



U.S. DEPARTMENT OF  
**ENERGY**

OFFICE OF  
**ENVIRONMENTAL  
MANAGEMENT**

# Update on Office of Packaging and Transportation Activities

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**Nuclear Waste Technical Review Board**  
**Summer 2016 Meeting**  
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Our mission is to provide guidance, tools, and support for DOE programs and contractors in order to assure safe, compliant, reliable, and efficient transportation of the Department's hazardous and nonhazardous materials.



# OPT Programs and Activities

## Packaging Certification

- Certificates of Compliance
- DOE Exemptions
- DOT Special Permits
- Quality Assurance
- RAMPAC

## Emergency Preparedness & Outreach

- TEPP
- NTSF
- State Regional Groups
- Tribes
- Prospective Shipment Report
- Fact Sheets
- Field Calls

## Regulations & Standards Support

- Domestic Federal Agencies
- International Community
- Nongovernmental Organizations
- DOE Orders, Policy, Guidance

## Transportation Risk Reduction

- Motor Carrier Evaluations
- Physical Protection
- Transportation Compliance Reviews
- Safety Metrics

## Program & Site Support

- DOE/Contractor Interfaces
  - TMC
  - PMC
  - EFCOG
- Tender Negotiations
- Automated Systems
- Annual Report



## DOE Packaging Certification Program

Department-wide program that provides for –

- Certification of fissile and Type B packagings
- Packaging quality assurance approval
- Packaging assistance
- Packaging university
- RAMPAC – Radioactive Material Packaging
- DOE RFID – Radiofrequency identification
- In FY-16, work-in-progress- 20 packaging dockets
  - 20 dockets open at start of FY
  - 28 dockets closed
  - 33 new dockets opened
  - 7 QA dockets approved

# Outreach and Transportation Emergency Planning and Preparedness (TEPP)

## Outreach

- Through the National Transportation Stakeholders Forum, shared Information and collaborated with state, and tribal governments, and other federal agencies along transportation routes.
- Coordination with DOE program offices, site operations, and impacted states and tribes along transportation corridors.

## Emergency Preparedness Training

Region	Classes	Students
West	85	1168
South	64	1091
Midwest	6	101
Northeast	51	738

- Training video updates

# Defense in Depth for Packaging & Transportation Activities

## Transportation Risk Reduction

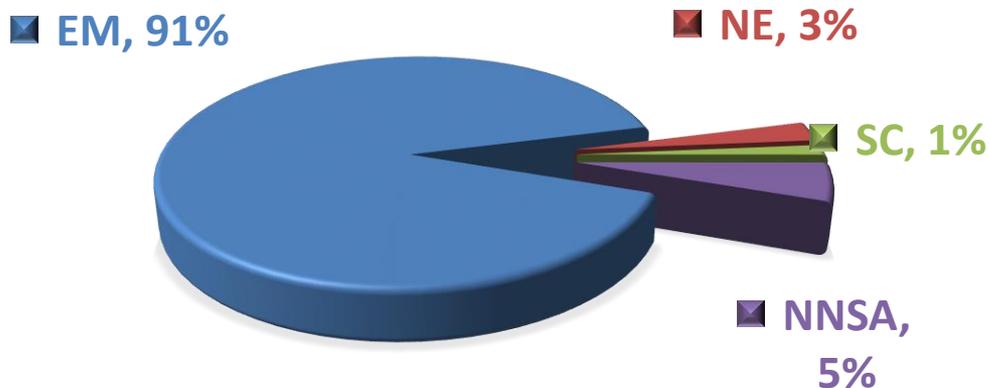
- Manages and implements the DOE Motor Carrier Evaluation Program (MCEP)
- Oversees the Transportation Safety and Operations Compliance Assurance Program (TCAP)

## Program and Site Support

- Packaging Management and Transportation Management Councils
- EFCOG – Energy Facility Contractors Group
- Coordination & Communication Across the Complex
- Automated Tools
  - ATLAS – Automated Transportation Logistics and Analysis System
  - RADCALC – Calculates radioactive material shipping determinations
  - RADTRAN – Risk Assessment for NEPA analyses
  - WebTRAGIS – transportation routing

