Limerick Generating Station

Digital Modernization Project

LAR Pre-submittal Meeting

Click to add text

NRC Pre-submittal Meeting
June 9, 2022

Introductions – Constellation Project Team

- Licensing
  - Dave Helker, Licensing Manager
  - Frank Mascitelli, Licensing Lead
  - Laura Lynch, LGS Regulatory Assurance Manager
  - George Budock, LGS Regulatory Assurance
  - Pareez Golub, Digital Licensing SME
  - Richard Paese, HFE SME
  - John Schrage, Licensing SME

- Engineering
  - John Connelly, Central Design Organization (CDO) Manager
  - Mark Samselski, CDO - Lead Responsible Engineer
  - George Bonanni, CDO - Senior Staff Engineer
  - Mike Foote, CDO - Senior Staff Engineer
  - Scott Schumacher, Systems Engineering

Introductions – Constellation Project Team

- Project Management
  - Steve Hesse, Project Director
  - Dave Molteni, Senior Manager and Station Lead
  - Jerry Segner, Principal Project Manager
  - Kayla Marriner, Project Manager
- Operations
  - Paul Krueger, Senior Operations Specialist
- Nuclear Oversight
  - Dave Peiffer, Performance and Assessment Lead
- PRA Support
  - Jeffrey Stone, Director, Corporate Engineering PRA
  - Suzanne Loyd, Senior Manager, Engineering Risk Management

Introductions – Westinghouse Project Team

- Project Management
  - Dominic Mocello, Project Manager
  - Boyan Setchenski, Program Manager

- Engineering
  - Dan Zenger, DCS Lead - Engineering
  - Warren Odess-Gillett, Lead – Licensing
  - Steve Seaman, System Integration Lead
  - Steve Merkiel, WEC Technical Lead
  - Cal Tang, BWR Technical Advisor

Introductions – Idaho National Labs Project Team

- HFE Specialists
  - Paul Hunton
  - Jeffrey Joe

Agenda / Opening Remarks

- Open / Public Session
  - Introductions
  - LAR Update
  - Project Update / Schedule
  - Human Factors Engineering Evaluation / Integrated System Validation
  - Response to NRC Questions
  - Next Pre-submittal Meeting Topics

LAR Update

LAR Status

Constellation will be submitting three LARs to support the Limerick Digital Modernization Project:

- Digital Modernization Project LAR
  - Plan to submit in August 2022 to support April 2024 Refuel Outage on Unit 1
  - Includes elimination of the automatic Turbine Main Steam High Temperature Isolation similar to HATCH Precedent (NRC ADAMS Accession No. ML 21286A595)
  - Includes Elimination of Redundant Reactivity Control System (RRCS) Feedwater Runback
- Installation Support LAR
  - Plan to submit October 2022 and request a one-year NRC review time frame
  - Needed to support pre-outage demolition activities and facilitate installation of the new PPS system within given outage duration
  - Technical Evaluation is not linked/dependent on Digital Modernization LAR
- Risk Informed Completion Time (RICT) LAR
  - Plan to submit March 2023 and request a one-year NRC review time frame
  - Plan so that Unit 1 would be able to restore instrument related RICTs at end of 2024 Refuel Outage
  - Technical Evaluation is linked to Limerick Digital Modernization LAR but will not be an Acceptance Review Issue

