



Decommissioning in a Dynamic Environment

A Licensee's Perspective

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EnergySolutions has decommissioning projects at various stages of completion

- LaCrosse
- Zion
- NSS Savannah
- Ft Calhoun
- SONGS
- TMI-2
- Kewaunee



A Licensee's Perspective

- Importance of planning and scheduling regulatory activities
- Leveraging new technologies



Create a Decommissioning Regulatory Schedule

- Prepare a regulatory schedule that includes each licensing and compliance activity for the decommissioning project
- Integrate the regulatory schedule into the site decommissioning master schedule
- Allow ample time for permits or approvals needed from any regulatory agency
- Success is measured by field activities not being delayed by pending permit or regulatory approval



Focus on development of the LTP Early in the Project



- Licensing activities focus on the development, approval and implementation of the License Termination Plan (LTP)
- LTPs have historically taken 2 to 3 years from initial submittal to NRC approval
- Delay in LTP approval may result in work being done at risk
- Separate LTP may be required to obtain State approval to release the site for unrestricted use



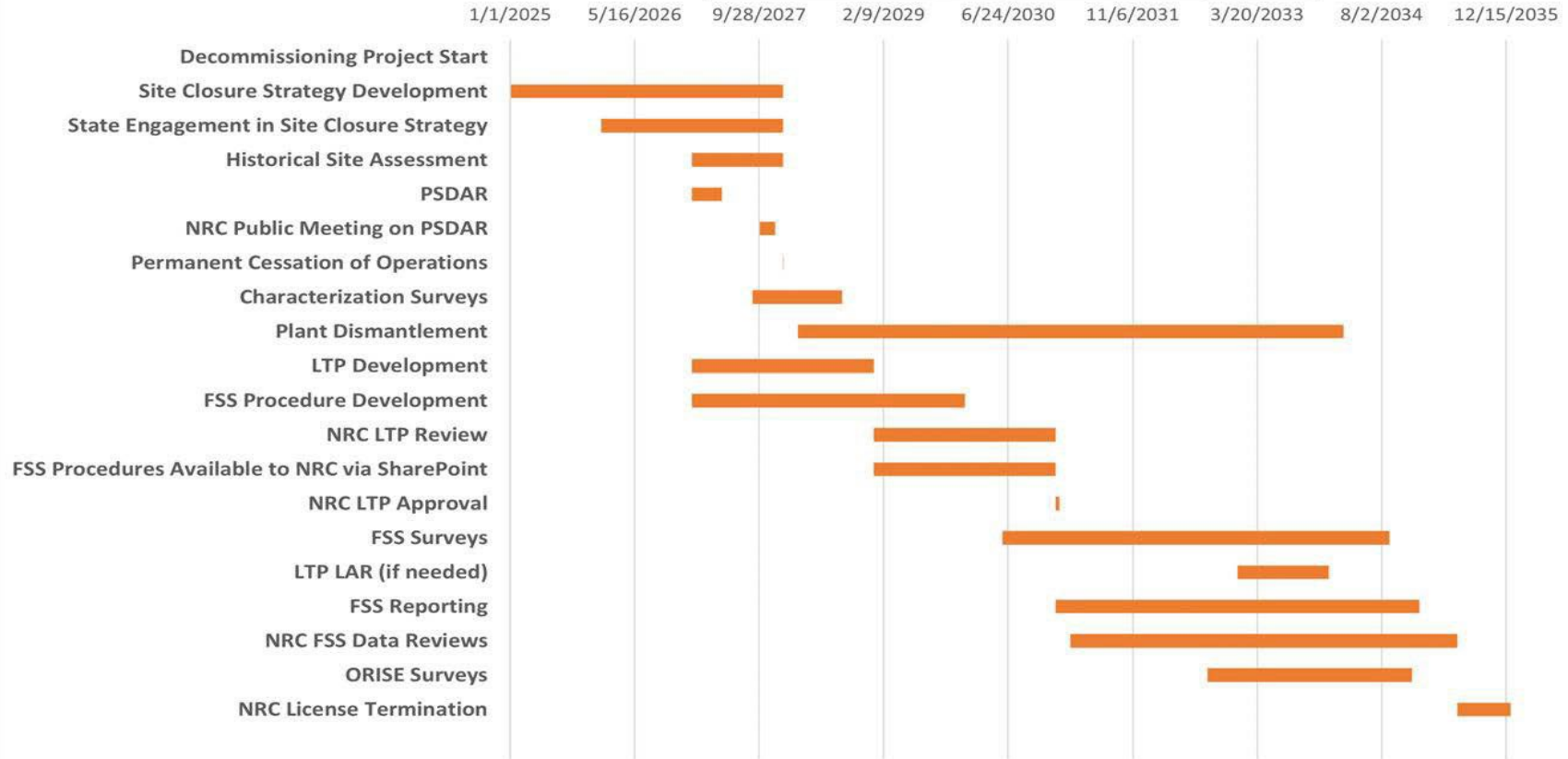
Additional Regulatory Considerations



- Site must also meet the EPA soil and groundwater activity limits for specific radionuclides in order to obtain unrestricted future use of the site by the State
- Existing groundwater monitoring program is replaced by LTP program once the LTP is approved and implemented
- License termination and partial site releases controlled by the LTP process

Decommissioning Timeline

Decommissioning Project Timeline (Typical)



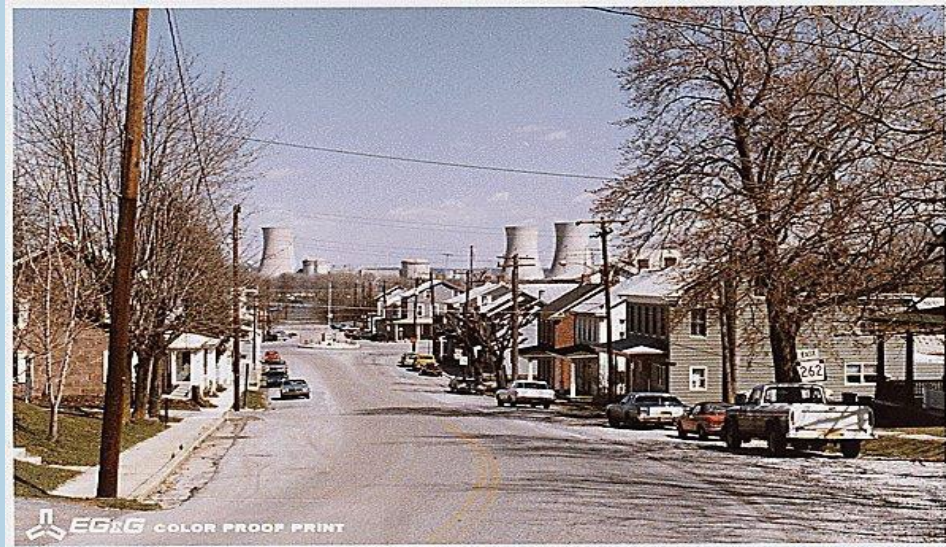
Important to Coordinate NRC Inspections

- Coordinate with NRC and State inspectors on a weekly basis regarding upcoming activities
- Communicate schedule changes as soon as they are known
- Surveys of excavations must be coordinated with NRC inspectors and headquarters staff as these are done “at-risk” before the FSS is completed



