Current Status of Shutdown Sites Activities

Transportation Infrastructure Near Crystal River

Steve Maheras
Pacific Northwest National Laboratory

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Three Topics Covered

- Current Status of Shutdown Sites Activities
- Transportation Infrastructure Near Crystal River Based on Recent Site Visit
- Summary of Transportation Alternatives for Shutdown Sites
The purpose of the shutdown sites evaluation is to support planning for removing SNF and GTCC waste from shutdown nuclear power plant sites by collecting and documenting information related to:

- Site inventory
- Site conditions
- Near-site transportation infrastructure and experience

Identify gaps in information needed to ship SNF and GTCC waste from the shutdown sites

Based on the available information, identify options for transporting SNF and GTCC waste from the shutdown sites
Current Status of Shutdown Sites Activities

- Updated Shutdown Sites Report (SSR) posted on DOE-NE website on 05/28/2015
- Crystal River site visit occurred 02/18-02/19/2015
- San Onofre site visit occurred 06/02-06/05/2015
- State, State Regional Group (SRG), Tribal, and Federal Railroad Administration (FRA) representatives have now participated in 9 of the shutdown site visits
- Revised SSR submitted 09/18/2015
- Revised SSR includes information from Kewaunee, Crystal River, and San Onofre site visits, and includes Vermont Yankee as a new shutdown site
- Arranging Vermont Yankee site visit, anticipated to occur spring 2016
- 541-547 total canisters [506-512 SNF, 35 GTCC waste] at 13 shutdown sites (estimated and actual)
- 11 dry storage systems
- 9 transportation casks

Key:
SNF – spent nuclear fuel canisters
GTCC – canisters of greater-than-Class C waste
Sources of Information Used in Evaluation

- **Documents and Data Bases – Public Documents, DOE-RW Documents, DOE Used Fuel Disposition Campaign Documents, Data Bases, Nuclear Industry Sources**
  - DOE RW-859 Data Base
  - Facility Interface Data Sheets (FIDS), Services Planning Documents (SPDs), Facility Interface Capability Assessment reports (FICAs), and Near-Site Transportation Infrastructure reports (NSTIs)

- **Independent Spent Fuel Storage Installation (ISFSI) Site Managers**
  - Confirmed information obtained from other sources
  - Clarified current conditions at the shutdown sites
  - Provided photos and other detailed information

- **Heavy Equipment Lifting, Rigging, and Transporting Companies**
Sources of Information Used in Evaluation (continued)

- **Shutdown site visits**
  - Twelve shutdown sites visited from August 2012 through June 2015
  - Confirmed aspects of inventories at the sites, obtained detailed inventory data by canister, and canister load maps
  - Observed transportation infrastructure at and near sites
  - Detailed photos taken at sites
  - State, State Regional Group (SRG), Tribal, and Federal Railroad Administration (FRA) representatives have participated in 9 shutdown site visits

- **Google Earth**
  - Understand layout of shutdown sites
  - Used to provide detailed maps of shutdown sites and ISFSIs
  - Portray transload locations, and rail and heavy haul routes
Site Conditions

On-Site Transportation Features

- On-Site Rail
- On-Site Roads for H-H Trucks
- Barge Access

On-Site Equipment to Support Transportation Operations

- Transfer Casks
- Cranes and Rigging

On-Site Staging Areas for Transport Vehicles, Equipment and Operations Support
Near-Site Transportation Infrastructure and Experience

- Evaluate transportation mode options for the shutdown sites

- Near-Site Rail Access
  - Condition and capacity of near-site rail infrastructure
  - Potential transload locations
  - Site experience with rail shipments

- Local Roads and Highways
  - Distance to potential rail transload locations (rail spurs or sidings)
  - Characteristics and condition of roads and associated infrastructure that would be used by heavy haul vehicles
  - Site experience with heavy haul shipments

- Barge Access
  - Characteristics of onsite or nearby docks/slips/shorelines
  - Site experience with barge shipments
Crystal River site visit  
02/18-02/19/2015

Crystal River has no SNF in dry storage
- 1244 PWR assemblies in pool
- 428 high burnup (HBU) assemblies

