

# Decommissioning Lessons Learned



## NorthStar Vermont Yankee Project

May 2, 2023



## VY Site info/size

VY: GE 3/4 BWR with Mark I Containment

Constructed 1967–1971 Operation 1972–2014

Original design 1592 MWt (540MWe) uprated in 2006 to 1912MWt (620MWe)

Vermont Yankee has a small footprint compared to many commercial nuclear facilities:

Site property is approximately 140 acres

Original Operating Protected Area is 12 acres

ISFSI Protected Area 1.3 acres

# Vermont Yankee Timeline



Commercial Operations  
began in 1972

**December 29, 2014**

Permanent Shutdown

**January 11, 2019**  
Acquired by  
NorthStar

**August 27, 2013**

Entergy announces it  
will cease operations

**February 5, 2015**

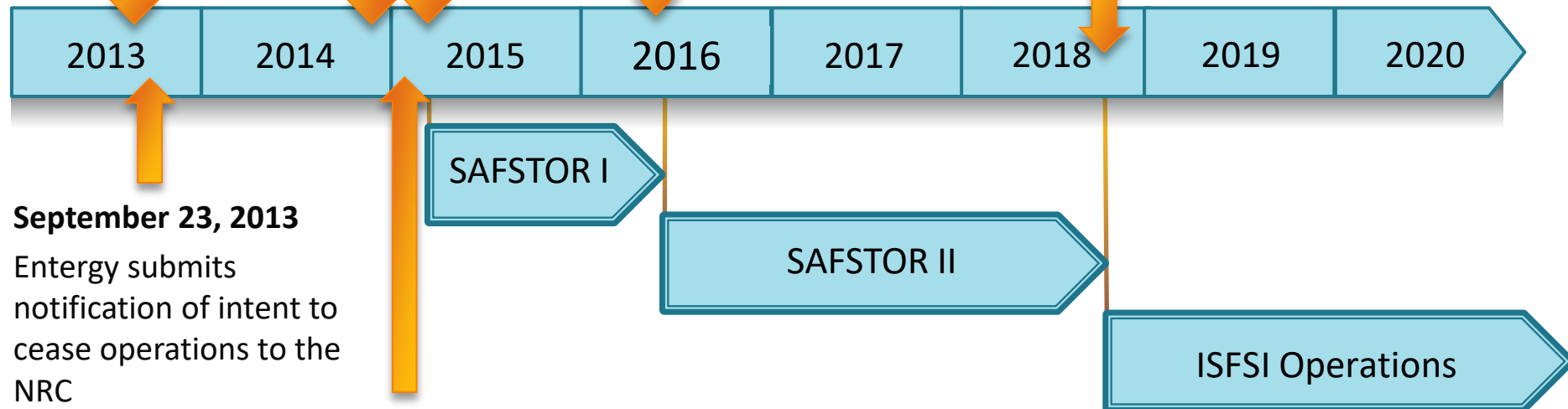
Implement Post-Shutdown  
Emergency Plan

