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Decommissioning
San Onofre
Nuclear Generating Station

Canister Downloading

- **Incident Review**
- **Path Forward**

Tom Palmisano

Vice President

Decommissioning San Onofre Nuclear Generating Station

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Tonight: Addressing questions regarding canister downloading incident and re-start

- What happened with canister #29 on Aug. 3 and why
- What happened on July 22 and how does it relate
- What were the NRC's findings (addressed by NRC)
- What has been done to understand the incident
- Have canisters been analyzed for a drop and, if so, what are consequences
- What is the status of canister #30
- Are canister scratches an issue of concern
- What is being done to prevent reoccurrence
- What specific new actions are being taken
- What is the re-start timeline

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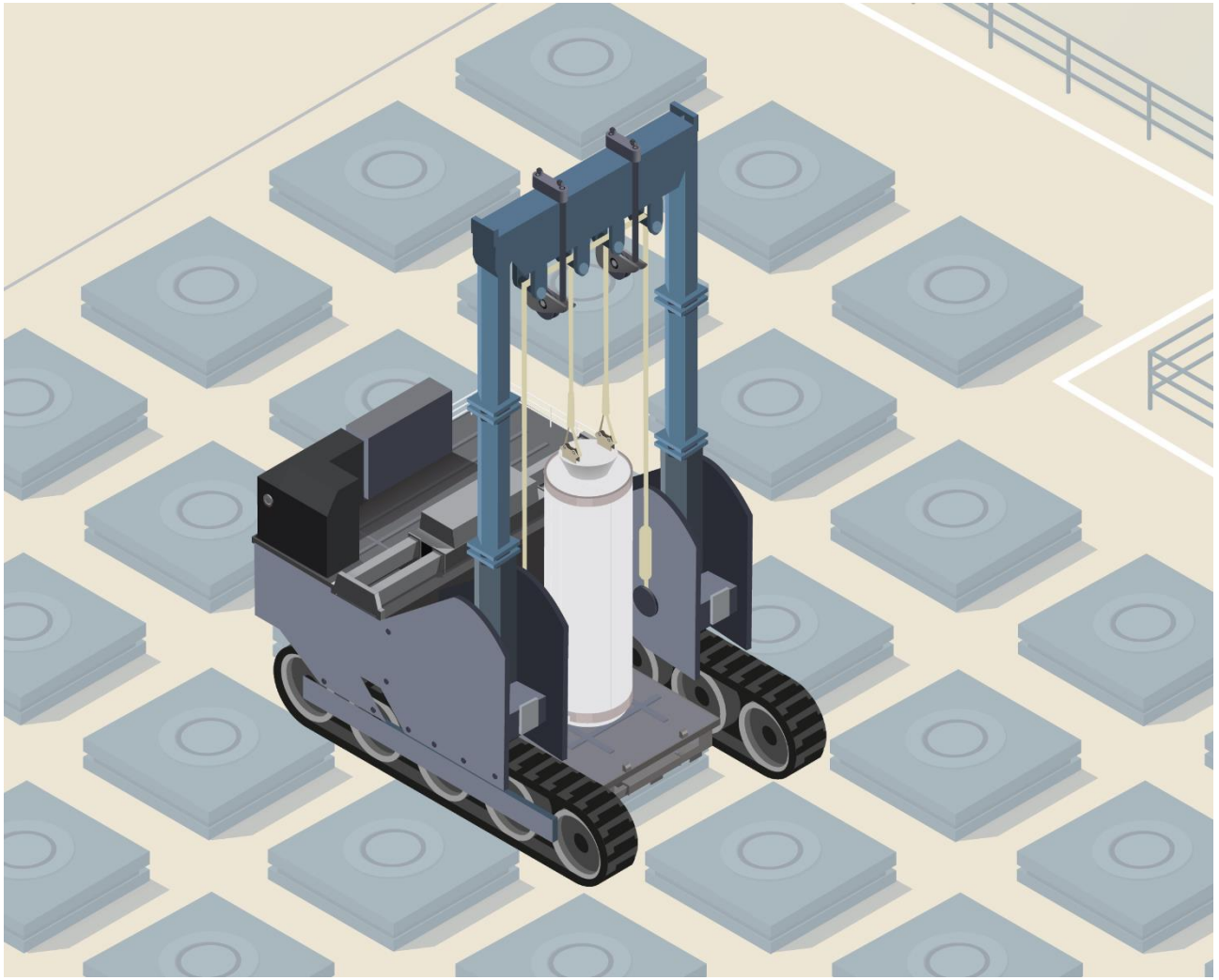
What is canister downloading



