

# Vermont Yankee: 620MWe GE Boiling Water Reactor with Mark I Containment

## Facility Size:

Vermont Yankee Site total property is ~ 143 acres

- Original Operating Protected Area = 12 acres
- Interim Spent Fuel Storage Installation (ISFSI) total area ~ 6 acres
  - ISFSI Protected Area 1.3 acres

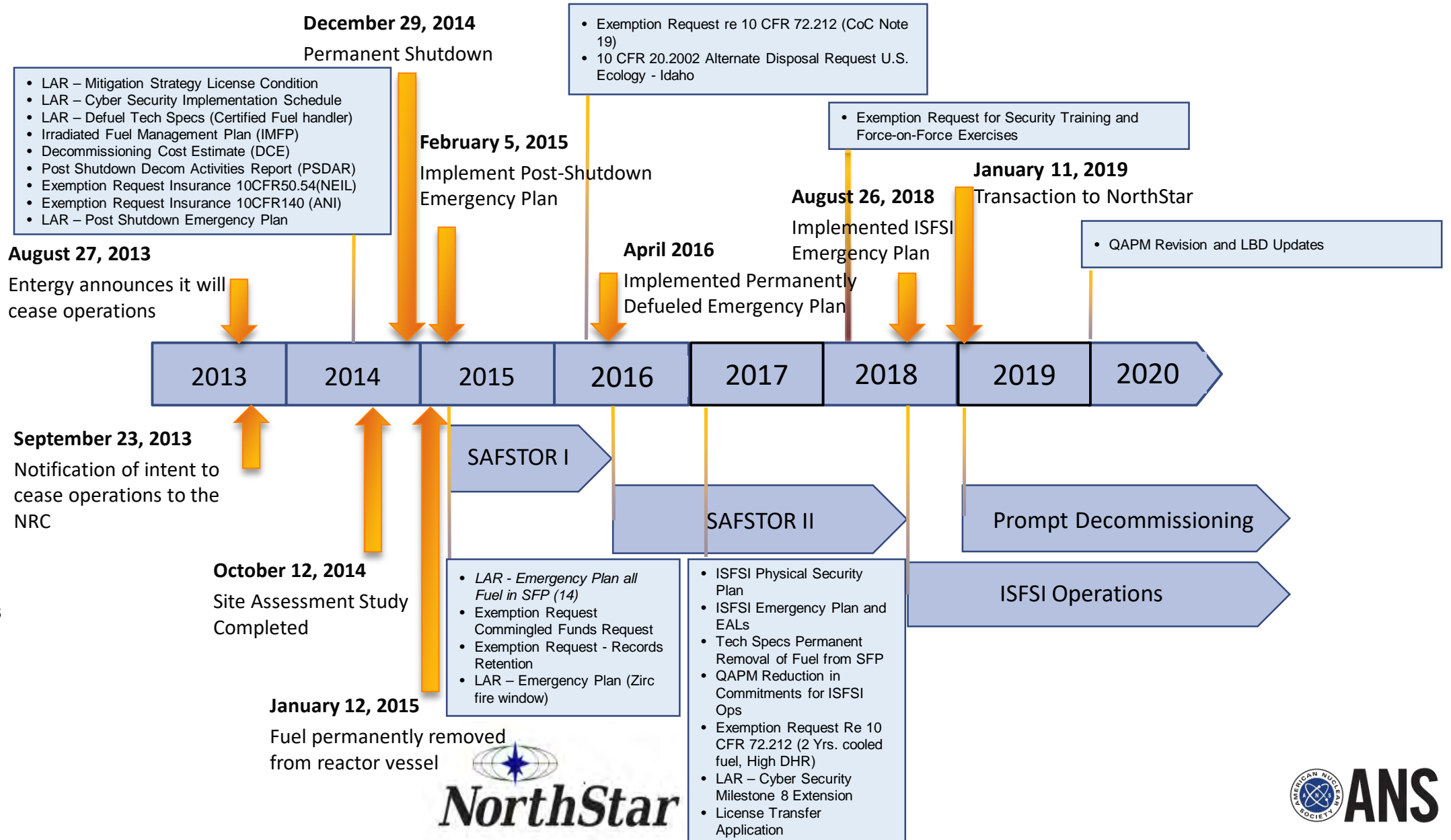
**SAFETY** with all we do: Target Zero (🚫 accidents)