**April 2016**

Implemented  
Permanently Defueled  
Emergency Plan

**2018**

Implemented ISFSI Emergency  
Plan



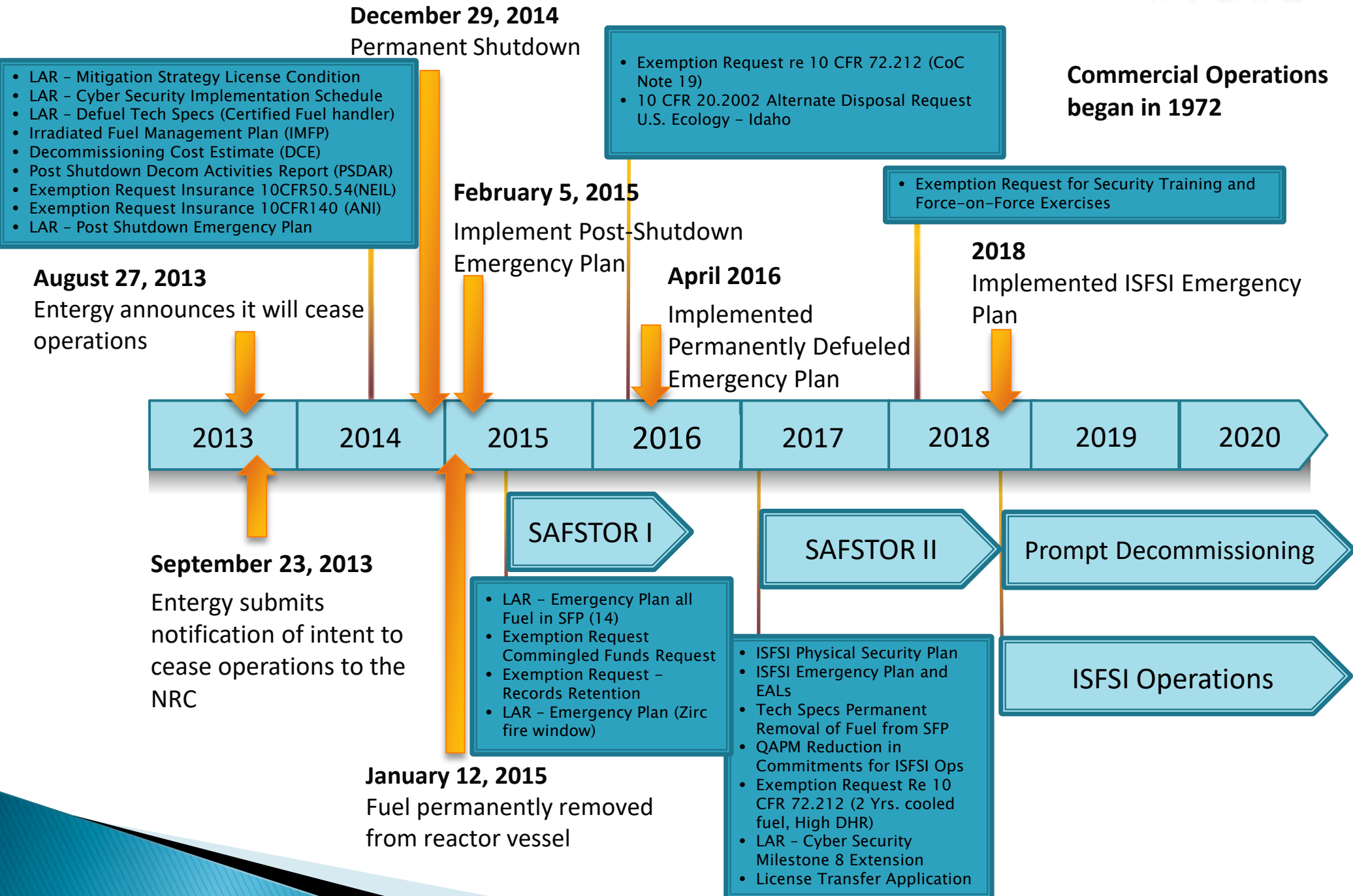
**September 23, 2013**

Entergy submits  
notification of intent to  
cease operations to the  
NRC

**January 12, 2015**

Fuel permanently  
removed from reactor  
vessel

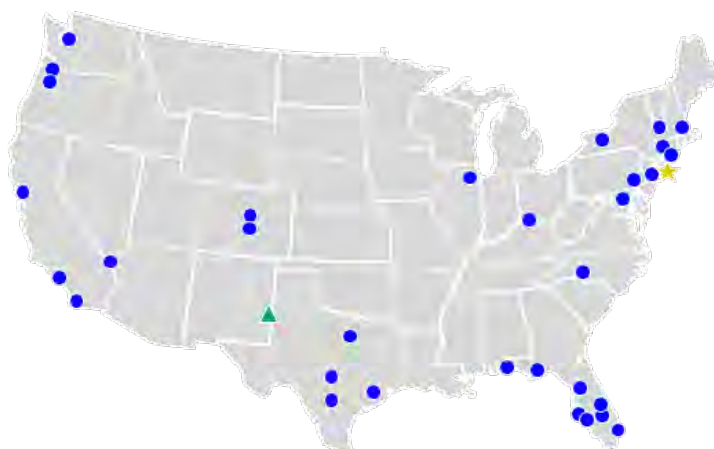
# Vermont Yankee Timeline



# NorthStar Group Services, Inc.

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## Nationwide Branch Network