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CANISTER INCIDENT REVIEW

What happened on Aug. 3

- Canister #29 wedged on shield ring during download
  - Not supported by rigging, not initially recognized by crew
- Canister safely lowered into final storage position
- Canister analyzed for drop greater than 18 feet and remain intact
- SCE halted work to investigate
- NRC briefed on Aug. 6
- No risk to public health & safety

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What happened on Aug 3

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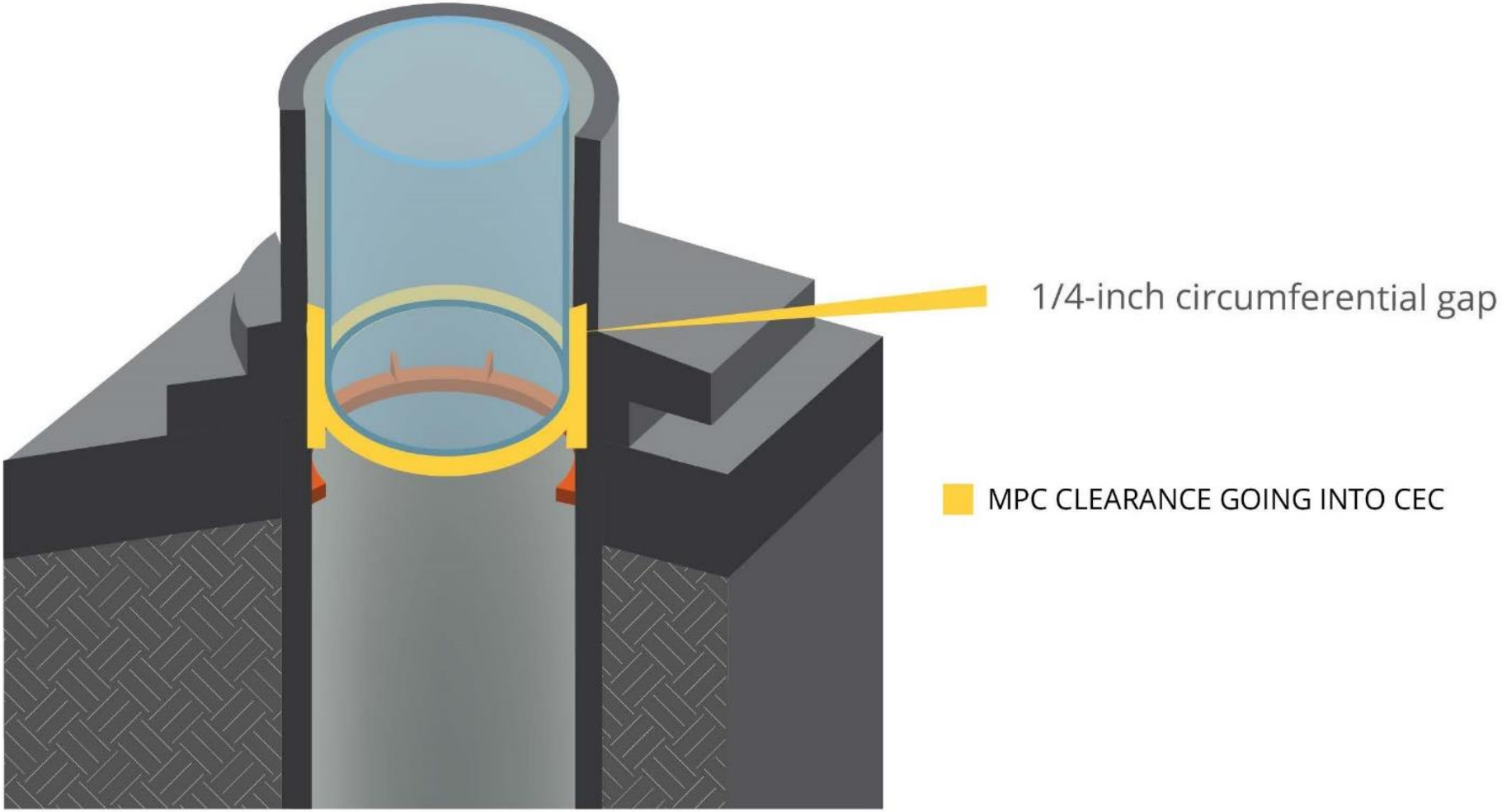
What happened on Aug. 3