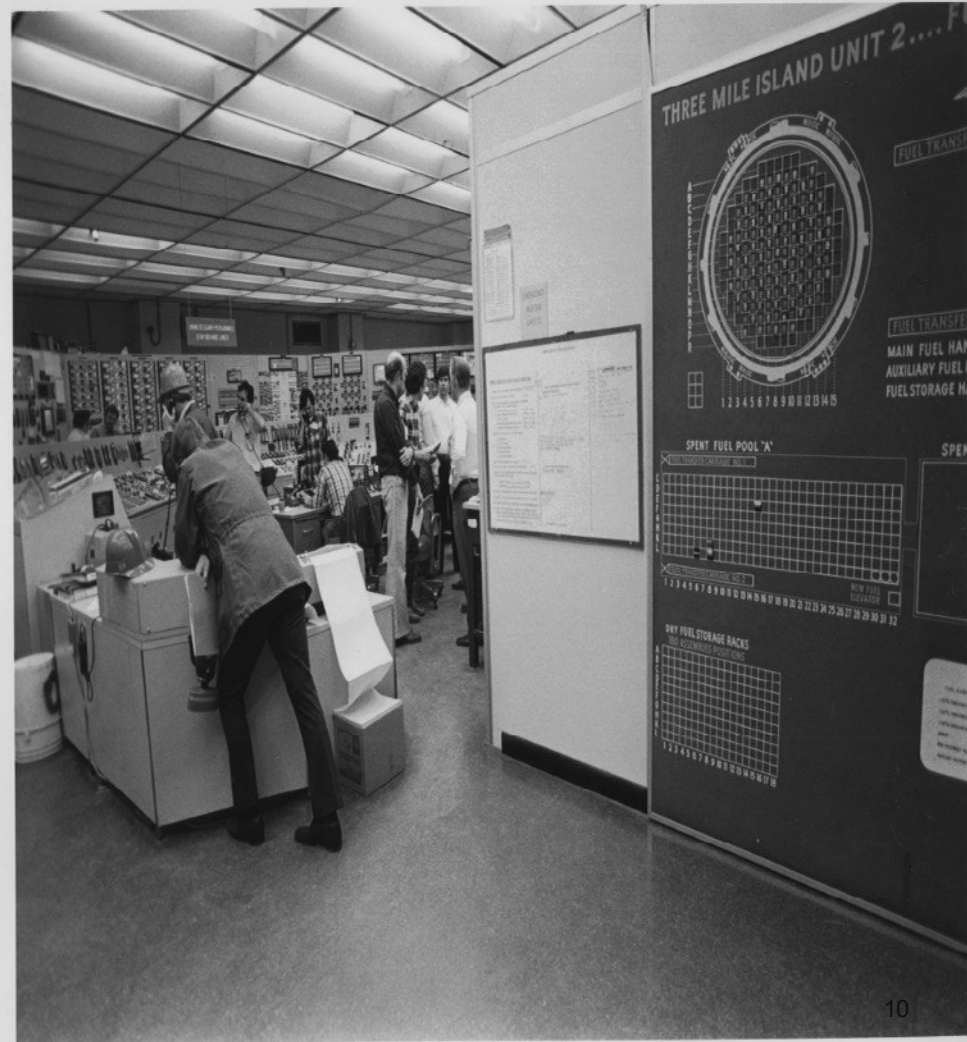
Three Mile Island Unit 2

Leveraging Technology for Safety & Efficiency



At TMI-2, EnergySolutions manages remote field work and uses new technologies to drive low dose performance

- Robotics & Drones
- Scanning & BIM
- Remote Operation & Monitoring
- Chemical Decontamination
- Water Filtration
- Video Monitoring
- RVI Core Barrel Segmentation