Radiological, Environmental, Industrial, Nuclear

**Do it right. Do it safe.**



# Vermont Yankee Shutdown/Decom Timeline



Commercial Operations began in 1972

# VY Pre-Transaction Work / Preparation / Schedule adjustments

- Vermont State and Local Stakeholders/Intervener involvement necessitated significant effort by NorthStar to gain collaborative approval for sale/license transfer of VY from Entergy to NorthStar (ref MOU's/VT Docket 8880)
- Original Transaction target date slipped by approximately 4-5 months awaiting approval by VT State PUC
- Site configuration required multiple adjustments for logistical preparations to accommodate efficient bulk material transportation and equipment interim storage/laydown areas (VY Protected Area is a small footprint)
- Schedule compression for Dry Fuel Storage campaign/ISFSI construction/commissioning to meet transaction timing target challenged other Pre-Transaction Prep Work (Primarily the Spent Fuel Pool rack removal/cleanout and demobilization of RFF from DFS campaign)
- Transfer of all permits (environmental/operating/discharge, etc.) with transaction arrangement was complex and took significant effort/coordination with associated State Agencies



# Refuel Floor Preparation & Infrastructure adjustments

Empty & Clean Spent Fuel Pool



HTS construction/pad



Rail Refurb/Spur Addition



Demo of Office Building



Custom Box storage area

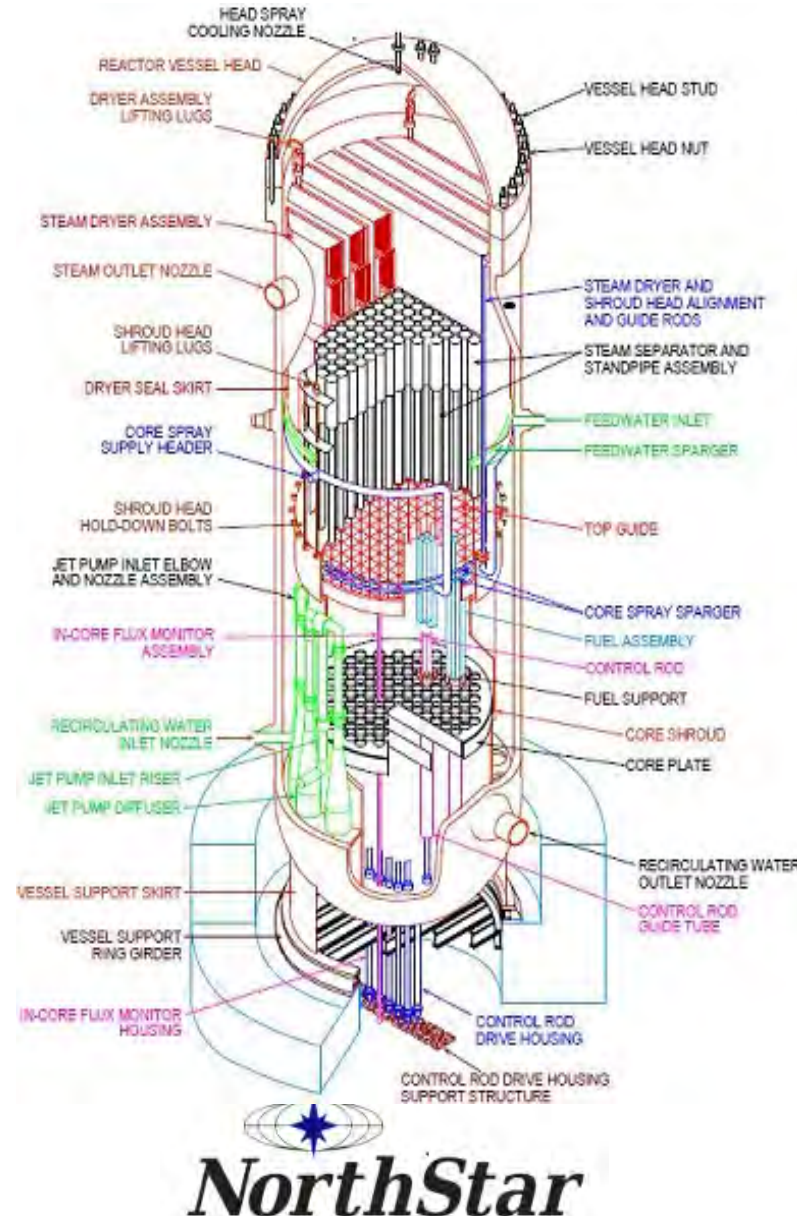


Temp Structure Erection



# GE BWR (3/4) Reactor & Internals Removal

- Detailed 3-D modeling and surveys conducted in containment of reactor and associated components allowed optimization of cutting and packaging plans
- Specialized tooling of multiple varieties have been developed and proven for optimizing cutting process
- Cutting and packaging work broken into “sequences” started at the top of the vessel and working downward



- 17 Custom Boxes fabricated in 11 different sizes for VY project
- Precise geometries are obtained during cutting
- Most cutting operations performed underwater
- Many components were already removed during Safstor Preps (fuel, control rods, instrumentation, etc.)

# Reactor Vessel Segmentation Update

Reactor Head **DONE**  
Steam Dryer **DONE**  
Steam Separator **DONE**  
Shroud Head **DONE**  
Feedwater Sparger **DONE**  
Top Guide (Upper Grid) **DONE**  
Guide Tubes **DONE**  
Core Plate **DONE**  
Shroud Cylinder **DONE**  
Jet Pump Assemblies **DONE**



## Next Steps

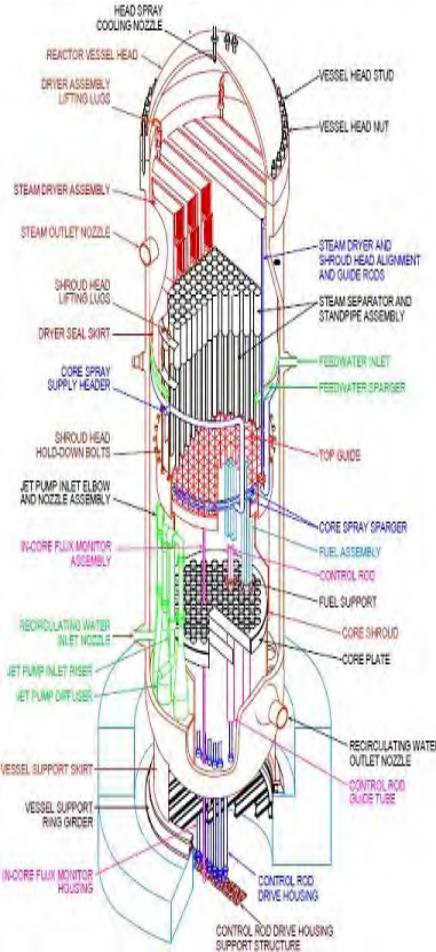
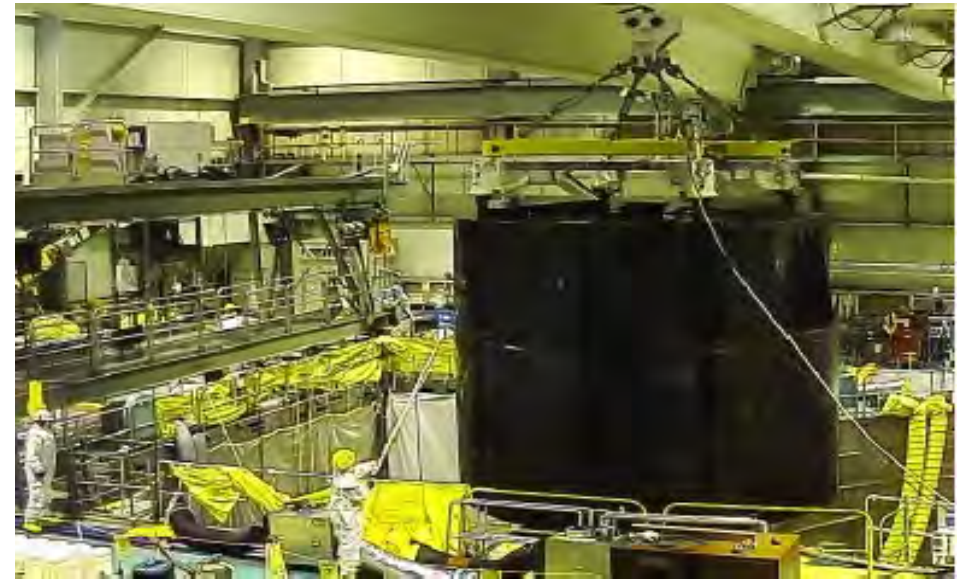
Final packaging of Jet Pump Diffusers ongoing.