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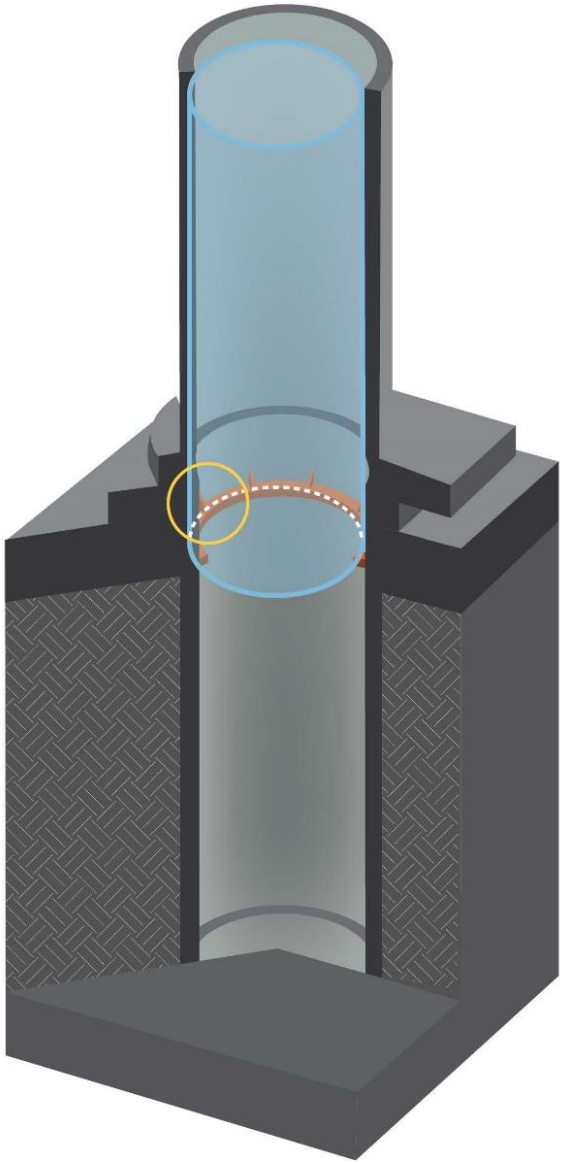
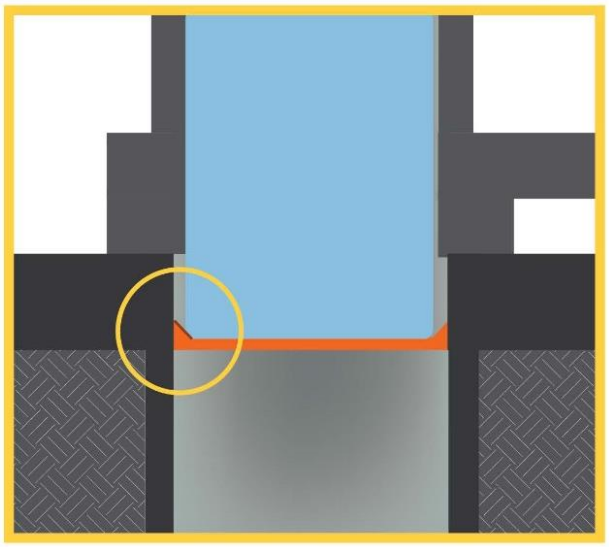
What happened on Aug. 3





