Barry Miles

Deputy Director, Reactor Refueling

Naval Nuclear Propulsion Program

Naval Nuclear Propulsion Program

Overview of Naval Nuclear Propulsion Program (NNPP)

Overview of Container Shipments

Shipping Container Accident Exercises

M-290 Spent Fuel Shipping Container

Integrated Navy and DOE Program

CLEAR, TOTAL RESPONSIBILITY AND ACCOUNTABILITY FOR ALL PROGRAM ASPECTS:

- Research, development, design, construction
- Maintenance, repair, overhaul, disposal
- Radiological controls, environment, safety, and health matters
- Officer operator selection, operator training
- Administration (security, nuclear safeguards, TRANSPORTATION, public information, procurement and fiscal management)
- Centralized control of Program's Industrial Base/Vendors
- Spent fuel custody
- Emergency Planning
- Cradle-to-Grave Responsibility

SIMPLE, ENDURING, LEAN ORGANIZATIONAL STRUCTURE

- Director tenure 8 years, 4-Star Admiral/Deputy Administrator in National Nuclear Security Administration (NNSA)
- Dual agency structure with direct access to Secretaries of Energy and Navy
- Small headquarters, field activities

EXECUTIVE ORDER 12344 SET FORTH IN PUBLIC LAW 98-525 AND 106-65

NNPP Background

- **Naval Nuclear Propulsion Program founded in 1948**
- **Currently operating:**
  - 96 reactors (compared to 99 for the US commercial industry)
  - 10 nuclear powered aircraft carriers (two more under construction)
  - 72 submarines (four more under construction)
  - Two land based prototypes
  - Two Moored Training Ships
- **Nuclear-powered warships comprise more than 45% of all the Navy's major combatants**

NAVAL NUCLEAR PROPULSION PROGRAM

NAVAL REACTORS FACILITY

- Dry Storage Program
- Expended Core Facility

Field Offices

REPORT TO DIRECTOR

- Ensures focus on mission
- Immediate identification of concerns

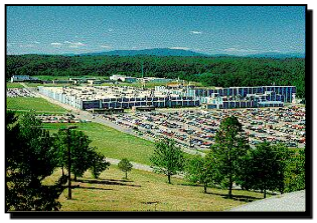
NUCLEAR POWERED FLEET - 82 warships
- About 45% of major combatants

NAVAL REACTORS *480 people*

DEDICATED LABORATORIES

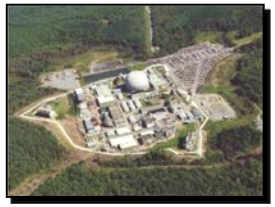
- Bettis Atomic Power Laboratory - Knolls Atomic Power Laboratory - GOCO

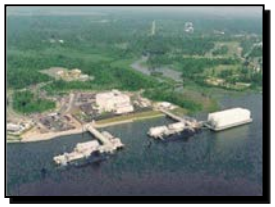
SHIPYARDS 4 Public / 2 Private



SPECIALIZED INDUSTRIAL BASE

- 1 dedicated equipment prime contractor
- Hundreds of suppliers





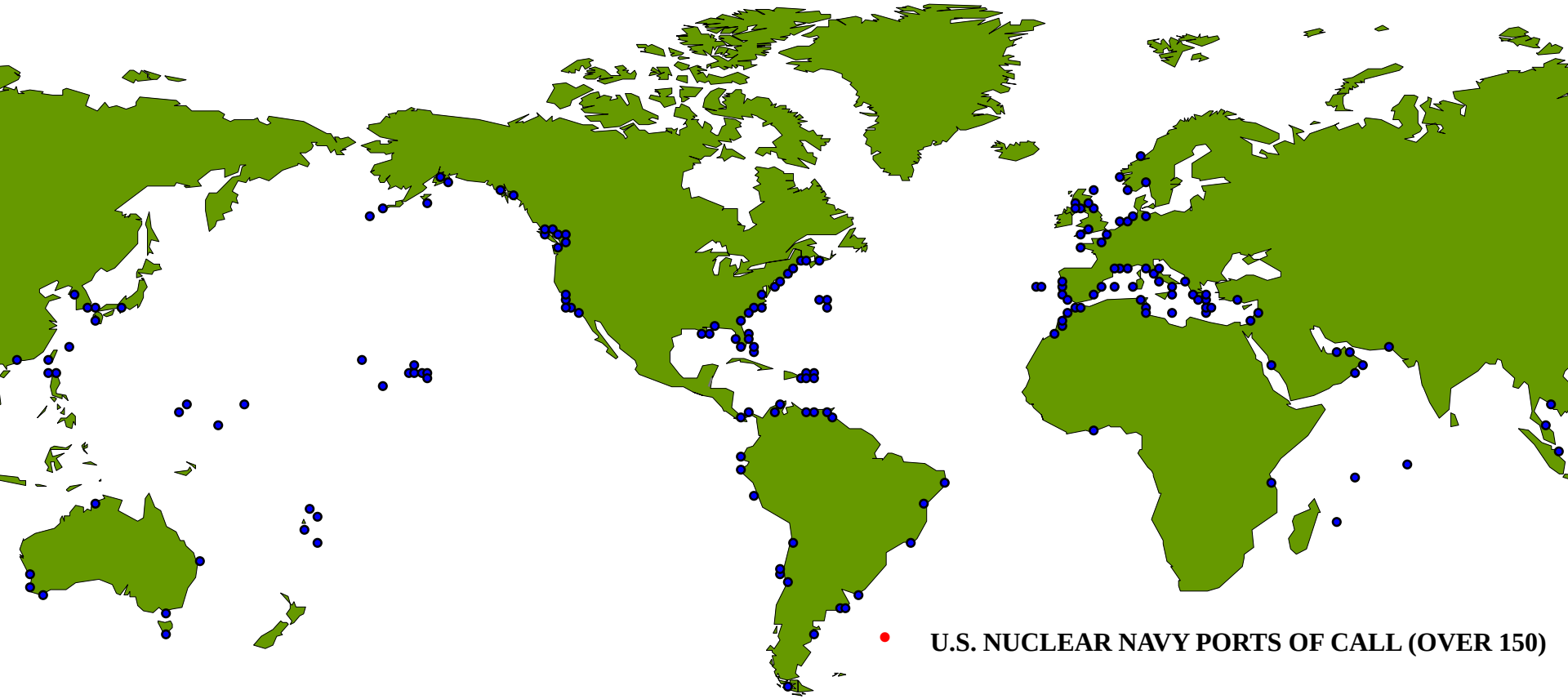
R&D/TRAINING REACTORS - Train 3000 students/year