**Corporate Headquarters – New York City**

### Regional Offices:

Austin, Boston, Chicago, Cincinnati,  
Dallas, Denver, Los Angeles, NYC/New  
Jersey, Houston, Orlando, Philadelphia,  
Portland, San Francisco, Seattle, Tampa

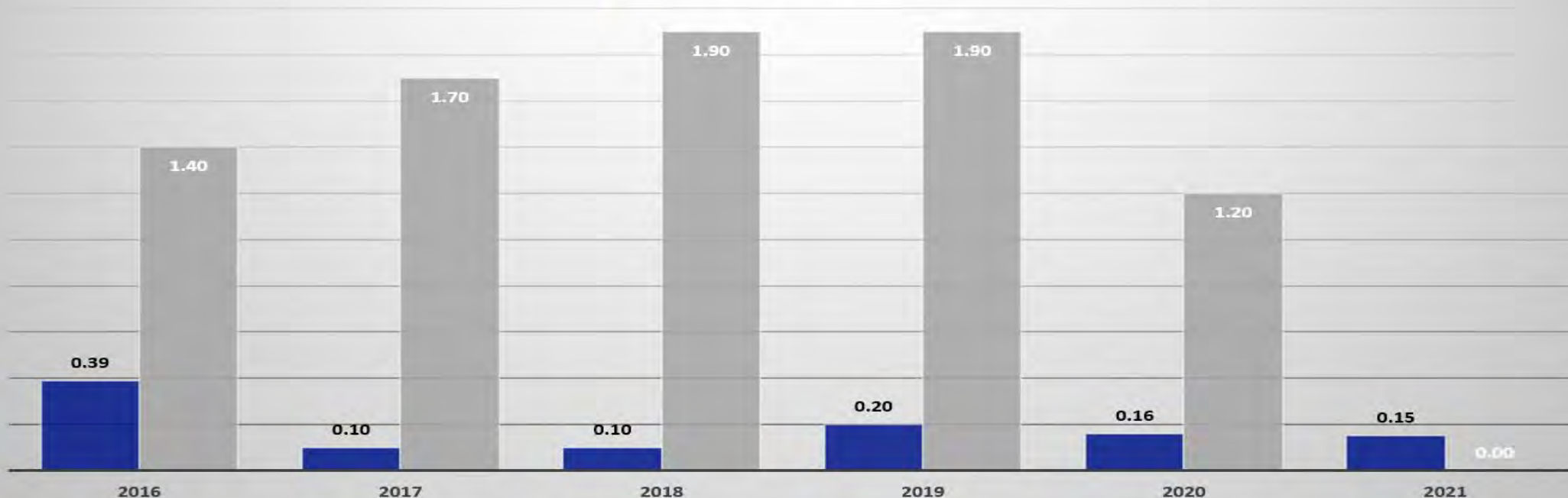
- Leading provider of highly technical infrastructure and environmental services in the United States
- Founded 1986
- Over 30 Offices Nationwide
- Safety – 2022 EMR 0.69
- Backlog exceeds \$3 billion
- Annual Revenue more than \$1 billion
- \$10 billion in projects since 1986
- 7,500+ Annual Projects
- Largest Integrated Decommissioning and Demolition Company in the World

With NorthStar safety is not just a goal, it is a responsibility. With statistics below the industry average for 25 years, safety is one of Northstar's main competitive advantages.

NorthStar remains committed to delivering quality work with the safety and health of our employees as a top priority. This responsibility goes far beyond compliance with regulatory requirements, exceeding minimum standards, and helps us to achieve sustainable safe work environments on every project.