MPC WEDGED IN CEC

What happened in July and how does it relate to Aug.3 incident?

- On July 22, 2018, canister contacted inner ring during download
- Crew recognized problem, adjusted, and completed download
- Canister never unsupported and not at risk for a drop
- Team failed to document challenges and learn from experience

NRC Special Inspection

Scott Morris

Deputy Regional Administrator

Region IV

U.S. Nuclear Regulatory Commission

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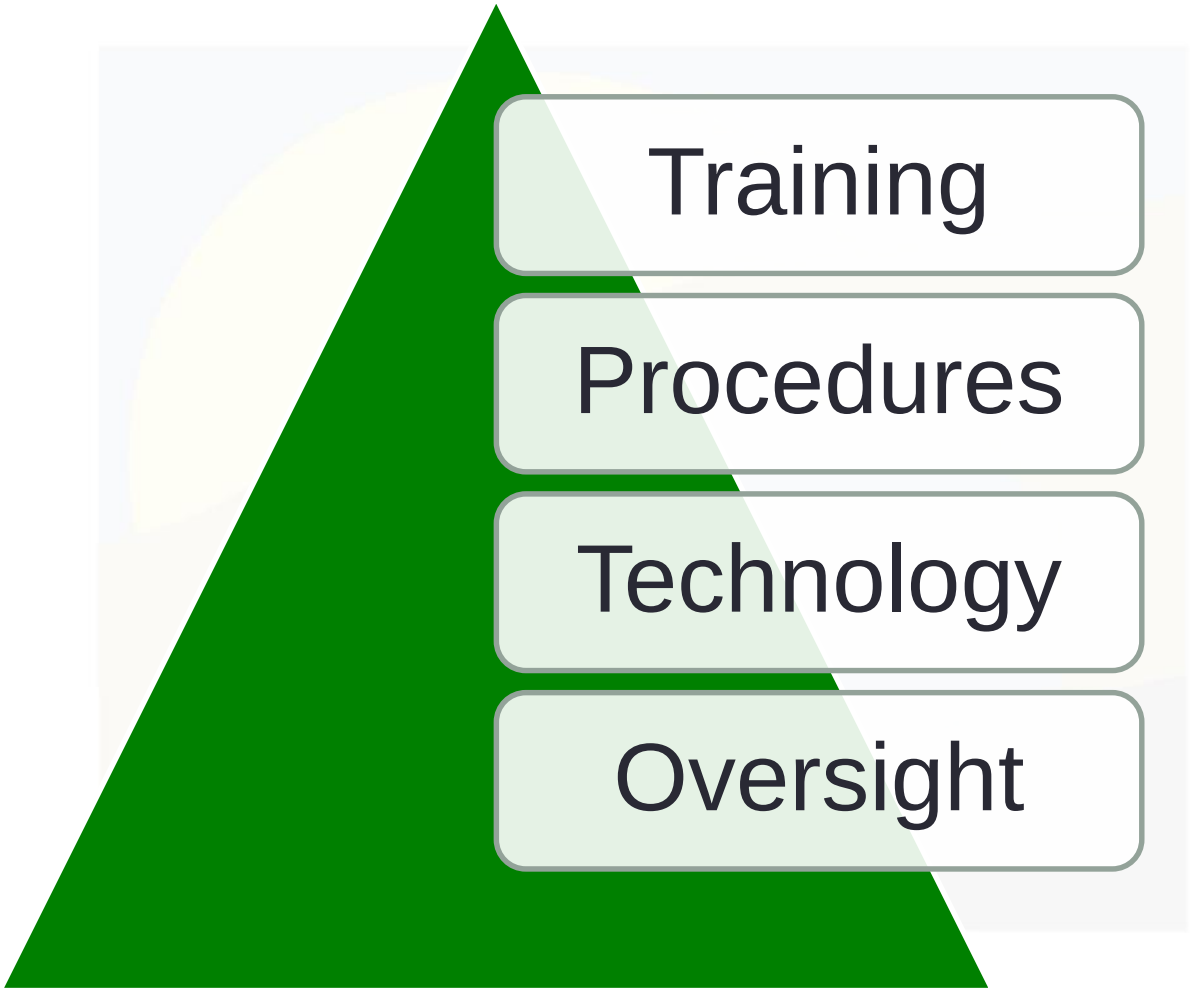
UNDERSTANDING THE INCIDENT

