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Land Transport Emergency Response Technology Report

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Prepared by
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LAND TRANSPORT EMERGENCY RESPONSE TECHNOLOGY REPORT

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Japan Nuclear Cycle Development Institute

Abstract

Sandia National Laboratories was tasked by the Japan Nuclear Cycle Development Institute (JNC) to provide assistance in developing an emergency response plan for radioactive material transportation activities. Those tasks included compiling radioactive materials (RAM) transportation accident data from the open literature and databases, investigating emergency response plans for radioactive materials transport in the United States, and developing specific recommendations for the JNC's nuclear material transport emergency response plan, based on information gathered during the first two tasks. These recommendations include developing a RAM database, a public transparency Internet website, an emergency response infrastructure designed specifically for transportation needs, and a clear set of directives to provide authority in the case of transportation accidents or incidents involving RAM.

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Nomenclature

AEC	Atomic Energy Commission
AECL	Atomic Energy of Canada Limited
CAO	Carlsbad Area Office
CFR	Code of Federal Regulations
CMR	Central Monitoring Room
CRL	Chalk River Laboratories
DFO	Disaster Field Office
DOD	Department of Defense
DOE	Department of Energy
DOJ	Department of Justice
DOS	Department of State
DOT	Department of Transportation
EM	Office of Environmental Management
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ETAS	Enterprise Transportation Analysis System
FBI	Federal Bureau of Investigation
FRA	Federal Railroad Association
FRERP	Federal Radiological Emergency Response Plan
FRMAC	Federal Radiological Monitoring and Assessment Center
FRP	Federal Response Plan
Hazmat	hazardous materials
HAZWOPER	Hazardous Waste Operations and Emergency Response (U. S. 29 CFR 1910.120)
HMIS	Hazardous Materials Information System
HLW	high-level waste
HMEP	Hazardous Materials Emergency Preparedness
IAEA	International Atomic Energy Agency
IART	Incident/Accident Response Team
IC	Incident Commander
ICS	Incident Command System
IAEA	International Atomic Energy Agency
JIC	Joint Information Center
JNC	Japan Nuclear Cycle Development Institute
JOC	Joint Operations Center
LC50	lethal concentration in 50% of the population
LFA	lead federal agency
NAERG	North American Emergency Response Guidebook
NASA	National Aeronautics and Space Administration
NCS	National Communications System
NDA	National Defense Area
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NRC	Nuclear Regulatory Commission

NSA	national security area
NTP	National Transportation Program
NTSB	National Transportation Safety Board
OSC	On-Scene Commander
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
ppm	parts per million
PSM	prospective shipment module
RAM	radioactive materials
RAP	Radiological Assistance Program
RAT	Radiological Assessment Team (AECL) or Radiological Assistance Team (DOE)
RMIR	Radioactive Materials Incident Report
RSPA	Research and Special Programs Administration
SCBA	self-contained breathing apparatus
SCT	Transport and Communications of Mexico
SEO	Senior Emergency Officer
SFEN	Societe Francaise d'Energie Nucleaire
SMRO	Security Monitoring Room Operator
SNL	Sandia National Laboratories
TC	transport Canada
TEPP	Transportation Emergency Preparedness Program
TRANSCOM	Transportation Tracking and Communications System
TRU	transuranic waste
USCG	United States Coast Guard
WIPP	Waste Isolation Pilot Plant

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1. Introduction

Sandia National Laboratories (SNL) was tasked by the Japan Nuclear Cycle Development Institute (JNC) to provide assistance in developing an emergency response plan for radioactive material transport. Specific tasks included:

Task 1: *Accident data* for radioactive material (RAM) transport accidents will be compiled from the open literature and databases and will include details of the cause, packaging, local accident response, and subsequent site remediation and restoration as available.

Task 2: *Emergency response plans* for radioactive materials transport in the United States will be investigated.

Task 3: *Specific recommendations* for the Japan Nuclear Cycle Development Institute's (JNC's) nuclear material transport emergency response plan will be developed based on a review of the above items.

The three tasks described above are contained within Sections 2, 3, and 4, respectively, of this report.