Preparations commenced for:

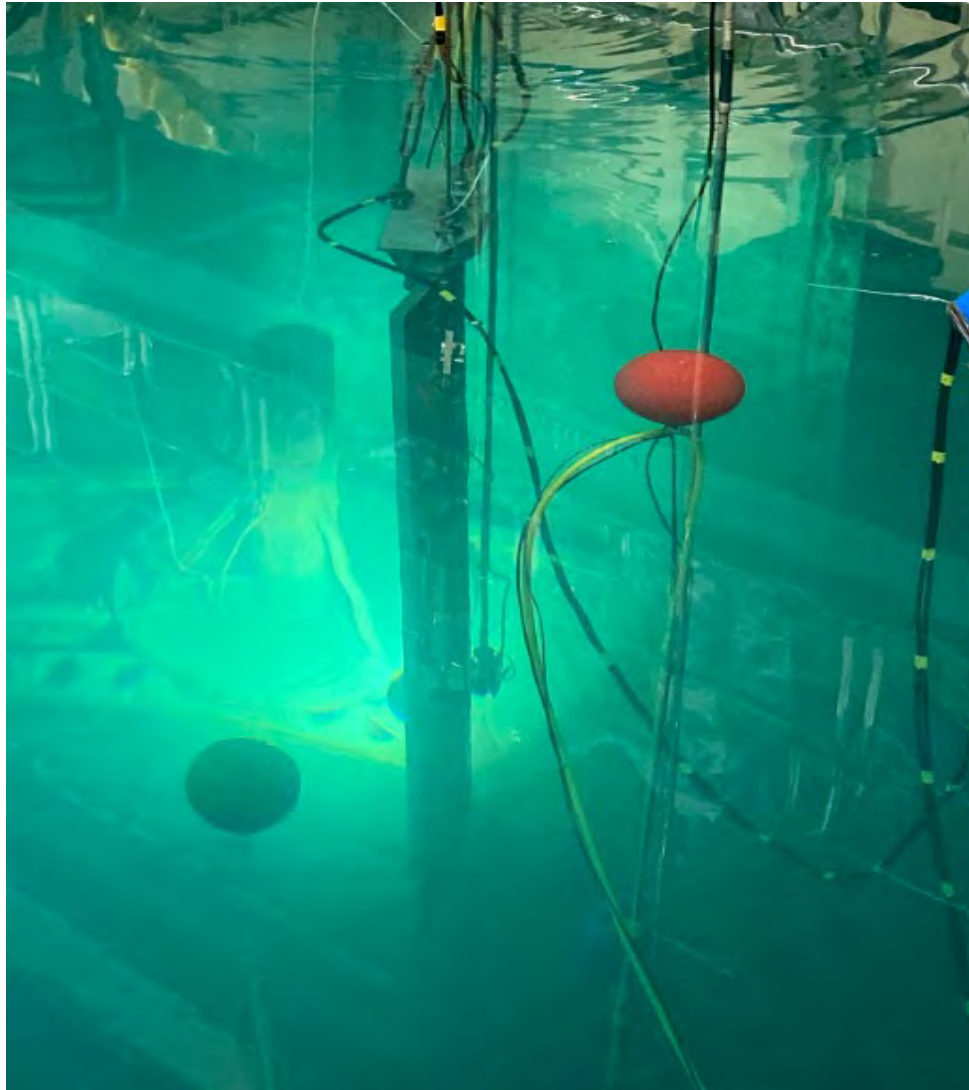
1. Reactor Vessel drain down
2. Cutting of Nozzles
3. Reactor Vessel Segmentation