SCHOOLS

- Nuclear Power School - Nuclear Field "A" School

96 reactors operating worldwide

World-Wide Access and Demonstrated Safety Record



- World-wide operation, visiting over 150 ports in over 50 countries and dependencies.
- Over 6,700 reactor-years of operating experience without a reactor accident or any problem causing a significant effect on the environment.
- Over 156 million miles safely steamed by nuclear-powered ships.

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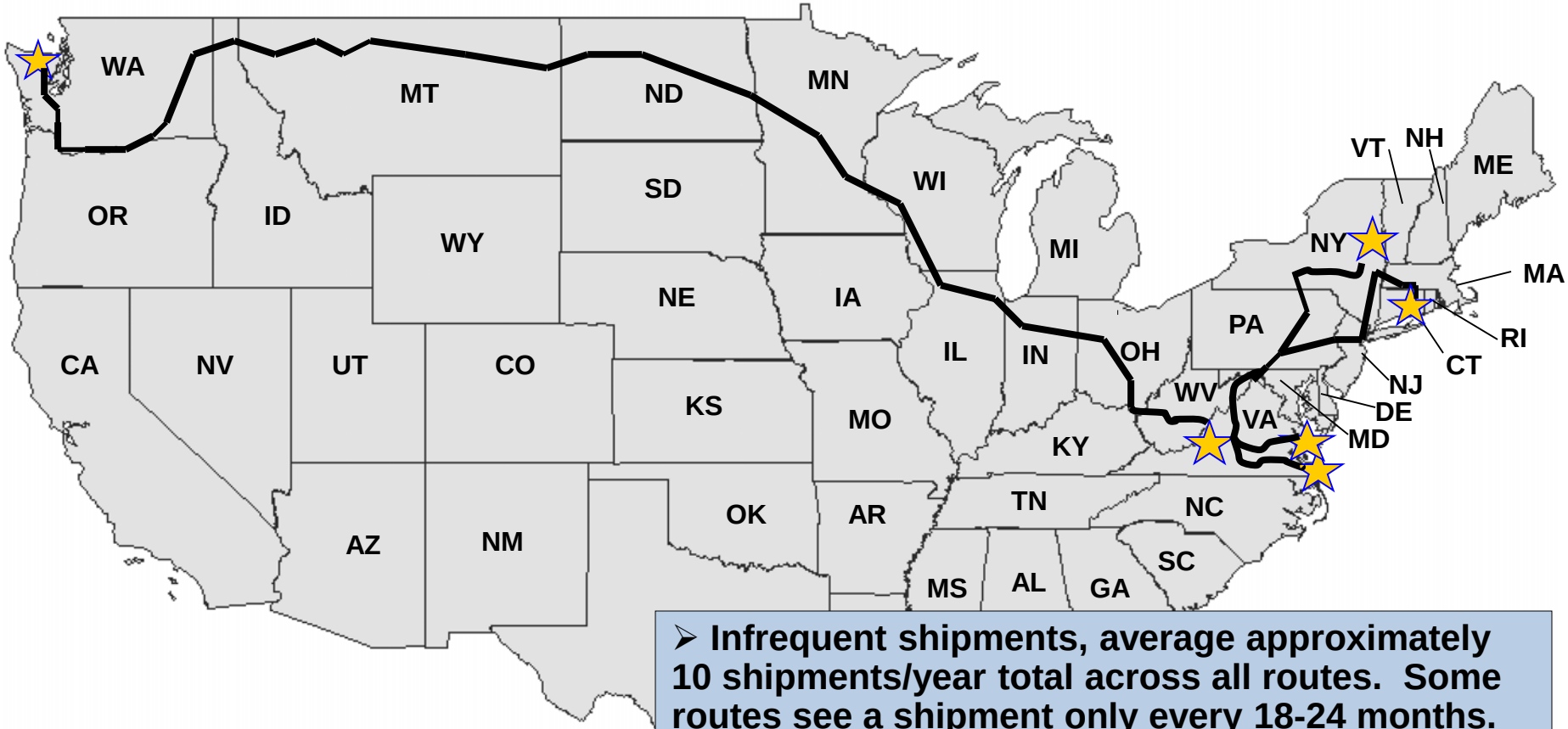
NNPP Reactor Core Component Shipments

- For over 60 years, NNPP shipments of reactor core components have traveled safely throughout the United States by rail.
- Two types of shipments:
  - New components not yet installed in a propulsion plant
  - Used components removed from a propulsion plant (spent fuel)
- All shipments classified (security) and invoke the Department of Transportation (DOT) National Security Exemption (49CFR173.7b).
  - Radioactive labels and placards not used.
  - Shipping papers supplied to the railroads do not identify all information normally provided by the DOT regulations.
    - NRLFO shipment couriers have all required DOT information.
  - No advance notification

Typical New Component Shipping Routes



New Component Origins & Destinations

- **Infrequent shipments, average approximately 10 shipments/year total across all routes. Some routes see a shipment only every 18-24 months.**
- **Typically one flatcar or 3-6 boxcars in a shipment.**
- **Shipments move in dedicated train service.**

