UNIT 2
REGULATORY CONTROLS

U.S. Nuclear Regulatory Commission and Agreement States

"Transportation of Radioactive Materials"
NRC Course H-308

OBJECTIVES

- Identify the primary international agency that regulates the transportation of hazardous materials.
- Identify the two primary domestic agencies that regulate the transportation of hazardous materials.
- Describe the roles of the domestic agencies and their regulatory responsibilities.

WORLD-WIDE PERSPECTIVE OF DANGEROUS GOODS TRANSPORT

	Fraction Of All Goods As Dangerous Goods	Fraction Of All Dangerous Goods That Are Radioactive
ROAD	15%	< 2%
RAIL	20%	< 2%
AIR	3 - 4%	< 10%
SEA	50%	< 1%

REPORTABLE INCIDENT

(Reference 49 CFR 171.15)

- DOT defines “reportable incidents" as incidents that as a direct result of hazardous material:
  - a fatality or injury (requiring admittance to a hospital) occurs;
  - requires the evacuation of the general public for one hour or more,
  - a major transportation artery or facility is closed or shut down for one hour or more; or
  - the operational flight pattern or routine of an aircraft is altered;
  - fire, breakage, spillage, or suspected radioactive contamination occurs involving a radioactive material or an infectious substance other than a regulated medical waste;
  - the release of over 119 gallons (liquid) or 882 pounds (solid) of a marine pollutant;
  - a situation exists of such a nature that it should be reported to the NRC even though it does not meet the criteria above; **or**
  - during transportation by aircraft, a fire, violent rupture, explosion or dangerous evolution of heat occurs as a direct result of a battery or battery-powered device.

INCIDENTS

SOURCE: Hazardous Materials Information System, USDOT (2009 2nd Quarter; Data as of 10/05/2009)

By Hazardous Materials Class

Hazardous Materials Class	Incidents	Injuries		Fatalities	Damages ($)
		Hospitalized	Non-Hospitalized		
All Classes (none for Class 7)	7,442	5	49	1	24,380,252

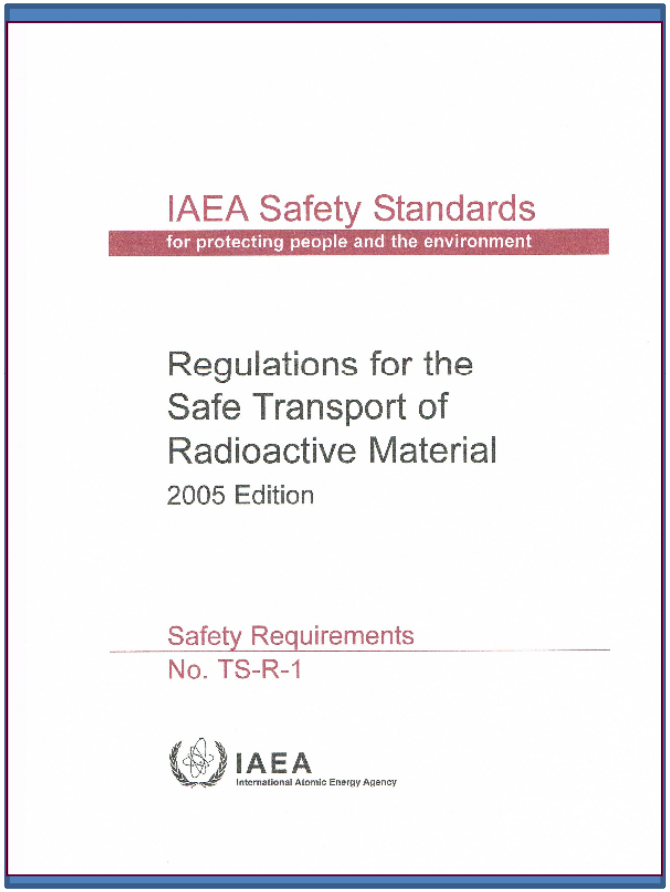
By Transportation Phase

Transportation Phase	Incidents	Injuries		Fatalities	Damages ($)
		Hospitalized	Non-Hospitalized		
In Transit	1,813	3	25	1	22,196,369
Loading	1,419	0	9	0	200,506
Unloading	3,936	2	13	0	1,179.823
In-Transit Storage	272	0	2	0	170,092

http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents

INTERNATIONAL ATOMIC ENERGY AGENCY

(IAEA)