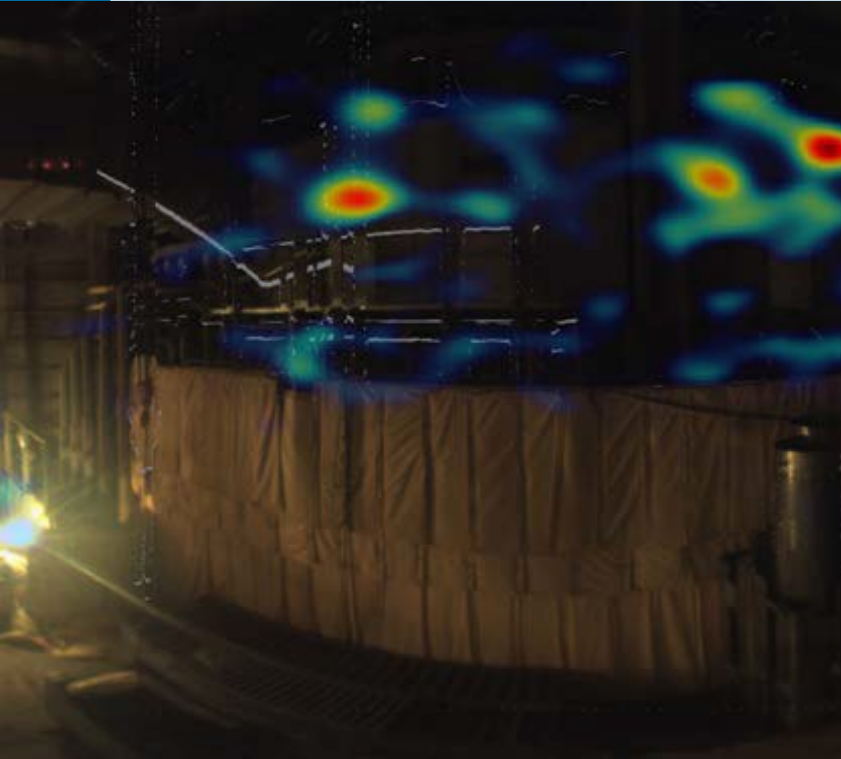


Robotics & Drones



- Unmanned Ground Vehicles (UGVs)
 - Robot from Boston Dynamics
 - Enter high radiation zones
 - Arm to manipulate environment
 - Survey payloads integrated to the robot
- Drones – Unmanned Aerial Vehicles (UAVs)
 - Video and radiation survey of entire Reactor Building

Scanning & BIM



- Building Information Model (BIM)
 - Complete model of the island based on as-builts
 - Coordinate installations of equipment and infrastructure
 - Updated as systems are decommissioned
- Radiation and 3D Survey Combo Model
 - Model built from as found conditions
 - LiDar 3D scanning of entire Reactor Building
 - Radiation heat map showing hot spots
 - Guide for future dose reduction

Remote Operation & Monitoring

- **Integrated Command Center (ICC)**
 - Remotely monitor radiation dose and field work from command center
 - 2-way communication from worker in field to stakeholder in office
- **Remote Operation of Equipment**
 - SPOT, Demolition Robots, Polar Crane
 - Reduce worker radiation and industrial safety exposure



