



**Crane Clean Energy Center
(Crane)**

**Regulatory Path to Restoring the
Operating Reactor License Basis**

October 25, 2024

Introductions

- Constellation
 - David Gullott - Vice President, Licensing & Regulated Programs
 - Trevor Orth - Plant Manager, Crane Clean Energy Center
 - Craig Smith - Senior Manager Regulatory Assurance, Crane Clean Energy Center
 - Dennis Moore - Senior Manager, Corporate Licensing
 - Jason Zorn - Associate General Counsel



Agenda

- Introduction and Meeting Purpose/Goal
- Crane Plant Overview
- Crane Current Plant Status
- Plant Restoration
- Staffing and Training
- Restoration Quality Assurance
- Proposed Regulatory Path
- Expected Submittals
- Environmental Review
- Coordination with Energy Solutions (Unit 2)
- Final Approval
- Discussion / Questions

Meeting Purpose and Goals

- Purpose:
 - Provide an overview of the Crane Clean Energy Center (Crane) restoration and restart project:
 - Outline the major activities necessary to return the plant to a safe and reliable operating status
 - Introduce and discuss Constellation's proposed regulatory path to restore Crane to an NRC approved Operating Reactor License Basis (ORLB)
- Goals:
 - Obtain NRC feedback and insights on the proposed regulatory framework and the plant restoration plan
 - Gain Constellation and NRC alignment on the subsequent licensing and inspection activities/approaches to reauthorize Crane power operations

Crane Plant Overview

- Unit 1 commenced commercial operation in 1974
- License renewal granted in October 2009 with the current Operating License expiring in 2034
- Reactor shut down for retirement on September 20, 2019
- Prior to retirement, Unit 1 was one of the strongest performing plants in the industry:
 - In its last year of operation, the unit capacity factor was over 99 percent – well above the industry average
 - Annual payroll of about \$60 million while employing more than 600 full-time workers
 - Over 1,000 highly skilled, mostly union craftspeople, supported the unit's biennial refueling outages

Crane Plant Overview

- On September 20, 2024, Constellation announced our intention to restore Three Mile Island, Unit 1, to commercial service and that we have signed a 20-year power purchase agreement (PPA) with Microsoft
 - Facility to be renamed Crane Clean Energy Center
- Restoration supports and aligns with:
 - Constellation's vision to accelerate transition to carbon-free future
- Benefits of Crane operations over 20 years:
 - 835 megawatts of reliable, carbon-free energy, added to the grid
 - Creates more than 3,400 jobs, including 600 permanent jobs at the plant ⁽¹⁾
 - Adds \$3.6 billion in state and federal tax revenue ⁽¹⁾

(1) Brattle: Economic Impacts of Establishing the Crane Clean Energy Center – <https://www.brattle.com/wp-content/uploads/2024/09/Economic-Impacts-of-Establishing-the-Crane-Clean-Energy-Center-CCEC.pdf>

Crane Current Plant Status

- Plant shutdown, September 20, 2019
- All spent fuel is in Independent Spent Fuel Storage Installation (ISFSI)
- Spent fuel pool is drained with cover in place
- Protected Area is scaled commensurate with current plant status
- Security fence in place and monitored for the purposes of material control
- Major systems status:
 - Most major plant systems have been drained and deenergized
 - No major plant components have been removed
 - Reactor coolant system status
 - Loops drained and vented
 - Reactor vessel filled with water covering internals
 - Reactor vessel head installed
 - Main generator inspections completed and placed in long term layup
 - Main power transformers inspection complete with procurement of new transformers in progress

Crane Current Plant Status – Steam Generators

- Steam Generators were replaced in 2009
- Enhanced Once Through Steam Generators (EOTSG) design
 - Alloy 690 thermally treated tubes
 - Stainless steel support plates
- Spring 2024 Inspection Summary
 - Performed in compliance with Technical Specifications, EPRI PWR SG Examination Guidelines, and Constellation In-Service Inspection program requirements
 - 100% eddy current inspection of all in service tubes
 - Visual inspection of primary and secondary surfaces, and previously installed tube plugs
 - No abnormal conditions identified
 - NRC Region I observed inspection activities
- Primary and secondary sides remain drained with secondary sides isolated and in a dehumidified air layup condition
- Anticipate submitting the Steam Generator Inspection Report to NRC in December 2024