## Lost Time Incident Rate (LTIR)

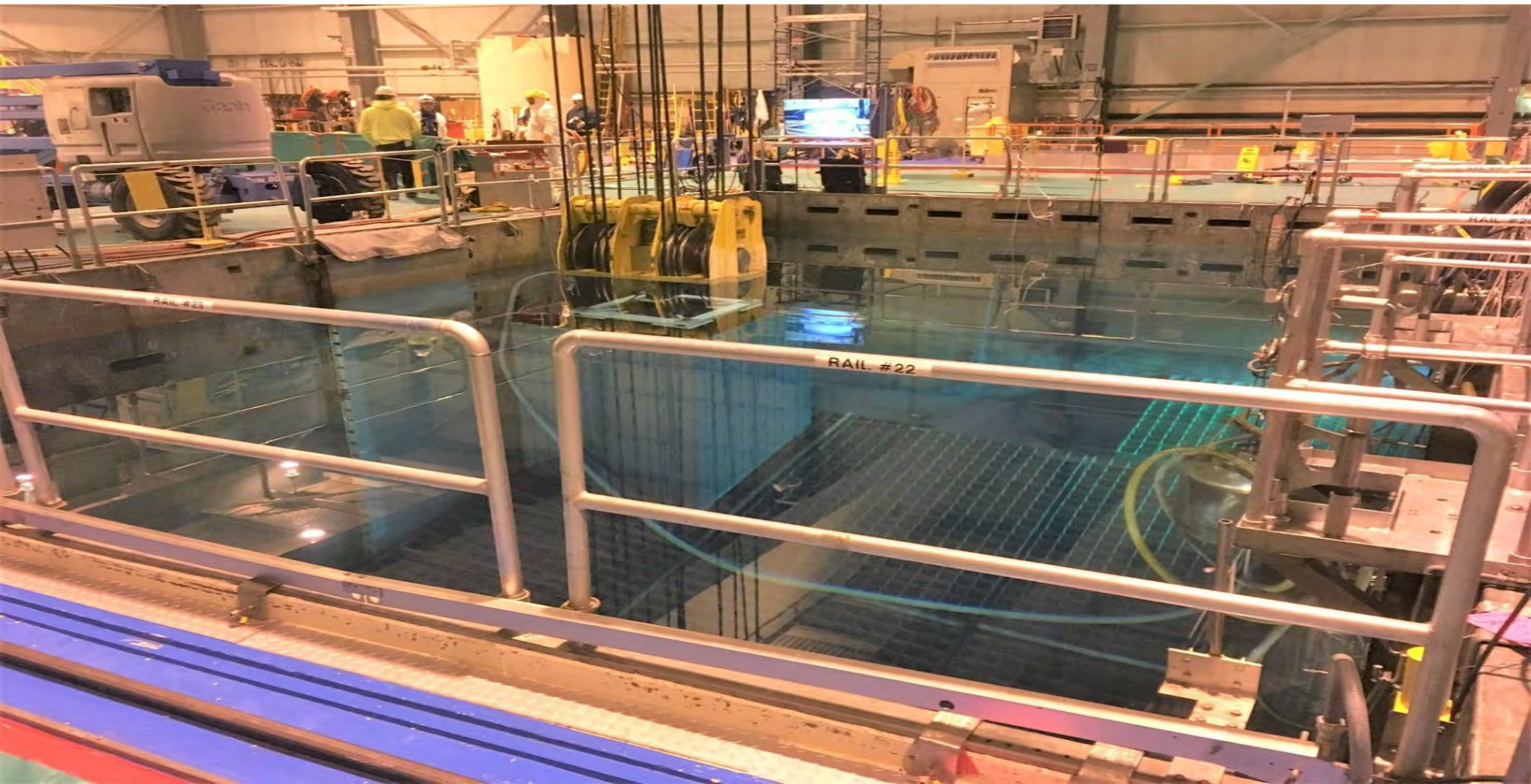
■ NorthStar ■ Industry Average





# Simple Priorities

- **SAFETY** with all we do: Target Zero (accidents)  
Nuclear, Radiological, Environmental, Industrial  
**Do it right. Do it safe.**





# Reactor Vessel Segmentation with Orano

GE BWR Mark I Reactor Vessel

5 ½" thick forged carbon steel walls, clad with stainless steel

55' height (not including head)  
17' internal diameter

Reactor Head alone 60 tons  
(10 ½" thick and 22" tall at flange)

Reactor Vessel approx. 390 tons



Reactor vessel and all internal components have been disposed.