What has been done to understand the incident?

Multiple reviews conducted with third-party support

- SCE and Holtec performed in-depth analyses to identify performance deficiencies and causes
- Third-party Decommissioning Advisor MPR (international engineering firm) provided feedback on analyses
- SCE formed an Independent Readiness Assessment Team comprised of experts in dry cask storage and regulatory compliance

What causes were identified



Have Holtec UMAX canisters been analyzed for a postulated drop?

- UMAX canisters designed and analyzed for drop of up to 25 feet
  - No breach of canister
  - Drop analysis
    - Performed for MPC 37 canister in UMAX structure
    - Drop analysis reviewed by SCE & MPR (third party)
    - Differences between Holtec and 2007 NUREG 1864 analyses:
      - NUREG analyzed a different canister: MPC 68 in NUREG vs. Holtec MPC 37
      - Holtec UMAX MPC 37 canisters absorb energy and are less susceptible to damage
    - NRC continues to inspect the analysis
    - More information on the San Onofre website
- Canister #29 did not suffer a drop
  - After adjusting rigging, canister safely lowered into cavity enclosure
  - No damage to canister, fuel assemblies or fuel pellets

What are the consequences of a hypothetical UMAX canister drop?

- Canister remains intact with no breach / no release of radioactivity
- Inside canister, potential damage to lower portions of some fuel rods (sealed tubes containing fuel pellets)
  - Release of some fuel pellet radioactive products inside canister
  - Safety functions are maintained
    - Canister confinement boundary maintained
    - Adequate cooling
    - Subcritical
- Canister with potentially damaged fuel likely would be shipped offsite at some point
  - Using specially-licensed transport cask

What is the status of canister #30?

- While canister #29 was being lowered into ISFSI, canister #30 was in final preparations in spent fuel pool (SFP) building
  - Canister handling stopped due to incident with canister #29
  - Canister #30 was filled with spent fuel, dried, filled with helium & welded shut
  - Canister #30 in HI-TRAC transfer cask; seismically restrained in SFP building
  - HI-TRAC provides adequate cooling and shielding
  - Canister #30 in full compliance with license requirements

Are scratches to canister exteriors of concern for corrosion?

- Minor scratches due to incidental contact are not a concern
  - Canisters at SONGS fabricated from corrosion-resistant 316L stainless steel
  - Scratches quickly re-form an inert oxide film to protect from corrosion
  - Canisters stored in protective dry shelters with natural circulation air cooling
  - Chloride induced stress corrosion cracking is a long-term phenomenon
  - Holtec UMAX Inspection & Maintenance program starts in 2020
  - AREVA NUHOMS Aging Management Program starts in 2023

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PATH FORWARD

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What is being done to prevent reoccurrence?

