Barry Miles

Deputy Director, Reactor Refueling Division
Naval Nuclear Propulsion Program
United States Naval Nuclear Propulsion Program

U.S. NAVY Dispatch

<table>
<thead>
<tr>
<th>FROM</th>
<th>USS HAULUG SBP 571</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO</td>
<td>CTPU PLANET</td>
</tr>
</tbody>
</table>

rail track facing southwest

UNDERWAY 1344H ON NUCLEAR POWER BT

[Images of naval nuclear propulsion systems and ship at sea]
• Naval Nuclear Propulsion Program founded in 1948

• Currently operating:
  – 101 reactors (compared to 99 for the US commercial industry)
  – 11 nuclear powered aircraft carriers (two more under construction)
  – 75 submarines (three 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 Reactors
(~500 people)

Field Offices
- Report Directly to Admiral
- Regulatory Oversight
- Immediate identification of concerns

Nuclear Powered Fleet
- 86 operating ships
- Over 45% of major combatants
- All submarines and aircraft carriers

Shipyards
- ~65,000 employees
  - Private / Public
    - Norfolk
    - Portsmouth
    - Puget Sound
    - Pearl Harbor
    - EB - Groton, CT
    - HII - Newport News, VA

Schools
- Nuclear Power School
- Nuclear Field “A” School

Specialized Industrial Base
- Dedicated equipment prime contractor
- Hundreds of suppliers

Kesselring Site

Moored Training Ships

R&D / Training Reactors

Bettis Atomic Power Lab

Knolls Atomic Power Lab

Dedicated Naval Nuclear Laboratories (GOCO)
- ~4,800 employees

Naval Reactors Facility
- Dry Storage Program
- Expended Core Facility
- ~1,200 employees

Private / Public
- Naval Reactors
- (~500 people)

NNPP Organization
• 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.
861 CONTAINERS SAFELY SHIPPED
(March 1957 to Present)
NAVAL SPENT FUEL SHIPMENTS ARE SAFE

Nature of the Fuel
  o Rugged

Shipping Containers
  o Robust

Shipping Practices
  o Couriers
Solid metal; not flammable, explosive, or corrosive

Built for combat battle shock conditions (over 50g’s)

Fully contains fission products

Safe to operate in close proximity to sailors on warships

Exceptionally well-suited for safe transport and storage for long periods
The M-140 is the only NNPP Type B spent fuel shipping container that travels through New York State:

- Type B NRC/DOE Certified
- 14” thick solid stainless steel
- 350,000 pounds (loaded)

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

<table>
<thead>
<tr>
<th>Condition</th>
<th>DOT Limit</th>
<th>Naval Container</th>
<th>Typical Chest X-Ray</th>
</tr>
</thead>
<tbody>
<tr>
<td>On contact</td>
<td>200 mR/hr</td>
<td>1 to 5 mR/hr</td>
<td>10 mR</td>
</tr>
<tr>
<td>At 2 meters</td>
<td>10 mR/hr</td>
<td>.1 to .5 mR/hr</td>
<td></td>
</tr>
</tbody>
</table>

Everyday life exposure to radiation:

- ~300 mr/yr – soil, rocks, cosmic rays, radon (Source: NCRP Report No. 160)
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

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

- **Past exercise on U.S. Govt Installation**
- **Past exercise off U.S. Govt Installation**
- **2017 exercise**
NAVAL NUCLEAR PROPULSION PROGRAM
CITY OF MECHANICVILLE
TOWN OF HALFMOON
SARATOGA COUNTY
STATE OF NEW YORK
PAN AM RAILWAYS

NEW YORK NAVAL SPENT NUCLEAR FUEL TRANSPORTATION ACCIDENT EXERCISE DEMONSTRATION

JUNE 1, 2017
Summary of 2017 NYS Exercise Planning

- Site Assessment – 13 July 2016
- Initial Planning Meeting – 4 November 2016
- Scenario Planning Meeting – 1 March 2017
- Tabletop Exercise – 11 April 2017
- Field Exercise – 3 May 2017
- Demonstration – 1 June 2017
• Naval spent fuel shipment en route from Portsmouth Naval Shipyard to the Naval Reactors Facility being escorted by two NNPP shipment couriers

• Dump truck collides with the M-140 shipping container railcar at the Viall Avenue railroad crossing in Mechanicville, NY

• Driver is injured; NNPP couriers on scene

• Communications between shipper (NNPP), Pan Am Railways, local responders, and New York State agencies

• Unified Command established

• Local media and resident approach the scene

• Radiological surveys – NNPP couriers, Saratoga County Hazmat Team, and New York State Radiation Monitoring Team

• Radiological condition normal; re-rail and continue shipment
An M-140 Naval spent fuel shipping container en route from Portsmouth Naval Shipyard to Naval Reactors Facility in Idaho is approaching Mechanicville, NY on Pan Am Railways.
Simulated Accident Location – Viall Ave

Shipment moving west towards rail yard
Shipment enters rail yard from the southeast
Operating naval nuclear propulsion plants and shipping naval spent fuel safely for over 60 years. Key to the U.S. Navy continuing to meet its national security mission.

Questions:
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Empty M-140 Spent Fuel Shipping Container Accident

CSXT Frontier Rail Yard Buffalo, NY
Thursday, 22 Sep 2005
Approx. 0100 EDT
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. Shaw Envir. review. Buffalo Fire Dept responded and monitored recovery.
• CSXT called in Winter’s Rigging for recovery lifting/handling.
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.