New Component Boxcar

- **Metal shipping containers mounted/tied-down inside boxcars.**
- **Boxcars locked and sealed.**
- **Radioactivity release and increased radiation levels not issues for new components.**

New Component Flatcar and Shipping Container

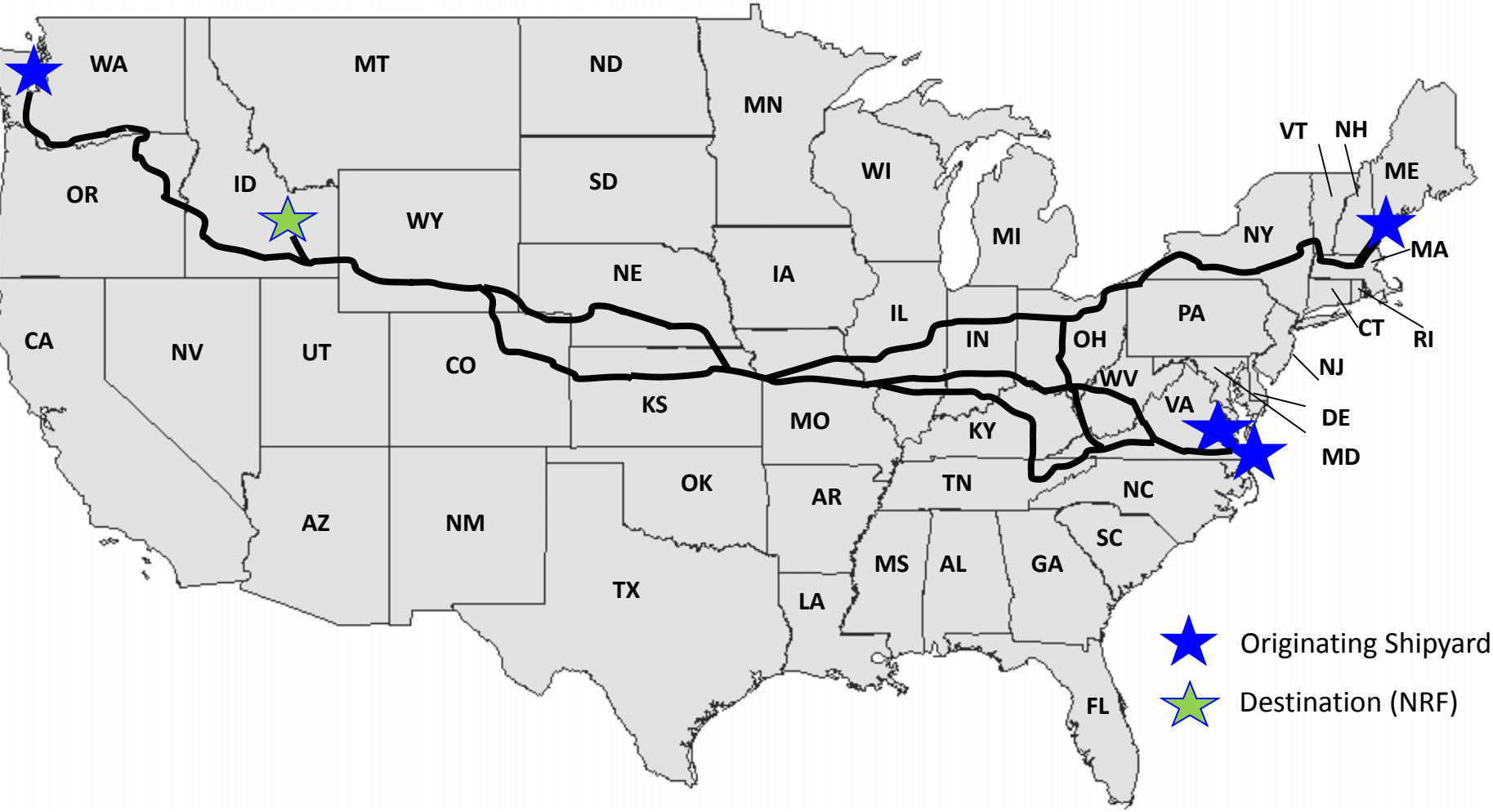
- **Large, heavy self-protecting.**
- **Radioactivity release and increased radiation levels <u>not</u> issues for new components.**

Naval Spent Fuel Cycle

- **Upon refueling/defueling, all naval spent fuel transported by rail to Program's facility in Idaho for examination to:**
  - Ensure maximum performance of current fuel
  - Enable design of new fuel with longer lifetimes
- **For perspective:**
  - First nuclear powered submarine fuel operated 2 years
  - Current fuel operates for 33 years – the life of an attack submarine
- **Fuel is stored temporarily pending disposal in geologic repository or interim storage site.**

Naval Spent Fuel Shipping Routes

844 CONTAINERS SAFELY SHIPPED
(March 1957 to Present)



Shipment Safety

- **Nature of the Fuel**
  - o **Rugged**
- **Shipping Containers**
  - o **Robust**
- **Shipping Practices**
  - o **Couriers**

NAVAL SPENT FUEL SHIPMENTS ARE SAFE

Naval Fuel Characteristics

- Solid metal; not flammable, explosive, or corrosive
- Built for combat battle shock conditions (well over 50g's)
- Contains fully all long-lived radioactivity (fission products)
- Safe to operate in close proximity to sailors on warships

EXCEPTIONALLY WELL-SUITED FOR SAFE TRANSPORT AND STORAGE FOR LONG PERIODS

Naval Spent Fuel Type B Shipping Containers

- Models M-140 and M-290:
  - Type B NRC/DOE Certified
  - At least 10” thick solid stainless steel
  - 350,000 and 520,000 pounds (loaded), respectively