# Segmentation of VY Reactor and Internals

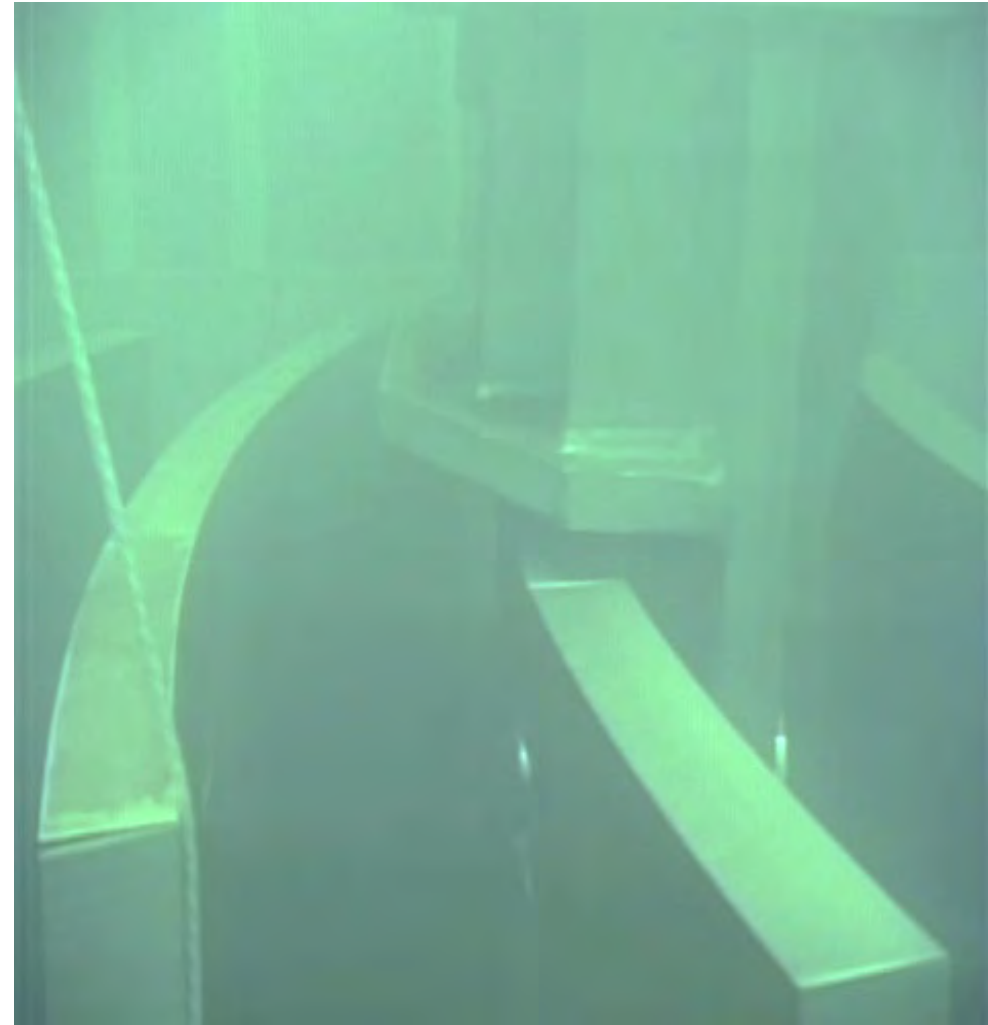


# Core Shroud Segmentation / Underwater Operations



Shroud Segment (more than 13ft tall)