Plant Restoration

Constellation is qualified and capable to restart Crane

- Considerable experience previously operating the facility at world class levels
 - Thorough knowledge of plant design and licensing basis
 - Constellation staff understands history of site operations and decommissioning activities
 - Strong Corrective Action and Safety Culture programs continue to be implemented
- Large fleet of resources to staff the project and train the site workforce
 - Includes extensive regulatory and engineering organizations
 - Oversight including Board of Directors reporting and regular Management Review Meetings with Chief Nuclear Officer and nuclear leadership
- Successful management of large projects
 - Peach Bottom Extended Power Uprate
 - Integration and turnaround of Fitzpatrick Clean Energy Center
 - Significant annual capital expenditures
 - Industry best refuel outage execution

Plant Restoration

- Procedures and processes have been developed to evaluate and document restoration activities against expected licensing and design basis requirements
- Key documents include, but are not limited to:
 - Updated Final Safety Analysis Report
 - Technical Specifications
 - Preventive Maintenance & Test Requirements
 - SSC Safety & Seismic Classification
 - Environmental Qualification
- Return to service plans will be created using a systematic evaluation process to identify and prioritize activities for safe and reliable plant operation
- Return to service plans include items such as:
 - Component level and system reviews, maintenance, and testing to establish functionality
 - Re-establishing configuration control using fleet configuration control processes
 - Technical Specification surveillance testing to re-establish full operability of all SSCs
 - Restoration of regulatory required programs (ISI, IST, Fire Protection, Aging Management, and others)

Plant Restoration

- Plant restoration processes will evaluate additional regulatory requirements and obligations to ensure conformance and compliance with current standards, including:
 - 10 CFR 50.155, “Mitigation of beyond-design-basis events”
 - 10 CFR 50.55(a), “Codes and standards”
 - NRC Orders
 - Regulatory Commitments
- Restoring plant equipment or required programs may result in changes to the Operating License or the Updated Final Safety Analysis Report
- When identified, those changes will be evaluated under 10 CFR 50.59 and/or 10 CFR 50.54 to determine if the change requires prior NRC approval

Staffing

- Hiring will occur in three, nine-month, waves over the course of three years
 - Positions were evaluated based on plant restoration to determine hiring priority
 - Hiring includes positions in corporate roles to support plant restoration
- A mix of internal and external candidates will be hired:
 - Former Crane employees, still within the fleet, or external to Constellation, will bring valuable plant knowledge, leadership, and the ability to mentor
 - Other Constellation (non-Crane) employees will bring fleet knowledge
 - External hires will bring diverse experiences and innovative ideas that will further strengthen our workforce
 - Contractors will be utilized to bridge the gap during hiring and onboarding