- Thick, solid steel typically results in radiation levels much lower than the safe maximum DOT limits:

	DOT Limit	Naval Container	Typical Chest X-Ray
On contact	200 mR/hr	1 to 5 mR/hr	10 mR
At 2 meters	10 mR/hr	.1 to .5 mR/hr	

- Everyday life exposure to radiation:
  - ~300 mr/yr – soil, rocks, cosmic rays, radon

M-140 Naval Spent Fuel Shipping Container

M-290 Naval Spent Fuel Shipping Container

Shipping Practices

- Railcars inspected and maintained at highest standard
- Location and status constantly monitored via satellite tracking
- Advance arrangements with railroad operations and railroad police
- Outreach with civilian authorities, e.g., accident exercises

ESCORT VEHICLE

- Escorted by specially trained NNPP shipment couriers
  - 24/7 surveillance
  - Immediate emergency response

Accident Derailment Response

Emergency Response Priorities:

- Emergency first-aid
- Summon assistance
- Prevent further injury/damage
- Verify radiological condition

NNPP Couriers assist Incident Commander:

- Shipper Specialist Employee (29CFR1910.120)
- Response priorities
- Communications and public information

ROBUST SHIPPING CONTAINERS PROVIDE A FORMIDABLE BARRIER TO PREVENT RELEASE OF RADIOACTIVE MATERIAL OR SIGNIFICANT RADIATION LEVELS

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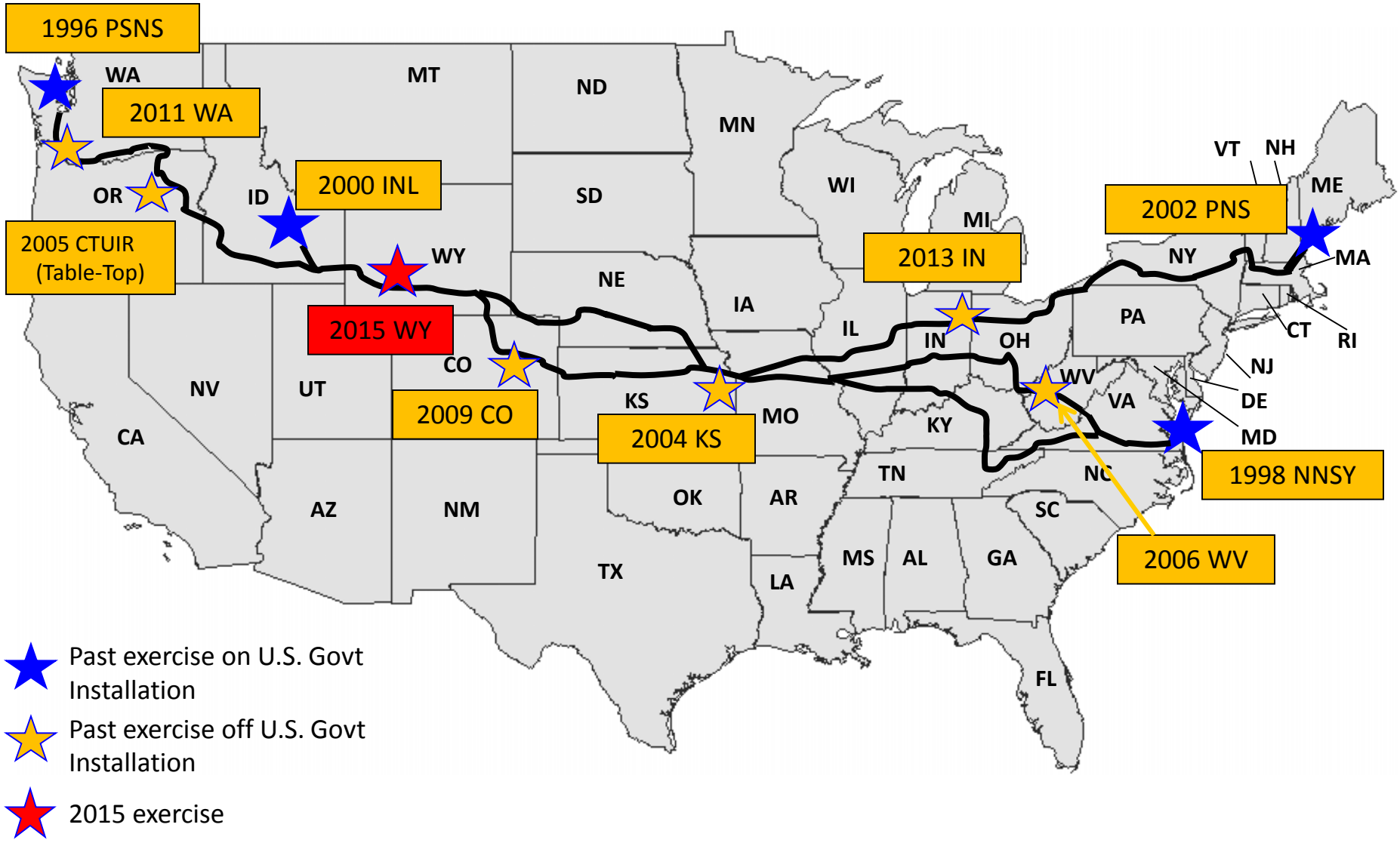
Naval Spent Fuel Shipment Exercise Objectives

- Familiarize stakeholders with Naval spent fuel shipping container characteristics and shipping practices.
- Evaluate the interactions of NNPP couriers accompanying spent fuel shipments and civilian emergency response representatives.
- Gain an understanding of how communication links would be activated in an accident involving a Naval spent fuel shipment.
- Evaluate the NNPP's ability to integrate into Unified Command and the Joint Information Center (JIC) (if established).