Training
Better training programs and re-training crews

Procedures
More detailed proceduers

Equipment
Load monitoring, cameras & alarms

Oversight
More intrusive and effective oversight of operations

Corrective Action Program
More effective to identify lessons learned

What specific actions are different?

Program Element	Actions
Enhanced Training & Procedures	• More specific training • More detailed procedures • Revised downloading alignment & multiple observers
Improved Load Monitoring	• Independent and redundant features to verify load • Telltale monitoring, camera indications & alarms
Enhanced Oversight	• Additional SCE staff with Holtec downloading experience • More specific training for SCE oversight team
Re-Training Crews	• New procedures and load monitoring • More detailed training for new staff
Independent Assessment Team	• Assess procedures, equipment, training & practice runs
Performing Practice Runs	• Validate new procedures, training & load monitoring • Oversight by Independent Readiness Assessment Team
NRC Inspection Activities	• NRC to observe final practice runs

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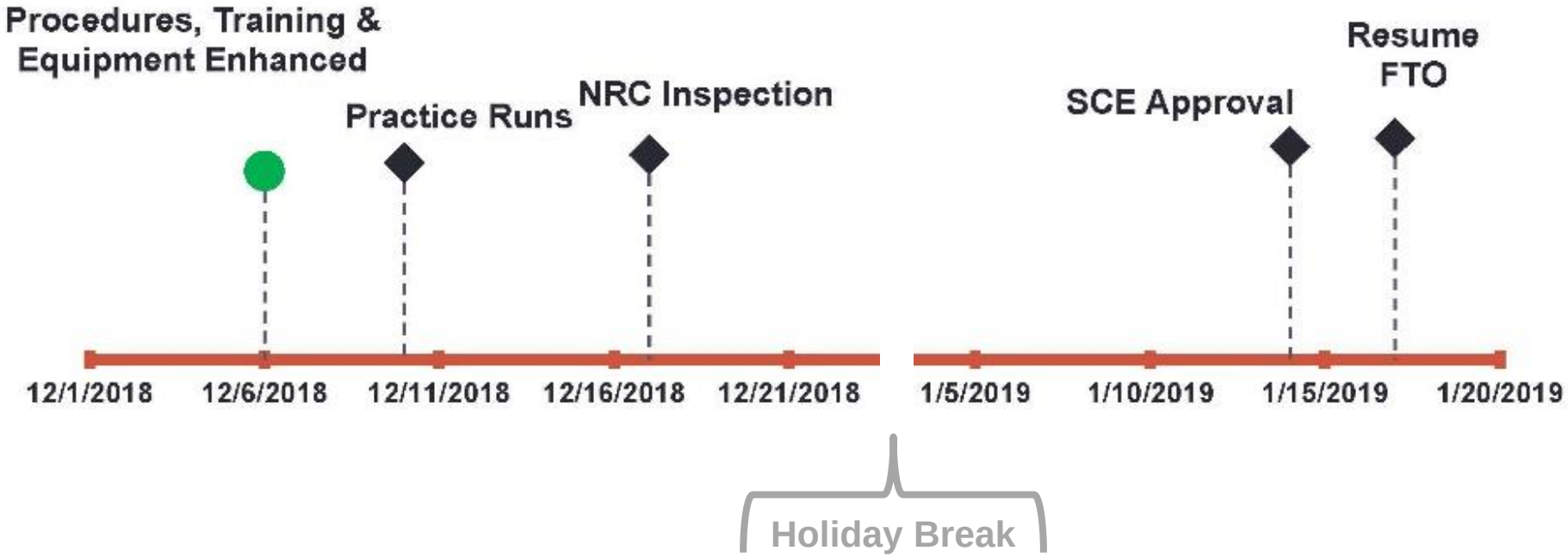
Re-Start Timeline



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Facilitated Public Questions on Canister Downloading Operations

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BREAK

Information Booths Available