LAR Status

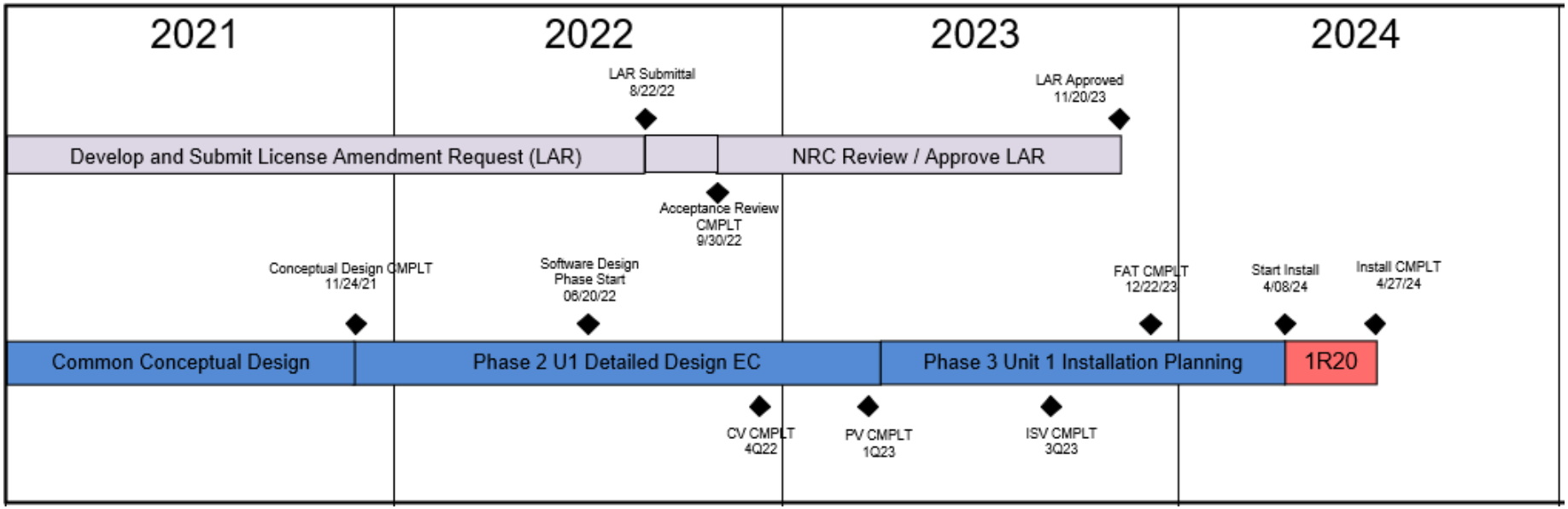
- Installation Support LAR
  - RRCS demolition 30 days prior to outage
    - Request a temporary one-time Allowable Outage Time (AOT) extension for Technical Specifications (TS) Section 3.3.4.1 “ATWS Recirculation Pump Trip System Instrumentation” Actions D and E, from 72 hour to 30 days and 1 hour to 30 days, respectively.
    - Deterministic technical evaluation with risk Insights (hybrid LAR)
  - Implement TSTF 582 (RPV WIC Enhancements)
    - Needed to facilitate TS compliance during outage installation configurations
    - EDG SR Applicability (TSTF-582 follow-up)
    - LOP Instrumentation Applicability (TSTF-583-T)
    - TS 3.5.2. Action a: Deletion of "CORE ALTERATION" (TSTF-542 follow-up)
  - TS change to facilitate Mode Switch inoperability and continued Core Alterations
    - Issue: During installation of the digital modification on the Reactor Protection System, including the "Reactor Mode Switch Shutdown Position" and "Manual Scram" functions (i.e., TS Table 3.3.3-1, functions 11 and 12), the unit will be in OPERATIONAL CONDITION (OPCON) 5 with the Reactor Mode Switch locked in the Refuel position, and considered inoperable (i.e., due to the modification work on the RPS). Similarly, the Manual Scram function will be inoperable.
    - TS change to facilitate Mode Switch inoperability and continued Core Alterations by using a similar note or exclusion to the one in ITS