Naval Spent Fuel Shipment Exercises



Summary of 2015 Wyoming Exercise Planning

- Site Assessment – 15 October 2014
- Initial Planning Conference – 2 April 2015
- Exercise Planning Conference #2 – 7 May
- Tabletop Exercise – 29 July
- Full Scale Exercise – 13 August
- Final Demonstration – 17 September

2015 Wyoming Exercise Scenario

- Naval spent fuel shipment en route from Newport News VA to the Naval Reactors Facility in Idaho- escorted by two NNPP couriers
- Dump truck collides with the M-290 container railcar at a railroad crossing in Granger, WY ; one truck is derailed
- Driver is injured
- Communications between shipper (NNPP), Union Pacific Railroad, local responders, and State of Wyoming
- Unified Command established
- Local media and resident approach the scene
- Radiological surveys – NNPP couriers and Rock Springs Regional Emergency Response Team
- Radiological condition normal; re-rail and continue shipment


Truck
Media
10' X 10'
Video
20' X 20'
Bleachers
60' X 20'
Google earth
1994
Imagery Date: 6/5/2014 41°35'35.50" N 109°58'08.55" W elev 6278 ft eye alt 6704 ft

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M-290 Shipping Container

M-290 Shipping Container

M-290 Loading Facility – Newport News

Naval Nuclear Propulsion Program

Operating naval nuclear propulsion plants and shipping naval spent fuel safely for over 50 years. Key to the U.S. Navy continuing to meet its national security mission.

Questions:
Barry Miles
Manager, Spent Fuel Transportation
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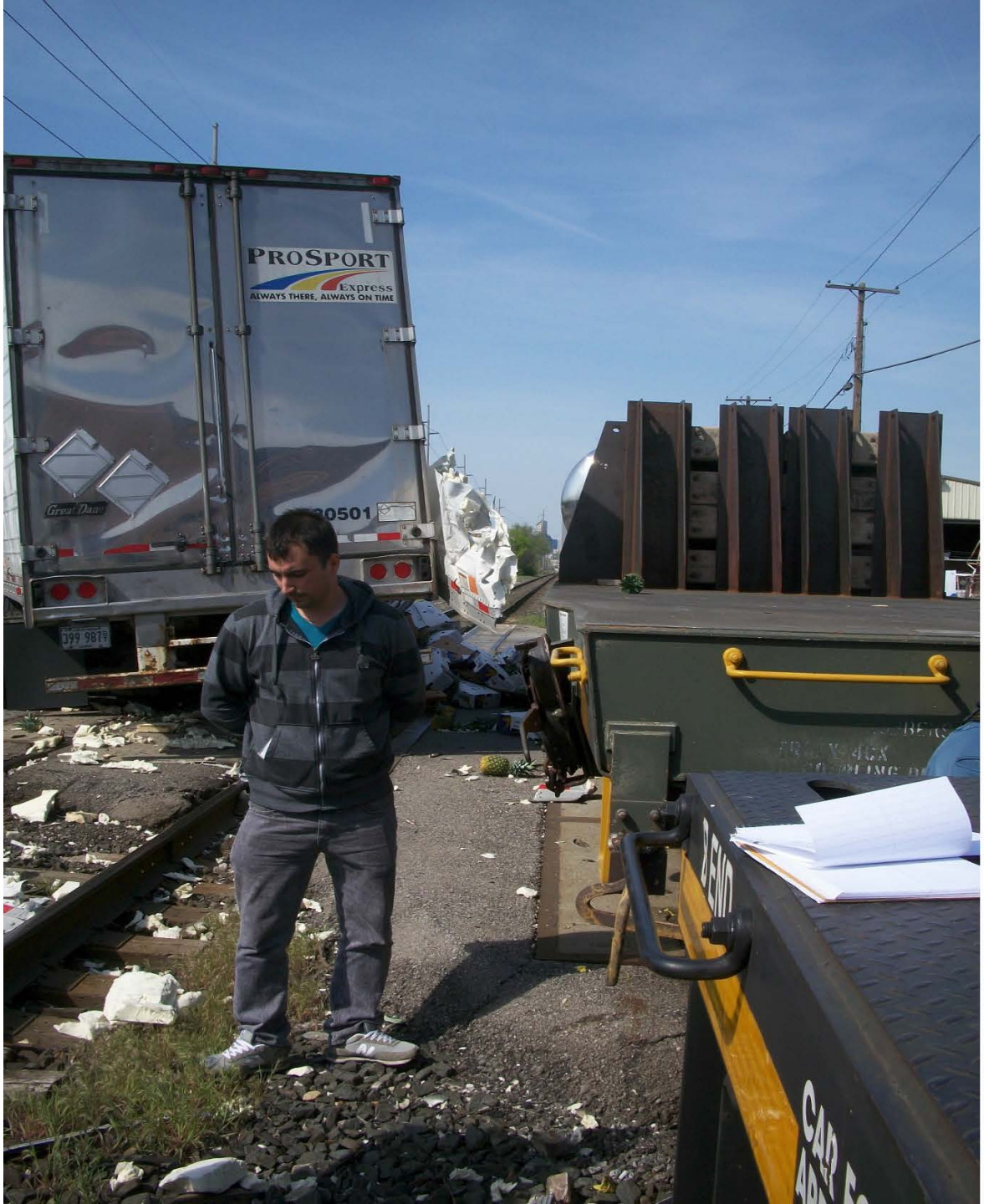
Pineapple Event
May 6, 2014


I FUCKED
UP!!


PROSPORT
Express
ALWAYS THERE, ALWAYS ON TIME
Great Dane

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Operating naval nuclear propulsion plants and shipping naval spent fuel safely for over 50 years. Key to the U.S. Navy continuing to meet its national security mission.