Crystal River will use NUHOMS horizontal storage modules (HSMs) for dry storage
- 39 32PTH1 canisters estimated, plus 5 canisters of GTCC waste from decommissioning
- Spent fuel pool will be kept in recoverable condition until all fuel removed from the site

Crystal River has direct rail access and barge access
Loading NUHOMS Horizontal Storage Modules (HSMs)

Photos courtesy of AREVA TN
Crystal River Future ISFSI Location
Industrial Rail Spur to Florida Northern Railroad (FNOR) (About 7 miles)
Crystal River Onsite Rail in Front of Future ISFSI

Onsite Rail Facing East

Onsite Rail Facing West
More Onsite Rail

Nuclear Energy

Junction of Onsite Industrial Spur and Nuclear Spur

Nuclear Spur
More Onsite Rail

Onsite Industrial Spur at Cool Loop Junction

Onsite Industrial Spur Approaching US Highway 19 from the West
Crystal River Has Shipped and Received Large Components by Rail

Four Moisture Separator Reheaters (MSRs)
300,000 lb. (each)
51’ long x 14’ diameter
(July 2009)

Generator Rotor
395,000 lb.
50’ long x 8’ diameter
(October 2009)
Crystal River Has Shipped and Received Large Components by Rail (cont.)

Shipping old MSRs offsite (June 2011)

Unloading Generator Rotor

CSX locomotive picking up old MSRs (June 2011)

Unloading New MSRs
Receipt of Horizontal Storage Modules by Rail in 2015

Received 12 horizontal storage modules
Each horizontal storage module weighed 189,000 lb.
Receipt of Horizontal Storage Modules by Rail (cont.)

Horizontal Storage Module Being Unloaded from Railcar

Horizontal Storage Modules Staged at Nuclear Spur after Unloading
Crystal River regularly receives shipments of coal by rail
- 100-110 tons per car
- 100 car coal trains

During Crystal River site visit, the Shutdown Sites Team rode with FNOR staff during their weekly track inspection

Started on Crystal River industrial spur and ended in Newberry, Florida, a distance of about 65 miles
- The industrial spur is not normally part of the FNOR inspection, but we were allowed access so we could photograph the entire route
FNOR to CSX in Newberry, Florida
(About 58 miles)
Newberry Wye
Defect Detectors on FNOR

Wheel Detectors (count # of axles, determine speed, open shutter for hot bearing detector)

Hot Bearing Detector

Dragging Equipment Detector

115 lb. Rail
Crystal River Barge

- Crystal River routinely receives coal in 20,000 ton barges
- This coal is unloaded at a specialized barge area
- Crystal River also received turbine components by barge in June 2012, but constructed a specially prepared area in the barge turning basin to receive these components using rollon/rolloff ramps

Two low pressure rotors 353,000 lb. (each)
Two low pressure upper casings 117,000 lb. (each)
Two low pressure lower casings 200,000 lb. (each)
Crystal River Barge Area

- Barge Turning Basin
- Area Where Turbine Components Offloaded
- Coal Conveyor to CR-1 and -2
- Coal Barge Unloading Area
Crystal River Barging

Coal Barge Unloading Area (Left) and Coal Conveyor

Coal Barge Unloading Area with Tugboats and Coal Barge

Barge Turning Basin
Crystal River Barging (cont.)

Docking Barge with Turbine Components

Barge with Turbine Components Grounded at Ramp

Turbine Components Being Unloaded Using Self-Propelled Modular Transporter (SPMT)
Crystal River Heavy Haul Truck Transport

High Pressure Turbine Delivered to Crystal River by Heavy Haul Truck

High Pressure Turbine weighed 150,000 lb.
### Summary of Transportation Mode Options Identified for Shutdown Sites

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<thead>
<tr>
<th>Reactor Site</th>
<th>Transportation Mode Options</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Maine Yankee</td>
<td>Direct rail</td>
<td>Barge to rail</td>
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<tr>
<td>Yankee Rowe</td>
<td>Heavy haul truck to rail</td>
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<td>Connecticut Yankee</td>
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For each reactor site, the transportation mode options and comments are listed. The condition of the onsite rail spur, potential rail transload locations, and other relevant details are noted in the comments column.