LAR Status

- RICT LAR
  - RICTs were excluded from Digital Modernization Project LAR to facilitate timely NRC review
  - Restore about 19 existing RICTs that cover about 97 instrument TS functions that are being excluded from the Digital Modernization Project LAR
  - Add several new RICTs for PPS Division inoperable LCOs
  - Anticipating final design for Digital Modernization Project LAR completed to the point where PRA model update changes can start to be developed in the October 2022 time frame
  - Re-perform Loss of Functions Reviews for applicable TS per functions impacted by instrument consolidations
  - Application of RICT Program changes will be evaluated using the methodology and probabilistic risk guidelines contained in NEI 06-09-A, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," Revision 0
  - Review is in in progress to determine if any Newly Developed Methods (NDMs) are involved for the PRA model changes
  - The anticipated changes to the PRA model will meet the definition of a PRA Upgrade
  - The PRA upgrade will require a Focused Scope Peer Review

Project Update/Schedule

Project Schedule



Constellation

Human Factors Engineering Evaluation / Integrated System Validation

LAR HFE Supporting Document Submittals

- NUREG-0711 is being used as a tool to develop the LGS HFE program plan and to identify the pertinent HFE activities to perform for the project.
- LGS is obligated to meet their regulatory and license basis HFE requirements, which are most explicitly defined in:
  - Generic Letter 82-33 (NUREG-0737 Supplement 1)
  - UFSAR Section 1.13
  - Detailed Control Room Design Review (DCRDR) program plan.
- The conclusions in the NRC's SER for the LGS LAR are to be based on the actual requirements (i.e., not NUREG-0711 or 10 CFR 50.34(f))
- Therefore, LGS is proposing to submit to the NRC only those documents necessary to show compliance to the LGS HFE regulatory and license basis requirements.

HFE Execution Summary, Status at LAR Submittal, and Expected Final Disposition

NUREG-0711 Element	Current Status	Final Disposition
HFE Program Plan	Complete	Included in the LAR Submittal
Operating Experience Review	Complete	Results Summary Report (RSR) available for audit (Q3 2022)
Functional Analysis and Allocation	Workshop at Limerick Simulator (Complete)	Combined RSR included in LAR Submittal
Task Analysis	Workshop at INL Human Systems Simulation Laboratory (Complete)	
Staffing & Quals	Implementation description in HFE Plan	Combined RSR included in LAR Submittal
Treatment of Important Human Actions	Implementation description in HFE Plan	

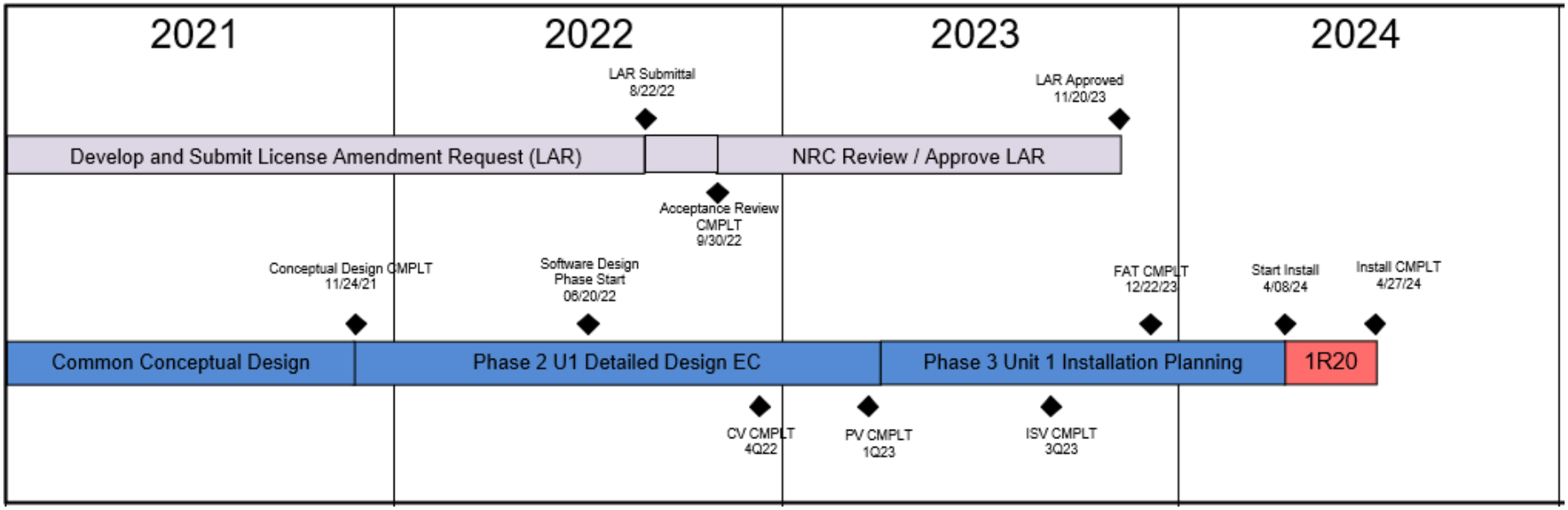
HFE Execution Summary, Status at LAR Submittal, and Expected Final Disposition