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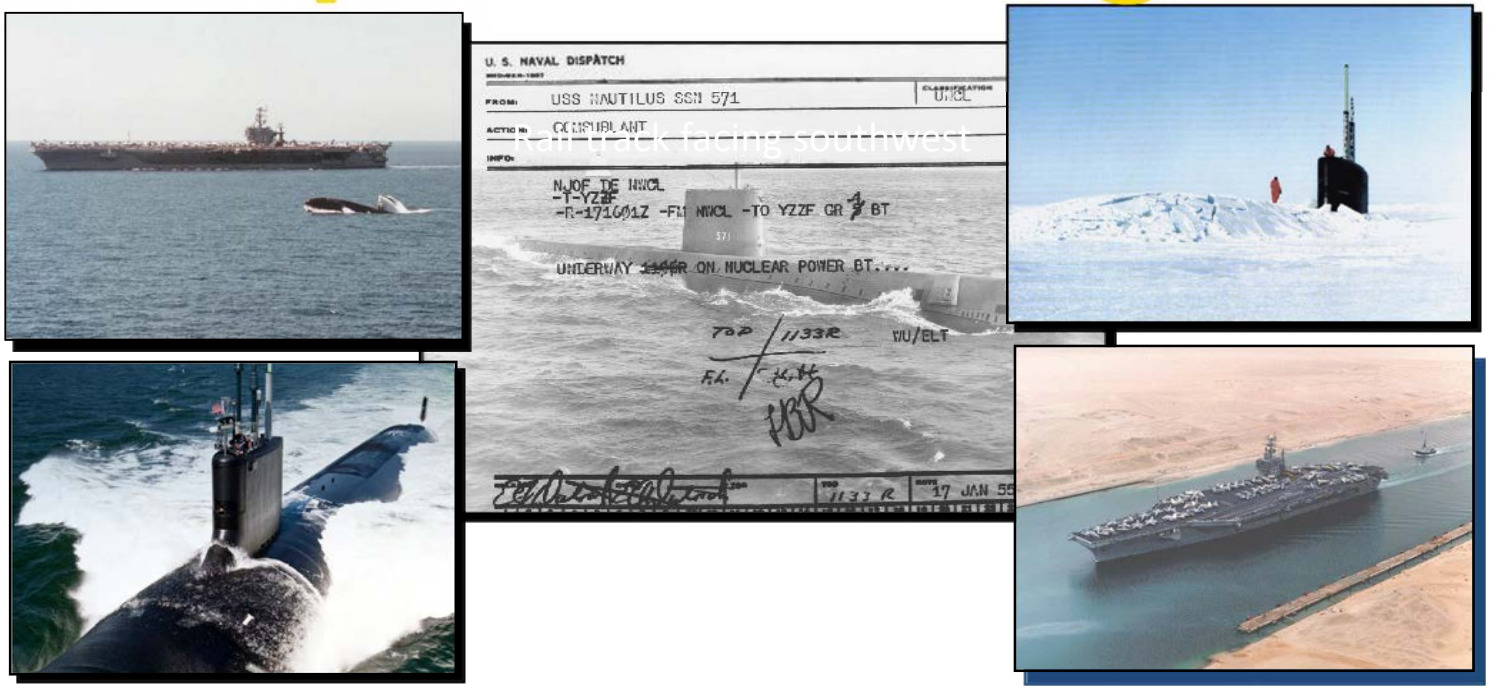
United States Naval Nuclear Propulsion Program



Naval Spent Fuel Type B Shipping Containers

- Designed, manufactured, and certified to severe accident survival standards
- NRC regulatory accident performance standards the container must withstand are (includes combinations of these events):
  - 30-foot drop onto an unyielding surface
  - 40-inch drop onto a 6-inch diameter vertical metal rod
  - Fully-engulfing 1475 degree Fahrenheit fire for at least 30 minutes
  - Immersion in 50 feet of water
- Analyses demonstrate will survive severe accident conditions and preclude harmful release of radioactivity or increase in radiation levels

- Scale model testing and full scale crash demonstrations have confirmed:
  - Standards are stringent, *and*
  - Techniques used to analyze containers are effective