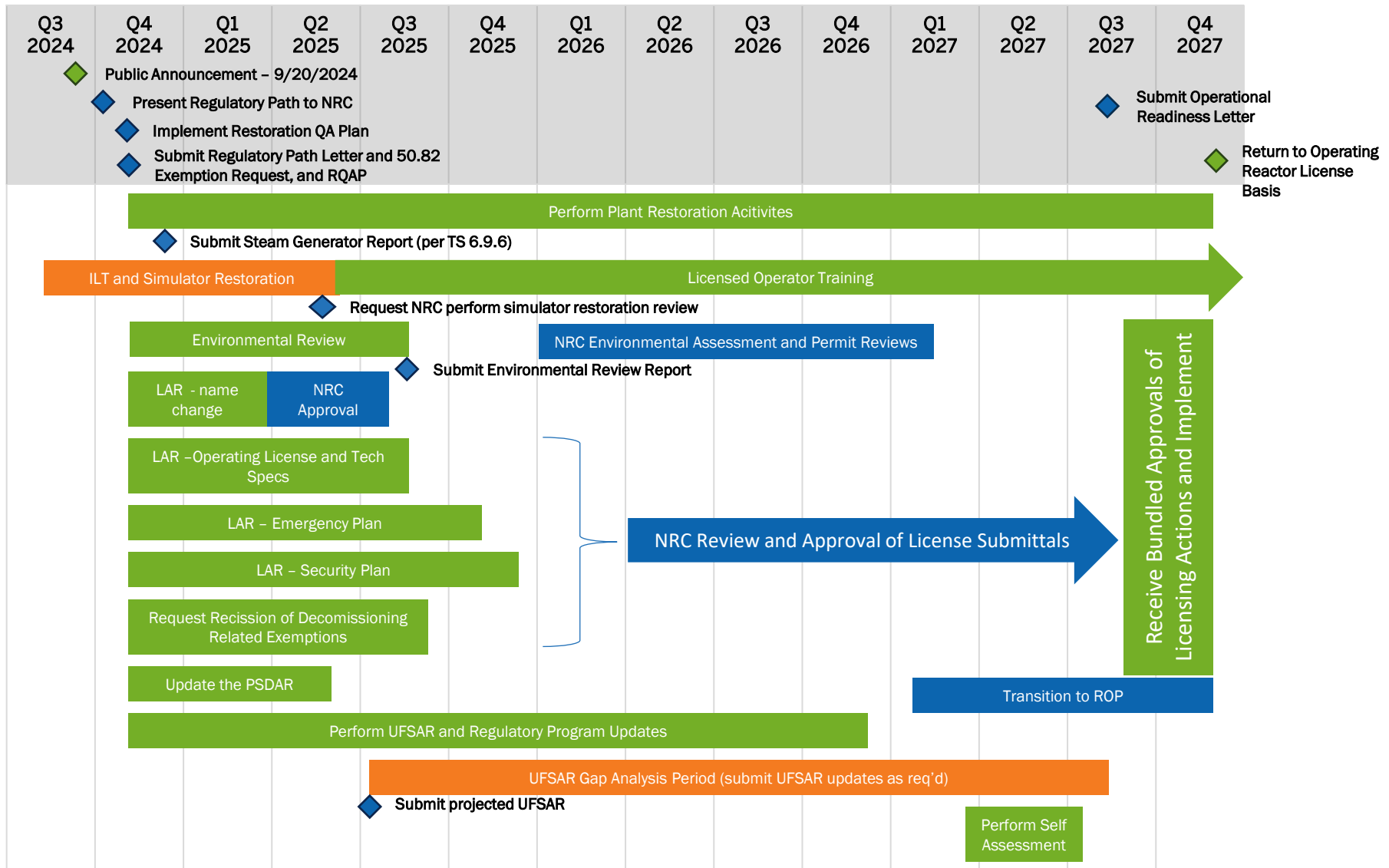
Training Programs

- Fleet processes will provide structure and support to new and returning employees
 - Oversight, governance, and peer-to-peer interaction are available through fleet Corporate Functional Area Manager organizations
 - Orientation and training at all levels of the organization will be available, including new leaders, new supervisors, and technical training
- Training program restoration includes:
 - Operations training, including licensed & non-licensed operator training and simulator fidelity
 - Maintenance and technical training (e.g., maintenance, chemistry, radiation protection, engineering, etc.)
 - Emergency Response Organization and Security training
- Training activities will be coordinated with the Institute of Nuclear Power Operations (INPO) to restore accreditation for Crane Training Programs
- Constellation will return the main control room simulator to its previously certified condition
- Expect to request NRC to perform a simulator restoration review in May 2025