3-D Modeling of reactor and associated components allowed for significant optimization of cutting and packaging plans

RV Closure Head

Steam Dryer

Steam Separator

Upper Core Grid

Guide Tubes

Core Plate Assembly

Shroud Cylinder

Jet Pump Assemblies

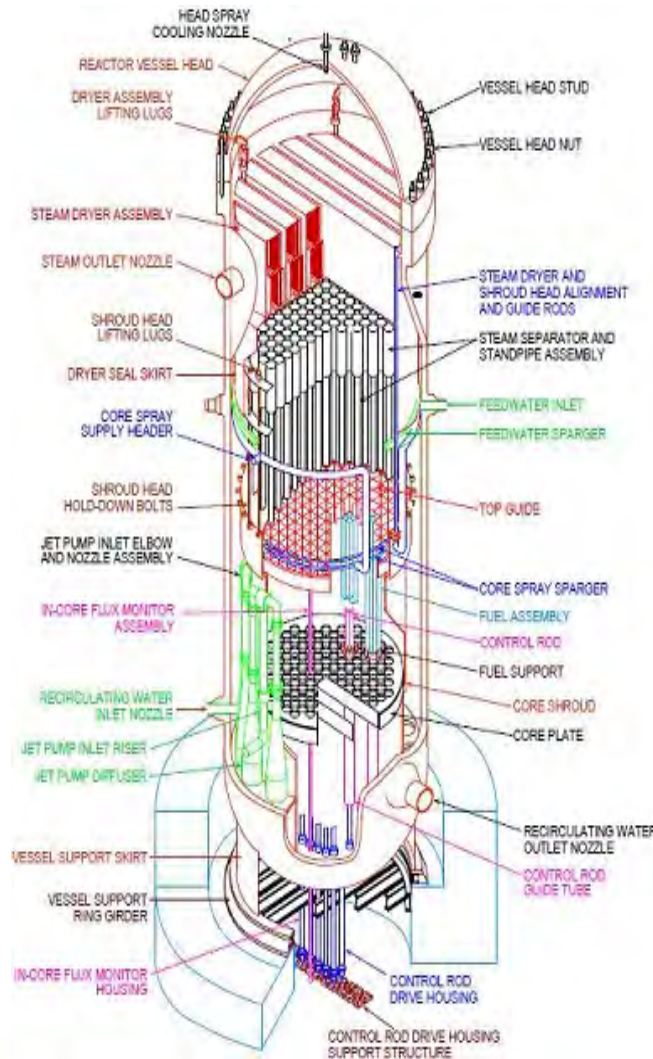
RV Nozzles

Reactor Vessel



# Reactor Vessel Segmentation ALARA OE

- Select components evaluated as GTCC Waste were packaged **into a single dry cask** for storage at the VY ISFSI
- Specialized tooling of multiple varieties were used for cutting processes
- Cutting and packaging work was broken into “sequences”
- Generally activities started at the top of the vessel and worked downward



- 17 spec built Custom Boxes were used of 11 different sizes
- Precise geometries were obtained during cutting to optimize packaging and self shielding of segmented components
- Most cutting operations were performed underwater





# VY Material Handling Safety OE





## Recent VY Rail OE



# Safety /Regulatory/Production

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Since VY ownership under NorthStar:

- ~ 1.4 Million Person Hours worked (and counting) with no OSHA recordable lost time events
- Zero Cited Regulatory Violations
- On track to finish Decommissioning years ahead of 2030 committed completion date
  - Shipping 3-4 rail cars per week to WCS (averaging about 11 per month)
  - Total Number of Shipments to Date: 599
  - Total Weight 66,955,320 lbs (34,478 tons)
  - Total Activity 35,620 curies



# Decommissioning Lessons Learned Crystal River 3 (CR3)



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## CR3 Plant Information

- B&W PWR 2,609 MWt (860 Mwe)
- Operations 1977-2011; all fuel on pad in 2018
- NRC Operating License transferred from Duke Energy to Accelerated Decommissioning Partners (ADP) on October 1, 2020
- ADP: Joint Venture of NorthStar Group Services and Orano Decommissioning Holdings

## Decommissioning Status

- RV/RVI segmentation and packaging in Orano 'Optimized Segmentation' using only 3 main large packages
- 2 GTCC canisters transferred to ISFSI
- Waste Shipments to WCS by rail ongoing with VY OE incorporated as "lesson learned"
- On track to finish ahead of 2027 target completion date



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