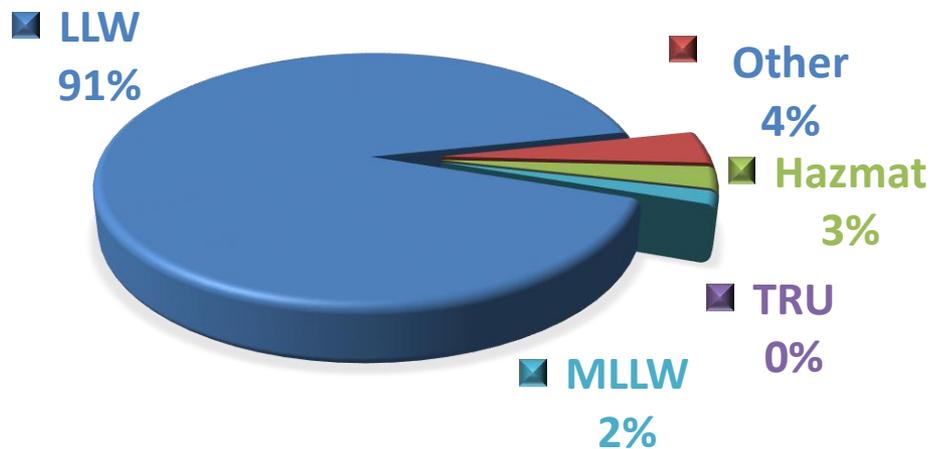
# FY15 DOE Shipments

## DOE HAZMAT SHIPMENTS BY PROGRAM



Total shipments = 18642

## EM OFFSITE HAZMAT SHIPMENTS



Total shipments = 16867

# Department-wide Integration

- What organizations within and external to the Department integrate with EM on packaging and transportation activities?
  - DOE Office of Nuclear Energy
  - DOE Office of Science
  - DOE National Nuclear Security Administration
  - Department of Transportation
  - Federal Emergency Management Agency
  - Federal Radiological Preparedness Coordinating Committee
  - General Services Administration
  - International Atomic Energy Agency
  - Nuclear Regulatory Commission
  - DOE EM Field Offices
  - Transportation Research Board – National Academy of Science
  - Tribal Caucus and State Regional Groups

# Department-wide Integration

- What shipments of SNF and HLW have occurred or are planned to occur?
  - A few shipments of SNF annually to Savannah River Site
    - Foreign Research Reactor (FRR) Spent Nuclear Fuel (SNF) Acceptance Program
    - University research reactor spent fuel
- What integration occurs for such shipments?
  - Requirements
    - DOE O 460.1C and 460.2B – Hazardous Materials Packaging & Transportation Safety, and Departmental Materials Transportation & Packaging Management
    - Title 49 – Hazardous Materials Regulation
    - 10 CFR Part 71 – Packaging & Transportation of Radioactive Material
  - External coordination – federal, local, state and tribal governments
  - Transportation emergency training
    - Along waste transportation corridors
    - Coordinating with NE on identifying SNF corridors when available.
  - Package certification
    - Certified Type B or fissile packagings for DOE materials
    - Pre review of design approval applications prior to submission to the NRC

# Department-wide Integration

- What factors, based on EM's past operational experience, are important to consider in meeting future needs for transport of DOE SNF and HLW as part of an integrated waste management system?
  - Safety
  - Security
  - Compliance with all applicable regulations

# WebTRAGIS Basics

- Is a browser-based GIS tool for modeling transportation routing
- Has numerous options for route calculation
- Provides access to network databases for highway, rail, and waterway infrastructures in the continental United States
- Provides population data for all transportation segments using the LandScan USA population distribution data model
- Deployed as a browser application, where the map display and user interface are accessed through a browser, while the routing engine is located on an external Oak Ridge National Laboratory server.