NUREG-0711 Element	Current Status	Final Disposition
HSI Design	Initial Prototype displays to support CONOPS developed for Task Analysis Workshop based on HSI Style Guide	This element is covered by Design Verification RSR.
Impacts to Procedures	Implementation description in HFE Plan	Combined RSR available for NRC audit (Q2 2023)
Impacts to Training	Implementation description in HFE Plan	
Task Support Verification	Implementation description in HFE Plan	RSR will be submitted as a LAR supplement (Q1 2023)

HFE Execution Summary, Status at LAR Submittal, and Expected Final Disposition

NUREG-0711 Element	Current Status	Final Disposition
Design Implementation	Part of Constellation Engineering Change Package	Installed per the design and implementation process date range. No additional information included in the LAR for this element.
Integrated System Validation	Developing implementation and simulator strategy for ISV. Implementation description in HFE plan	Perform ISV in Q3 2023. RSR available in Q4 2023.
Design Verification	Implementation description in HFE Plan	Occurs as part of I&C design. RSR, including any ISV updates, will be available for inspection (Q1 2024). LAR will include a Regulatory Commitment to complete Design Verification activity.
Human Performance Monitoring	Implementation description in HFE Plan	Items are identified, post-installation, in CAP for evaluation and resolution.

Project Schedule



Constellation

Phased Verification/Validation Activities

- Conceptual Verification (Q2 2023)
  - Impacts to Procedures and Training (Combined RSR)
    - HSI Design refinement
    - Static HSI workshop
- Preliminary Validation (Q1 2023)
  - Task Support Verification – Procedures & HSIs (RSR)
    - HSI Design Refinement
    - Dynamic HSI workshop
  - Perform “Preliminary Validation” per NUREG-0800, Chapter 18, Attachment A, “Guidance for Evaluating Credited Manual Operator Actions” in efforts listed above.
- Integrated System Validation
  - ISV Implementation Plan (Q2 2023)
  - Execute ISV (Q3 2023)
  - RSR available (Q4 2023)
- Design Verification RSR (Q1 2024)

Response to NRC Questions

Response to NRC Questions

- NRC Question
  - If alternative approaches to a full-scope, plant-referenced Limerick simulator will be used to support the verification and validation process, please clarify how that will be achieved and what methods are planned to be used.
- Constellation answer:

The overall plan is to use the LGS ANSI simulator as the platform for ISV.

- The simulator plan uses the early release of the safety and non-safety software platforms and will integrate those with the hardware at LGS
- The simulator plan uses a temporary physical configuration to run with the simulation software for training and testing
- The simulator software may undergo changes as integration and verification is ongoing and the software will be corrected and revised as necessary to support verification activities up to and including ISV
- Any HEDs identified during the process will be corrected and updated in the final simulator software release and incorporated in operator training

Response to NRC Questions

- NRC Question:
  - With regard to the submitted Limerick defense-in depth and diversity coping analysis, how will the information regarding new and modified manual operator actions be applied going forward into the remainder of the digital I&C submittal? (with a pointer to NUREG-0800 (SRP) Chapter 18. Attachment A).
- Constellation answer:
  - The manual actions credited in the D3 Coping Analysis and the Operator Actions which have been determined by PRA Reduction worth have been identified.
  - Each of these items will be screened to determine if the required action is impacted by the digital modification. Initial screening indicates there are less than 10 operator actions which fall into this category, but this review is preliminary at this time.
  - Preliminary validation of the implementation of these operator actions is planned to be performed during future static and dynamic workshops as the interface is developed and refined for each of the required actions.
  - ISV and the developed scenarios will serve to confirm the results of the preliminary validation efforts.