IAEA TS-R-1
2009 EDITION

Establish standards of safety

- *containment of the radioactive contents;*
- *control of external radiation levels;*
- *prevention of criticality; and*
- *prevention of damage caused by heat.*

INTERNATIONAL ATOMIC ENERGY AGENCY
(IAEA)

- U.N. agency authorized by statute to develop regulations for the safe transport of RAM.
- Other U.N. bodies rely on IAEA for their regulatory documents.
  - ICAO: International Civil Aviation Organization
  - IMO: International Maritime Organization
  - UPU: Universal Postal Union
  - IMDG: International Maritime Dangerous Goods

INTERNATIONAL ATOMIC ENERGY AGENCY
(IAEA)

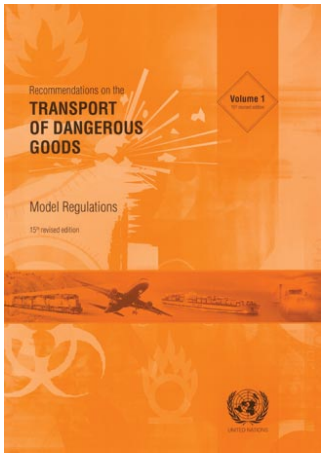
- IAEA regulations establish standards of safety.
  - Controls limits for packages and conveyances
  - Performance standard for package designs
  - Requirements on design & operation of packages
  - Requires administrative controls, e.g. approval by competent authority.

IAEA RAM TRANSPORT DOCUMENTS

TS-R-1	Regulations for the Safe Transport of Radioactive Materials (2009 Edition Safety Requirements)
TS-G-1.1	Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Materials (2008 Edition)
TS-G-1.2	IAEA Safety Guide: Planning and Preparing for Emergency Response to Transport Accidents Involving radioactive Material
TS-G-1.4	The Management System for the Safe Transport of RAM (2008 Edition)
TS-G-1.5	Compliance Assurance for the Safe Transport of Radioactive Material (2009 Edition)

IAEA REGULATIONS

ADOPTED INTO INTERNATIONAL REGULATIONS



"UN Recommendations on the Transport of Dangerous Goods" 2007 (Orange Book)

International Civil Aviation Organization - IT

Universal Postal Union

International Maritime Dangerous Goods

International regulations adopted into State and National Agreements

INTERNATIONAL REGULATIONS

- ICAO TI (International Civil Aviation Organization Technical Instructions) - based on the UN Recommendations on the Transport of Dangerous Goods and the International Atomic Energy Agency Regulations for the Safe Transport of Radioactive Material (TS-R-1).
- The U.S. Hazardous Materials Regulations authorize use of the IMDG Code as a means of compliance with the HMR when at least one segment of transport involves sea transport.

PRIMARY DOMESTIC AGENCIES

- DOT and NRC are the primary agencies issuing regulations based on the model regulations developed by the International Atomic Energy Agency (IAEA).

- The NRC and DOT share responsibility for the control of radioactive material transportation based on a Memorandum of Understanding (MOU, July 2, 1979).

- DOT is the "Competent Authority (the official U.S. representative organization)" to the IAEA (MOU, July 2, 1979).

MEMORANDUM OF UNDERSTANDING
JULY 2, 1979

- DOT U.S. Department of Transportation
  - Regulate safety in the transportation of hazardous materials, including radioactive materials.

- NRC U. S. NUCLEAR REGULATORY COMMISSION
  - License and regulate the receipt, possession, use, and transfer of “byproduct material”, “source material” and “special nuclear material”
  - Inspects licensees IAW DOT requirements

NUCLEAR REGULATORY COMMISSION

10 CFR 71.5

- NRC licensees *must* comply with 49 CFR 170-185 if they:
  - Transport licensed material outside the site of usage
  - Transport licensed material on public roads
  - Deliver licensed material to a carrier for transport

- Primarily concerned with special packaging req'ts for higher activity RAM.
  - develop safety standards of packages for fissile materials and quantities > Type A limits

DEPARTMENT OF TRANSPORTATION

- Governs all safety aspects of transportation, including packaging, handling, labeling, marking, placarding and routing, as well as the manufacture and maintenance of devices containing hazardous material.
- Title 49, Part 173, Subpart I (Class 7 radioactive material) sets forth the requirements for packaging and transportation of radioactive material.