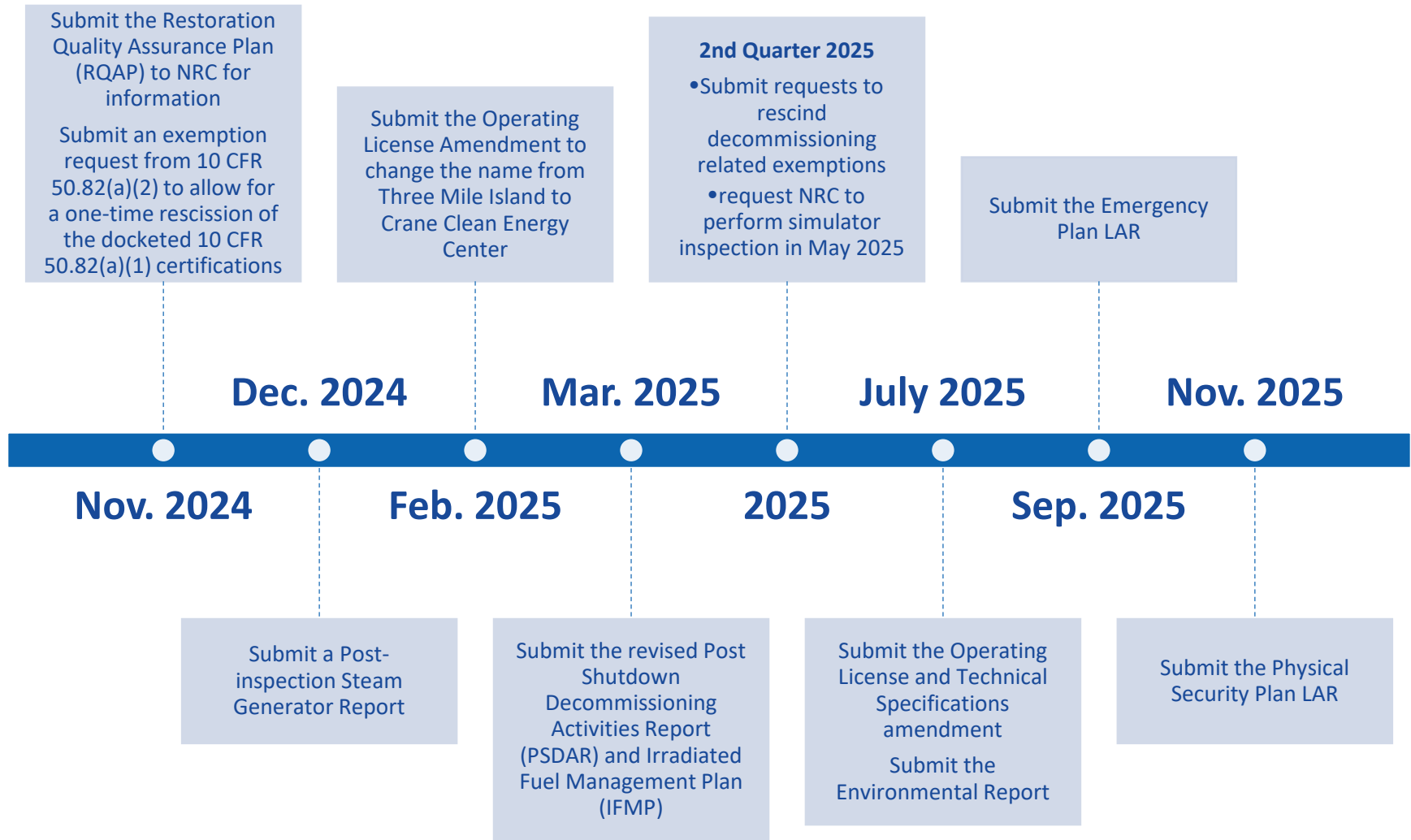
Restoration Quality Assurance Plan (RQAP)

- Prior to shutdown, the Crane Quality Assurance Program was governed by the Constellation fleet Quality Assurance Topical Report (QATR)
- After shutdown, Crane implemented the Decommissioning Quality Assurance Program (DQAP)
- During initial restoration activities and reviews, Constellation determined neither the QATR or the DQAP alone were sufficient for a plant being restored from the decommissioning status:
 - Constellation created and implemented a Restoration Quality Assurance Plan (RQAP) which implements the relevant aspects of both QATR and DQAP
- RQAP will be provided to the NRC in November 2024