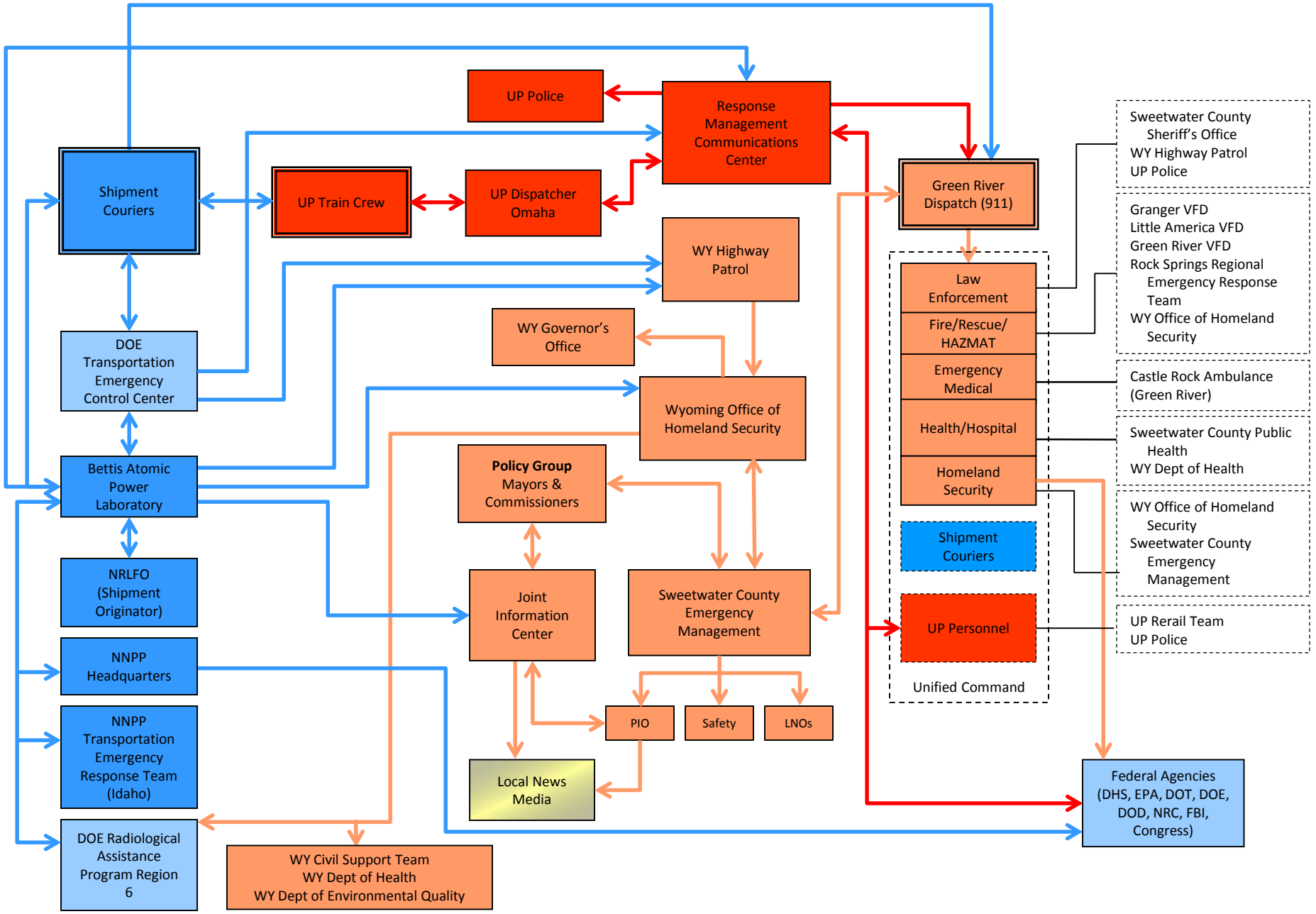
Naval Reactors Laboratory Field Office

- Naval Reactors Laboratory Field Office, Transportation Division (NRLFO-TRANS), is the Naval Nuclear Propulsion Program (NNPP) field organization responsible for transportation of the classified reactor core (nuclear fuel) components used in naval nuclear propulsion plants.
- Located in Pittsburgh PA at the Bettis Atomic Power Laboratory
- NRLFO-TRANS is responsible for all transportation logistics activities including:
  - Establishing shipping dates.
  - Selecting and making arrangements with railroad carriers.
  - Establishing operational and security procedures for the shipments.
  - Issuing the shipping papers.
  - Managing the Government-owned railcar fleet used for the shipments.
  - Training Navy couriers who accompany the shipments (qualified as DOE Federal officers and carry credentials)

NNPP Emergency Planning

- **All NNPP activities have detailed emergency response plans in place**
- **Priorities and response structure are defined**
- **Robust exercise program – demonstrate Program personnel are well prepared**
- **World-wide response capability**
- **Approximate number of trained responders:**
  - 6,000 Contamination Workers
  - 1,300 Radiological Controls Technicians

GRANGER, WY, NAVAL SPENT NUCLEAR FUEL TRANSPORTATION EXERCISE
COMPREHENSIVE COMMUNICATIONS DIAGRAM



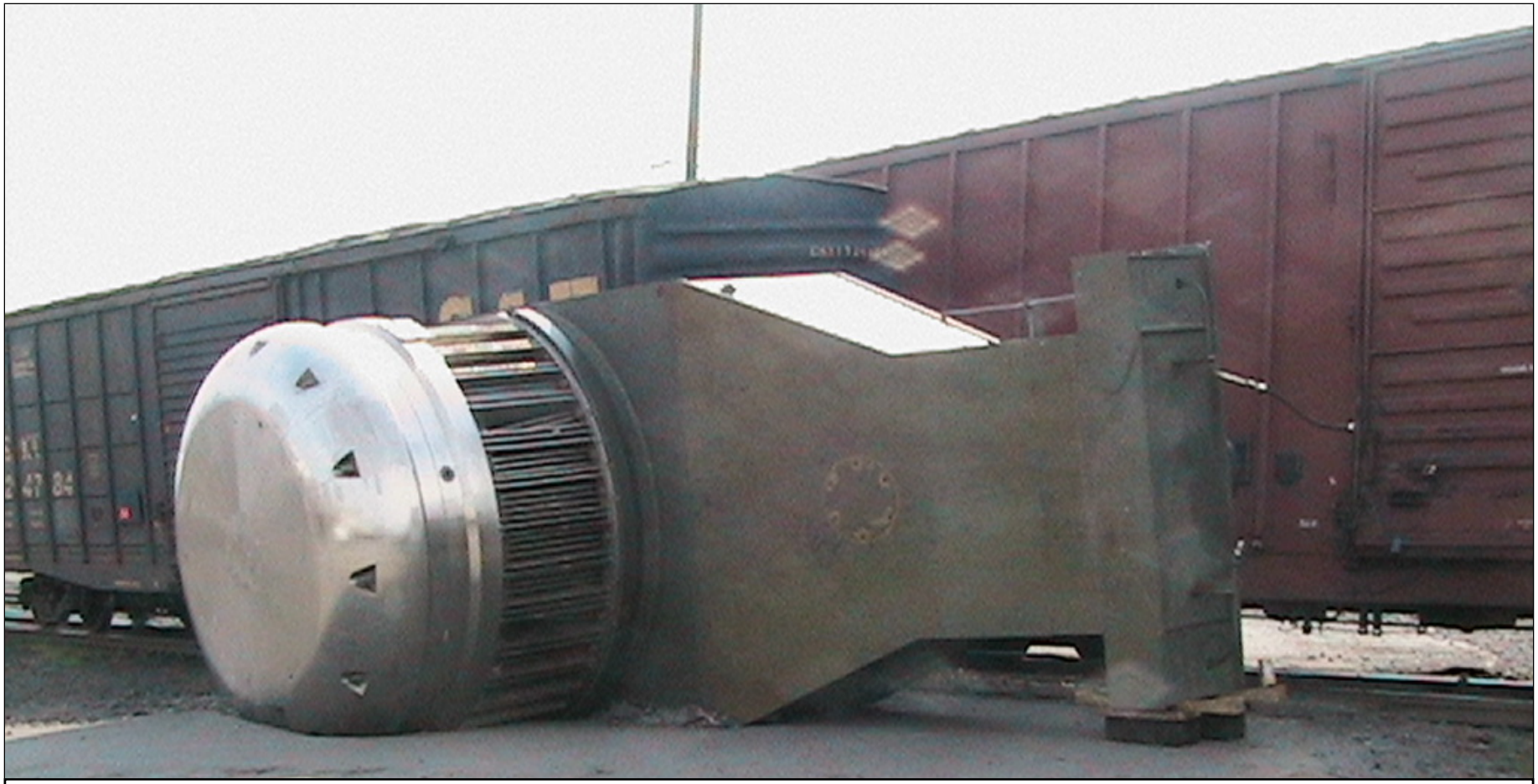
Empty M-140 Spent Fuel Shipping Container Accident