49 CFR 171.1

DEPARTMENT OF TRANSPORTATION

- Responsible for developing safety standards for:
  - the classification of radioactive materials
  - design specifications and performance requirements of packages for quantities of radioactive material (other than fissile) not exceeding Type A limits
  - design specifications and performance requirements of packages for LSA radioactive material
  - external radiation fields, labeling, and marking of all radioactive materials packages and vehicles

DEPARTMENT OF TRANSORTATION

49 CFR 170-185

- The Pipeline and Hazardous Material Safety Administration (PHMSA):
  - Oversees rules governing the safe transportation and packaging of hazardous materials by all modes of transportation, excluding bulk transportation by water
  - Assists local and state authorities with training for hazardous materials emergencies
- PHMSA Office of Hazardous Materials Safety (OHMS) is the Federal safety authority for ensuring the safe transport of hazardous materials (hazmat) by air, rail, highway, and water.
  - Serves as the DOT representative on the National Response Team

OTHER OFFICES OF THE DOT

- Federal Aviation Administration (FAA) 49 CFR 175.705
  - Enforces the HMR for air transport activities
- Federal Railroad Administration (FRA) 49 CFR 174.700
  - Enforces the HMR for rail transport activities
- Federal Motor Carrier Safety Administration (FMCSA) 49 CFR 177.842
  - Enforces the HMR for highway transport activities

SAFE TRANSPORT OF CLASS 7 MATERIAL

(DOMESTIC REGULATIONS)

- 49 CFR 100-180
  - Subchapter A (Parts 105-110)
    - Hazardous Materials and Oil Transport
  - Subchapter B (Part 130)
    - Oil Transport
  - Subchapter C (Parts 171-180)
    - Hazardous Materials Regulations (HMR)
- 10 CFR Chapter 1
  - Part 71
    - Packaging and Transport of Radioactive Material

NRC-DOT INTERFACE

RADIOACTIVE MATERIAL PACKAGING & TRANSPORTATION REGULATION INTERFACE				
Requirement	**49 CFR 106-180**	**10 CFR 71**	**10 CFR 61**	**10 CFR 20**
Type B(*) Package	Type A Package §173.416 §173.467	Type A Package §71.5 §71.71 §71.73	N/A	N/A
Fissile Package	Type A or B Pkg §173.417	Type A Package Type B Package §71.22 §71.55 §71.74 §71.88	N/A	N/A
Marking of Packages (HazCom)	§172 Subpart D	§71.5	N/A	App G (§20.1904 & §20.1905)
Labeling of Packages (HazCom)	§172 Subpart E	§71.5	§61.71 (Waste)	
Transport Documents – Not Waste (HazCom)	§172 Subpart C §172 Subpart G	§71.5	N/A	
Transport Documents - Waste (HazCom)	§172 Subpart C §172 Subpart G	§71.5	N/A	Subpart K
Placarding	§172 Subpart F	§71.5	N/A	N/A

NRC-DOT INTERFACE

(CONT'D)

RADIOACTIVE MATERIAL PACKAGING & TRANSPORTATION REGULATION INTERFACE				
Requirement	**49 CFR 106-180**	**10 CFR 71**	**10 CFR 61**	**10 CFR 20**
Package Dose Rate (Transport Control)	§173.441 §177.842	§71.5 §71.47 §71.87	N/A	§20.1906
Contamination Limits (Transport Control)	§173.443 §173.843	§71.5 §71.43 §71.87	N/A	§20.1906
Thermal Limits (Transport Control)	§173.442	§71.5 §71.71 §71.87	N/A	Subpart K (for Waste)
Package Arrays (Transport Control)	§173.441 §173.457 §173.459	§71.59 §71.61 §71.63 §71.64	N/A	N/A
Quality Assurance	§173.403 §173.474 §173.475	Subpart G Subpart H	§61.1	§20.1001 §20.1906
Registration with DOT	§107 Subpart G	§71.5	N/A	N/A
Obtain NRC License	N/A	§71.20 (§71.14) §71.17	§61.3	§20.1001 §20.1002