Proposed Regulatory Path



Proposed Regulatory Path



Expected Submittals – 10 CFR 50.82(a) Exemptions

- Initial licensing action will be a request for exemption from 10 CFR 50.82(a)(2) to allow for a one-time rescission of the docketed 10 CFR 50.82(a)(1) certifications
 - This exemption will request the removal of the current restrictions that prohibit operation of the Crane reactor and placement of fuel into the reactor vessel
 - Constellation will show that this exemption would meet the regulatory requirements of 10 CFR 50.12, “Specific exemptions”
 - Per IMC 2562⁽¹⁾, submittal of this exemption request will mark the start of the Crane regulatory restart activities
 - IMC 2562⁽¹⁾: *“When a licensee submits a request for exemption from the requirements of 10 CFR § 50.82 to allow placing fuel in the reactor vessel and authorizing operation of the reactor, the Restart phase of the reactor facility inspection program can begin.”*
 - 50.82 exemption request will be submitted in November 2024

(1) NRC Inspection Manual Chapter 2562, Light-Water Reactor Inspection Program for Restart of Reactor Facilities Following Permanent Cessation of Power Operations

Expected Submittals – License Amendment Requests

- Constellation anticipates requesting pre-submittal meetings for License Amendment Requests
- Operating License
 - Change name from Three Mile Island to Crane Clean Energy Center
 - Expected submittal - February 2025
 - Will be requesting review and approval independent of the bundled ORLB approvals
- Operating License and Technical Specifications (TS)
 - Restores TS to NRC approved TS at time of shutdown
 - Reviews TS to ensure alignment with projected license basis
 - Projected UFSAR will be submitted with Technical Specifications to facilitate NRC review
 - Expected submittal - July 2025

Expected Submittals – License Amendment Requests

- Site Emergency Plan (Eplan)
 - Primarily restores the Crane Emergency Plan to the approved Eplan at the time of shutdown
 - Intend to update the Emergency Action Level scheme to NEI 99-01, Rev 7 once approved
 - Expected submittal - September 2025
 - Expect to request NRC and FEMA to perform final emergency plan reviews and evaluations prior to August 2027
- Site Physical Security Plan (PSP)
 - Primarily restores the Crane PSP to the approved PSP prior to shutdown
 - Any changes to Protected Area footprint and perimeter will be analyzed to account for Unit 2 decommissioning activity
 - Reasonable Assurance Protection Time (RAPT) methodology will be used to review and develop security strategies
 - Expected submittal - November 2025

Expected Submittals – Additional 10 CFR 50.12 Exemptions

- Constellation will be requesting rescission of decommissioning related exemptions:
 - 10 CFR 50.82(a)(8)(i)(A) and 10 CFR 50.75(h)(1)(iv) - Decommissioning Trust Funds for costs associated with the dismantlement and disposal of non-radiological components and structures
 - 10 CFR 50.82(a)(8)(i)(A) and 10 CFR 50.75(h)(1)(iv) - Decommissioning Trust Funds for costs associated with Spent Fuel Management
 - 10 CFR 50.54(w)(1) - Reduction of the required onsite property damage insurance from \$1.06 billion to \$50 million
 - 10 CFR 140.11(a)(4) - Reduction of the required primary offsite liability insurance from \$450 million to \$100 million
 - Record Retention Requirements
 - Anticipate submitting the rescission requests in 2nd quarter 2025