Additional Applications

Chemical Decontamination

- Potential to significantly reduce dose in the RCS with little dose expenditure

Water Filtration

- Significantly reduce amount of HLW

Video Monitoring

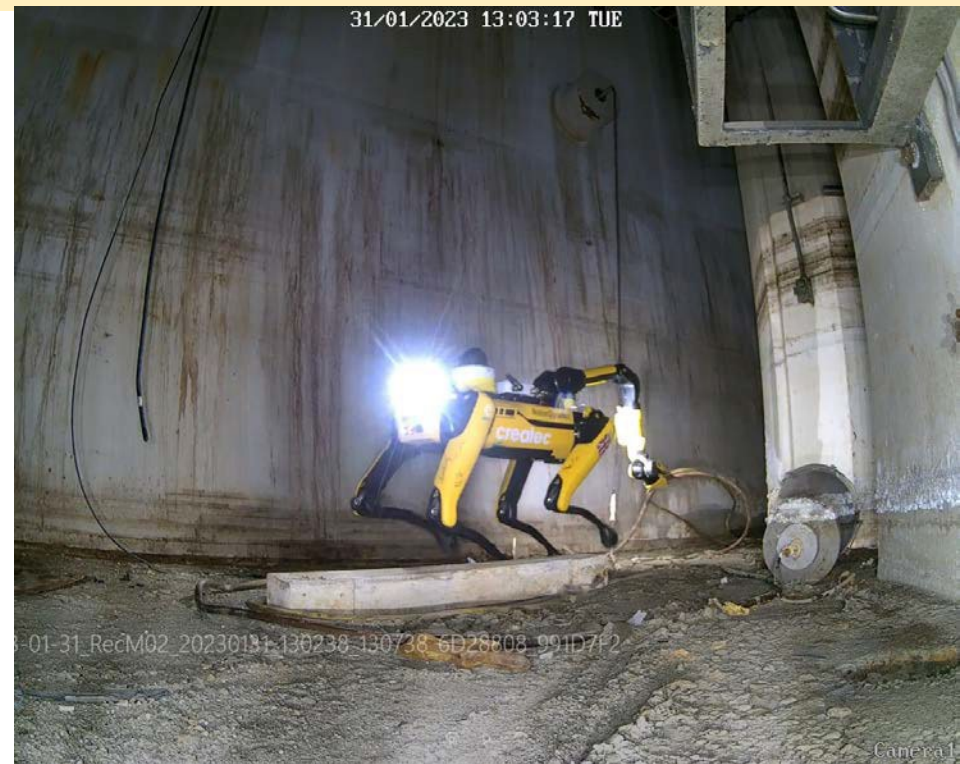
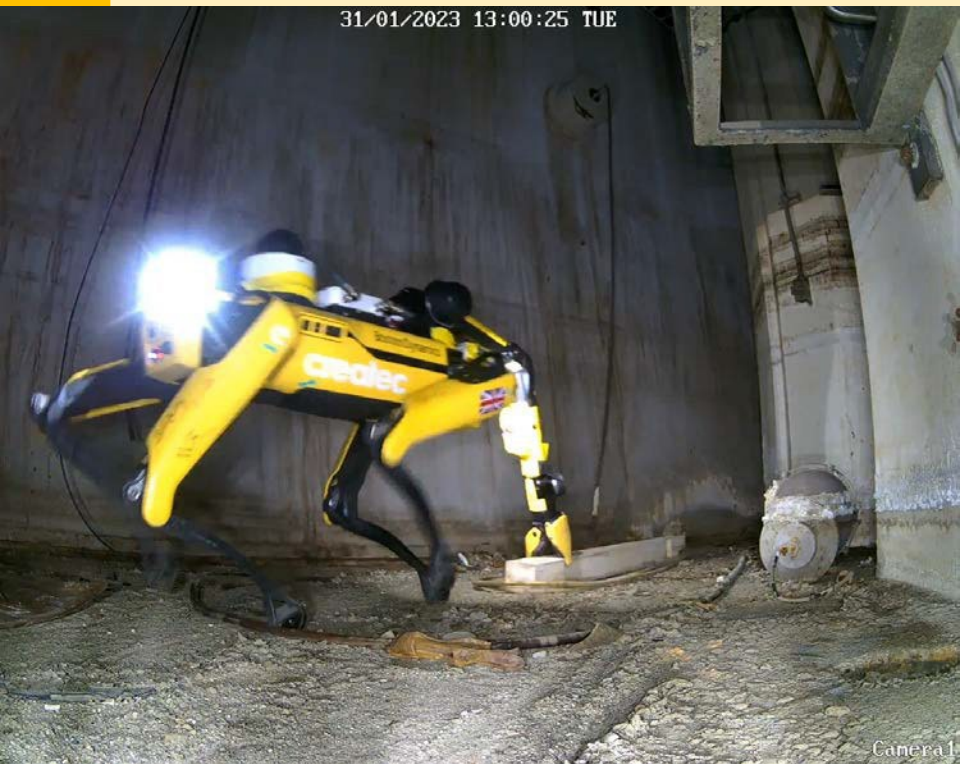
- Easily deployed cameras hosted on internet provide live viewing of work surface from anywhere

RVI Core Barrel Segmentation Inside Vessel

- Reduce risk and dose of core barrel removal



SPOT in Action at TMI-2





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TMI-2 Reactor Building Basement