# WebTRAGIS History

- Predecessor models developed in the late 1970's
  - HIGHWAY
  - INTERLINE
- TRAGIS developed in mid-1990s
- Client-Server version TRAGIS released late 1999
- Last iteration of old TRAGIS released in 2006

# Sponsor History

- Interline and Highway were developed under funding from DOE.
- The first versions of TRAGIS were funded by DOE-EM and DOD-MAD (Dahlgren NSWC) .
- Additional funding and program management transferred to DOE-RW which funded the first version of WebTRAGIS.
- The Federal Railroad Administration (FRA) funded a rail-specific RRVA enhancement.
- Current development funded by DOE-EM.

- Updated networks for multiple modes
- New layer display options
- Blocking by bounding box
- Expanded route reporting details
  - Route specifics
  - Critical infrastructure
- New population reporting
  - By link
  - By state
  - Counts and density

- All users need to register
- Requirements include
  - Requirement for federal sponsorship
  - No foreign users
  - No commercial users
  - Federal contractors require federal sponsorship
- Access controlled through:
  - Username
  - Password
- After approval, users can login and access TRAGIS

# TRAGIS Highway Routing Network

- Based on 1:100,000-scale data
- Over 21,000 links and 15,000 nodes
- Represents over 237,000 miles of roads
- Link attributes include
  - Road designation(s) [up to three]
  - Distance (based on shape)
  - Estimated driving speed

# Highway Link Attributes

- Toll indicator
- Commercial traffic prohibitions
- Urbanized areas over 100,000 people
- HRCQ preferred network, including state designations
- HazMat and radioactive restrictions
- Bridge and tunnel restrictions
- WIPP route designations

# Rail Routing is Different than Highway

- No single railroad provides service across the U.S. – unlike highways where many trucking companies serve the entire nation
- Railroad corporations own their right-of-way – trucks operate over public highways
- A railroad cannot operate over another company's line without trackage rights agreements
- Traffic interchange between railroads occurs only at certain locations
  - Traffic volume varies between interchanges
- Connecting tracks may not necessarily exist wherever rail lines cross

# WebTRAGIS Rail Network

- Based on 1:100,000-scale data revised using high-resolution satellite imagery
- Over 94,000 links and 35,000 nodes
- Represents over 143,000 miles of rail line
- Rail spurs are included in the network for ports, coal-fired and nuclear power plants, DOE sites, and military bases with rail access
- Transitioning control to FRA

# Additional Rail Attributes

- Number of tracks
- Frequency of passing sidings
- Subdivision names
- Crew change locations
- Major classification yards
- Track class
- Maximum operating speed
- Interchange locations between carriers

# WebTRAGIS Rail Routing Considerations

- Line ownership and trackage rights
- Model maximizes the use of more heavily traveled lines – referred to as Mainline Classification Code
- This isn't track class, but net result is to avoid low track class lines
- Interchange points between railroads
- Model provides a listing of all interchange locations
- Initial railroad maximizes its portion of revenue by maximizing the distance it carries the shipment
- TRAGIS tries to minimize the number of railroads on a route

# WebTRAGIS Waterways Network

- Derived from a 1:100,000 scale network from US Army Corps of Engineers and updated using satellite imagery
- 4,600 links and 4,000 nodes representing 160,000 waterway miles
- Waterway paths go through locks and dams at the actual barge channel
- Comprised of several subnetworks
  - Inland Waterways and Commercial Inland Waterways
  - Great Lakes
  - Coastal Waterways
  - Ocean Commercial Marine

# WebTRAGIS Output

- Provides a link by link summary of the route listed by state
- Details can be rolled up into individual state summaries
- By selecting a link, the map view will zoom in and highlight the link
- Each link has an estimated travel time, the distance, the impedance factor, and population density distance estimates
- Each file generates a Population Density Mileage Summary by State that is suitable for input into RADTRAN

- Partnership with, tribes, states, regulators, other stakeholders and industry, further clean-up mission while mitigating impacts to environment and communities.



# Contact for additional information

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