Placing last Shroud Segment into storage rack





# Reactor (Jet Pump) Segmentation Operations



Jet Pump Diffuser removal



Jet Pump D/P Instrument Piping removal

# Reactor Vessel Segmentation Operations



Jet Pump Inlet Riser Pipes are 13 feet long and segmented with specialty cutting tools

# Refuel Floor Activities

Demobilizing to make room for next sequence activities



Removing the racks that once held Core Shroud segments in the Spent Fuel Pool, as they are no longer needed



Racks decontaminated and packaged for shipment

# Cask Transfer Operations

(1) Out of the Reactor Cavity/SFP



(3) Ready to “down-end” onto Transport Trailer



(2) Down from the Refuel Floor



# Cask Transfer Operations

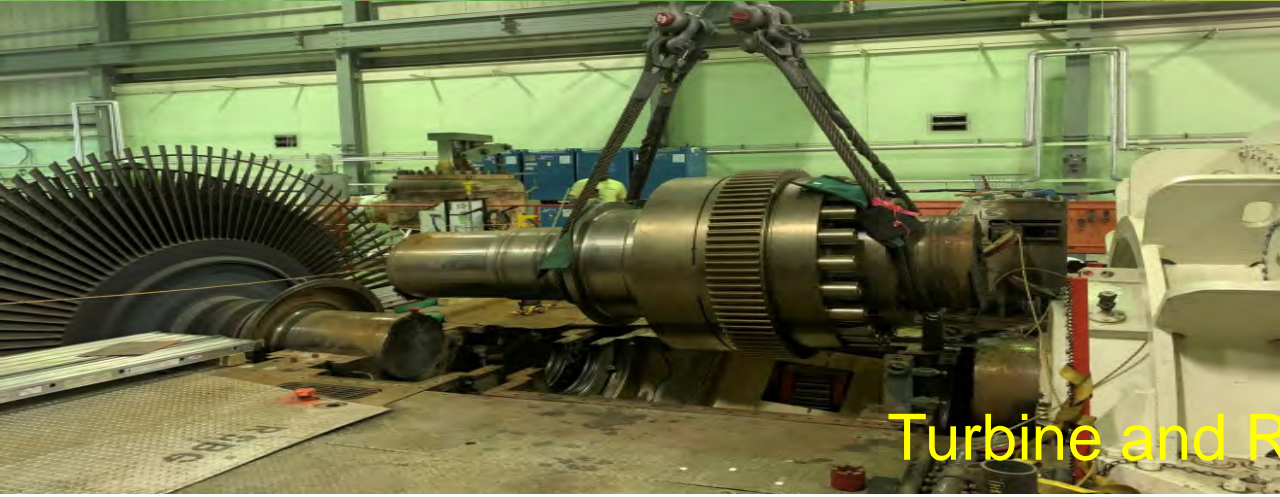
(4) Moving loaded Transfer Trailer with the “Tugger”



(5) Transfer into the HTS (Storage Vault)



