change Review Process: Should determine if the change is addressed in the SER.
- Change Evaluation Process: Should determine if the changes are still within the bounds of application SE approval.
- Documentation process: Provides detailed explanation of the changes and references all applicable revised documentation.
- NRC Audits: May be required to review application hardware / software / development process changes.
- Changes may require a Supplement or Revision to the Digital Application LTR.



Items Requiring Regulatory Approval Prior to Implementation

- New components or software that may affect the safety function.
- Modifications to existing components that affect processor reliability (e.g., fault tolerance, response time, processor interrupts)
- Application development process changes that deviate from NRC licensing criteria (e.g., V&V process).
- Processor Independence design—IEEE 603/7-4.3.2, Clause 5.6.
- Changes to Application Environmental Qualification Criteria
- Changes to processor failure modes and affects
- Changes to application D3 design
- Reduction in application QA Program Commitments



Thank You

- Questions??