Next Pre-submittal Meeting Topics

Closing Comments

Acronyms

ADS	Automatic Depressurization System	FMEDA	Failure Modes, Diagnostics, and Effects Analysis	PPS	Plant Protection System
AER	Auxiliary Equipment Room	FPGA	Field Programmable Gate Array	PSAI	Plant Specific Action Items
AOI	Advant Ovation Interface	FSAR	Final Safety Analysis Report	QA	Quality Assurance
ARI	Alternate Rod Injection	HFE	Human Factors Engineering	QMP	Quality Management Plan
ARP	Alternate Review Process	HPCI	High Pressure Core Injection	RAI	Request for Additional Information
ASAI	Application Specific Action Item	HSL	High Speed Link	RCIC	Reactor Core Isolation Cooling
ATWS	Anticipated Transient Without Scram	IBR	Incorporated by Reference	RHR	Residual Heat Removal
BPL	Bistable Protection Logic	ILP	Integrated Logic Processor	RPS	Reactor Protection System
BWR	Boiling Water Reactor	INL	Idaho National Labs	RPV	Reactor Pressure Vessel
CAP	Corrective Action Program	I/O	Input/Output	RRCS	Redundant Reactivity Control System
CCF	Common Cause Failure	ITAAC	Inspection, Test, Analysis, and Acceptance Criteria	RWCU	Reactor Water Cleanup
CDO	Central Design Organization	LAR	License Amendment Request	SER	Safety Evaluation Report
CRDR	Control Room Design Review	LCL	Local Coincidence Logic	SFMS	Supplier Fundamental Management System
CIM	Component Interface Module	LGS	Limerick Generating Station	SDC	Shutdown Cooling
CRADA	Cooperative Research and Development Agreement	LOOP	Loss of Offsite Power	SDV	Scram discharge volume
CPU	Central Processing Unit	LPCI	Low Pressure Coolant Injection	SLCS	Standby Liquid Control System
CS	Core Spray	LRA	Licensee Required Action	SPDS	Safety Parameter Display System
D3	Defense-in-Depth and Diversity	LTR	Licensing Technical Report	SPM	Software Program Manual
DCS	Distributed Control System	MCR	Main Control Room	SR	Safety-related
DDS	Data Display System	MPB	Manual Partial Bypass	SRNC	Safety Remote Node Controller
DEHC	Digital Electro-Hydraulic Control	MPT	Manual Partial Trip	SRV	Safety Relief Valve
DPS	Diverse Protection System	MSFIS	Main Steam and Feedwater Isolation System	SSE	Safe Shutdown Earthquake
ECCS	Emergency Core Cooling System	MSIV	Main Steam Isolation Valve	SyDS	System Design Specification
EDG	Emergency Diesel Generator	NSR	Nonsafety-related	SyRS	System Requirements Specification
EOP	Emergency Operating Procedures	NSSSS	Nuclear Steam Supply Shutoff System	TS	Technical Specifications
EQSR	Equipment Qualification Summary Report	OBE	Operating basis earthquake	TU	Trip Unit
ESFAS	Emergency Safety Function Actuation System	PC	Personal Computer	UFSAR	Updated Final Safety Analysis Report
FMEA	Failure Modes and Effects Analysis	PMS	Protection and Monitoring System	VOP	Vendor Oversight Plan
		PPC	Plant Process Computer	WEC	Westinghouse

Constellation.