CSXT Frontier Rail Yard Buffalo, NY
Thursday, 22 Sep 2005
Approx. 0100 EDT

NNPP *EMPTY* M-140 SPENT FUEL SHIPPING CONTAINER ACCIDENT

CSXT Frontier Rail Yard, Buffalo, NY
Approx. 0100 EDT, Thurs., 22 Sep 2005.

Scenario: Low speed, two trains on adjacent tracks being worked to same switch point, M-140 was lead car on train with the blue CSX boxcar behind it. Red boxcars on other train.

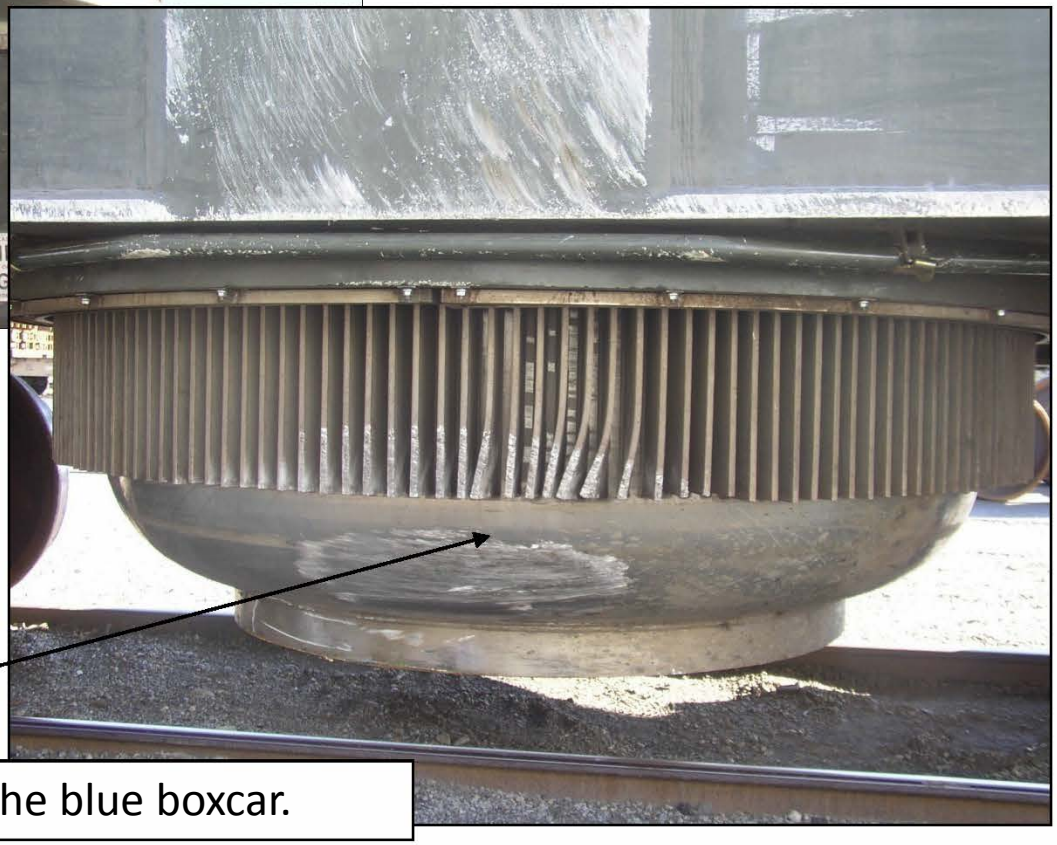


- NNPP activated ECCs. Shipper (Idaho facility) the first notified per shipping papers.
- NNPP NY field office at KAPL notified State of NY and kept NY informed.
- NNPP PA field office at Bettis coordinated response/recovery with CSXT.
- NNPP response teams from Bettis, KAPL, and Portsmouth Naval Shipyard start arriving on scene at 1030.
- Confirming radiological surveys by County officials, NNPP personnel, NY State. Buffalo Fire Dept responded and monitored recovery.
- CSXT called in Winter's Rigging for recovery lifting/handing.


CATERPILLAR


M-140/railcar uprighted 1135, 23 Sep
…approx 36 hours after derailment.

M-140 section that was in contact with the ground.



M-140 section that was in contact with the blue boxcar.


M-140 railcar out of Frontier Yard car shop on Saturday, 24 Sep at approx 1600 after final repairs/inspection complete….
approx 60 hours after derailment.
CSXT 165734
DO NOT HUMP
LT WT 137600