# Dismantling the Steam Plant



Turbine and Rotor Removal

09/12/2019 10:55

# Steam Plant Piping & Component removal

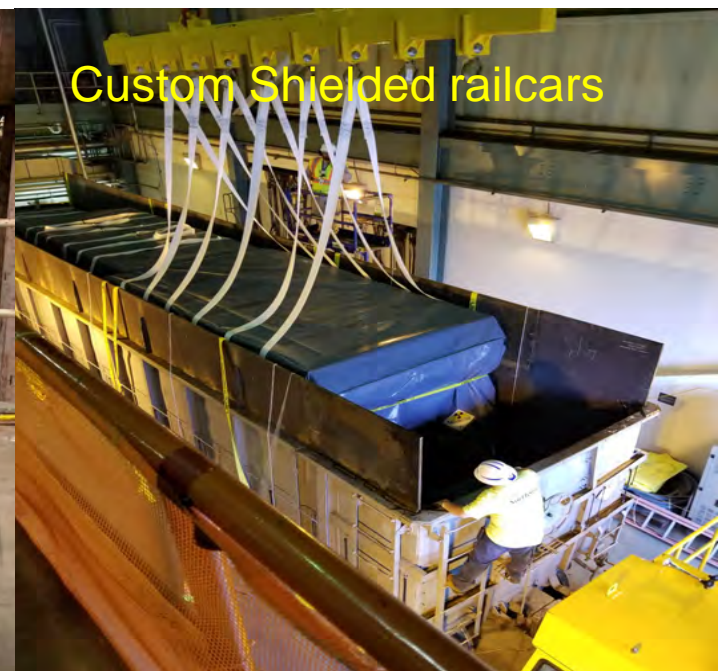
Small dedicated demo teams at work



Stop Valve Acuator Removal



Custom Shielded railcars



24 Yd Super Sack filled for transport



Feed Htrs sawed in half



Staging/Prepping Htr pieces for shipment



# Removing Condensate Demineralizers





# Main Condenser Demo nears completion



# Turbine Building (Heater Bay) Empty



# Epoxy Floor Coating Removal in Turbine Building



# Creating new access hatchways for RadWaste Bldg Demo

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# RadWaste Bldg Demo/Tank Removal



# Demo for Warehouse/Office & AOG (re-cap from 5/4/20)



# Warehouse and Maintenance Office Structure Demo



# Warehouse/Maint Office Structure Debris Removed





# AOG Structure Demo



# AOG Structure Demo



# Admin Building Demo Preps



Relocation of personnel, removal of all furniture, materials, universal waste, & structural separation from service building in preparation for demolition

# Admin Building Demo in progress



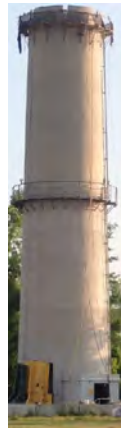
# 500,000 gal Condensate Storage Tank Demo



# Stack Demolition

5/20/21 through 6/23/21

(Zooming in)



7/13/21  
completed  
Stack Demo  
from 100' to  
ground with  
NorthStar Hi-  
Reach  
Excavator



## Other Infrastructure Adjustments



# Transportation of waste to WCS in Texas





# Shipping and Material Volumes as of 9/20/21

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- Currently shipping about 3 rail cars per week to WCS (106 shipments consisting of 89 railcars and 17 trucks shipped YTD / about 13 per month)
- Total Number of Shipments to Date: 320
- Total Volume 677,300 ft<sup>3</sup> (25,086 cyd)
- Total Weight 34,520,000 lbs (17,200 tons)
- Total Activity 25,850 curies



# NorthStar Target Zero ( Accidents) Do It Right. Do It Safe.

**>1,100,000 hours worked (and counting) at Vermont Yankee without a Lost Time Accident**

**No Regulatory violations (cited or non-cited) have occurred since ownership transfer**

- NorthStar is highly committed to maintaining a strong bias for conservatism through our Target Zero approach to Nuclear, Radiological, Industrial, and Environmental Safety.

Decommissioning is a creative and rapidly changing business.  
NorthStar is committed to continuous learning:

- We realize the value of partnering early with utility/host sites to conduct effective due diligence and create a mutual success path.
- We embrace the integration of a small knowledgeable workforce from host sites to leverage talent and sustain momentum from Shutdown/Defuel/DFS into Decommissioning.
- We actively engage ALL stakeholders early in process to develop trust, confidence, and mutual success.