Expected Submittals - PSDAR

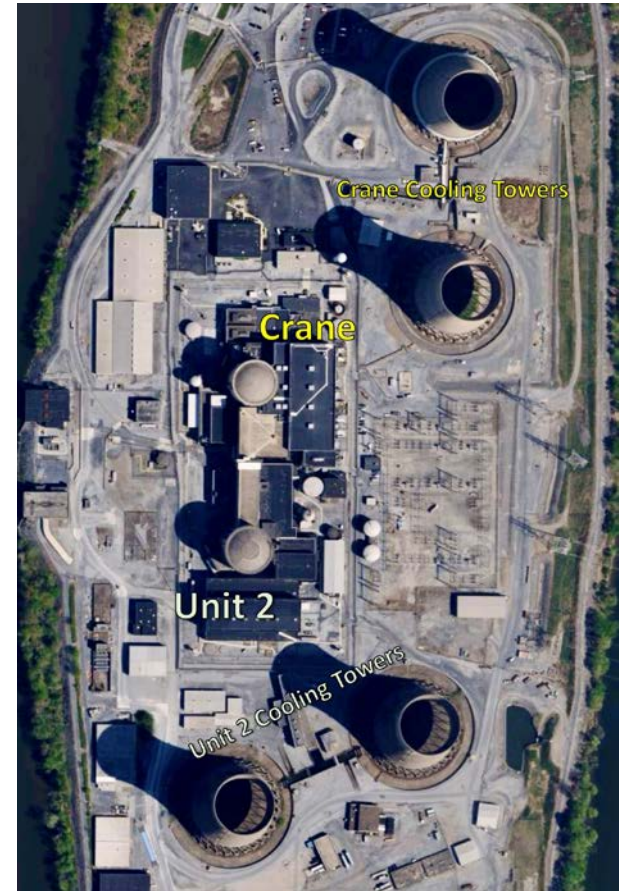
- Constellation will submit a revised Post Shutdown Decommissioning Activities Report (PSDAR) and Irradiated Fuel Management Plan (IFMP)
 - The revision will describe the plan, including schedule and cost, to maintain the spent fuel in the Independent Spent Fuel Storage Installation (ISFSI)
 - In conjunction with this change, Constellation will have further discussion with NRC to ensure Decommissioning Trust Funds continue to be used for Spent Fuel Management consistent with the costs in the revised PSDAR and IFMP
 - No Decommissioning Trust Funds have been or will be used for activities related to returning the plant to operation or restoration of the ORLB
 - Expect to submit the revised PSDAR and IFMP in March 2025

Environmental Review

- Environmental Report
 - Focuses on new and significant environmental information identified since issuance of the Supplemental Environmental Impact Statement for license renewal in 2009
 - Expect to submit the Environmental Report in July 2025
- Constellation anticipates:
 - NRC will conduct an Environmental Assessment (EA) within the final year of the restart project pursuant to its obligations under the National Environmental Policy Act (NEPA)
 - NRC will complete the EA prior to final issuance of a “no significant hazards” determination as required for final approval of Constellation's restoration-related licensing actions
- Work with other State and Federal agencies to obtain or amend environmental permits necessary to restore the facility to operation
 - National Pollutant Discharge Elimination System (NPDES) permit
 - Susquehanna River Basin Commission water use docket
 - Air Emissions Permit

Coordination with Energy Solutions (Unit 2)

- Unit 2 facilities and property under facilities are owned by Energy Solutions – TMI-2S
- An easement agreement controls access to and use of the site that are not owned by TMI-2S
- U2 entered Decommissioning in May of 2023
- Constellation regularly interacts with TMI-2S for awareness and alignment on their decommissioning activities, including understanding any potential impacts to Crane
- Safe and reliable plant restoration and operations is our priority, Constellation will continue to stay engaged with TMI-2S throughout their decommissioning process to achieve these outcomes



Final Approval

- An Operational Readiness Letter verifying completion of activities and readiness to implement the ORLB will be submitted to NRC
- Constellation anticipates submitting the Operational Readiness Letter by July 2027
- Following NRC determination of adequate operational readiness and reauthorization of power operations, Crane will transition to the Reactor Oversight Process
- Upon receiving final authorization for placement of fuel into the reactor vessel, the site will then commence activities to ensure a safe and event free reactor refueling, testing, and subsequent return to power operations

Discussion/Questions