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2. Task 1: Radioactive Materials (RAM) Transportation Accident Data

The first task involved gathering data and information from the open literature and from databases. The Radioactive Materials Incident Report (RMIR) database was the primary database consulted due to its direct relevance to the task. In addition, four RAM transportation accident case studies were examined and the lessons learned are discussed. Additional sources of information include the International Atomic Energy Agency (IAEA), U. S. Nuclear Regulatory Commission (NRC), Environmental Protection Agency (EPA), Department of Energy (DOE), Transportation Emergency Preparedness Program (TEPP), the North American Emergency Response Guidebook (NAERG), and the Hazardous Materials Emergency Preparedness (HMEP).

2.1 RAM Transportation Accident Databases

The RMIR is the only database in the United States that exclusively contains data related to radioactive materials transportation accidents and incidents. The RMIR database that was developed in 1981 at the Transportation Technology Center of SNL to support its research and development activities for the DOE. This database was developed to serve as a single-point resource that contains all pertinent information related RAM transportation incidents. The RMIR contains information about radioactive materials transportation incidents that have occurred in the United States since 1971 (the date when the U. S. Department of Transportation (DOT) instituted new reporting requirements for transportation incidents and accidents involving hazardous, including radioactive, materials). It includes information on the mode of transport and type of vehicle, type of RAM packaging, whether or not radioactivity was released, any subsequent injuries and deaths due to radioactivity released, and a narrative that contains details of the accident. Although the narratives that were provided to describe the incidents/accidents often include information on local accident response and subsequent site remediation and restoration, this is not a required field in the database.

The RMIR database draws most of its information from the DOT Hazardous Materials Information System (HMIS) database, a computerized information management system containing data related to the transportation of all hazardous materials by air, highway, rail, and water. However, RMIR also includes data obtained from the NRC, state radiation control offices, the DOE Unusual Occurrence Report database, and media coverage of radioactive materials transportation incidents.

2.2 Other Databases

The DOT maintains several other databases that contain statistics on all transportation accidents (i.e., not limited to the transportation of hazardous or radioactive materials). Statistics from these databases are often used in RAM transportation risk analyses because there are so few actual RAM transportation accidents from which to derive meaningful data. One such database is the Federal Railroad Association (FRA) database that contains railroad ac-

cident and incident reports the railroads are required, by law, to submit to the FRA. The FRA Safety database is currently accessible via the Internet at <http://safetydata.fra.dot.gov/officeofsafety/>.

The National Response Center, operated by the U. S. Coast Guard (USCG), recently implemented an on-line query system that makes all dangerous goods and hazardous substances spill data available via the Internet (<http://www.nrc.uscg.mil/foia.htm>), last accessed in December 2000. The primary function of the National Response Center is to serve as the national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States.

2.3 RAM Transportation Accident/Incident Reporting Requirements

The two federal agencies with primary responsibility for developing and promulgating regulations for the transport of radioactive materials in the United States are the DOT and the NRC, and the RMIR database derives most of its information from these two agencies. Reporting requirements for these two agencies differ. DOT regulations for reporting a hazardous materials incident (of which radioactive material is a subset) are specified in the Code of Federal Regulations (49 CFR 171.15). The DOT requires that a report be filed after each incident that occurs during the course of radioactive materials transportation (including loading, unloading, handling and temporary storage) in which one of the following directly results: (1) a person dies; (2) a person is injured and requires hospitalization; (3) estimated carrier or other property damage exceeds \$50,000; (4) there is fire, breakage, spillage, or suspected contamination involving radioactive materials; or (5) a situation that the carrier believes should be reported. The NRC regulations are also outlined in the Code of Federal Regulations (10 CFR 20.402 and 20.403) and require that the theft or loss of radioactive materials, exposure to radiation, or release of radioactive materials be reported.

2.4 RAM Transportation Accident/Incident Statistics

The RMIR database is the best single-point source for transportation accident/incident information in the United States and the statistics provided in this section were obtained from that source. The following definitions apply:

Transportation Accident: A vehicle transporting radioactive material is involved in an accident in which there is a fatality or injury, or in which the vehicle is damaged enough that it cannot move under its own power.

Handling Accident: Damage to a packaging during loading, handling, or unloading operations (e.g., a forklift puncturing a package at a warehouse).

Other Incident: An actual or suspected release, or surface contamination of radioactive materials from either the package or the transport vehicle that exceeds the regulatory requirements.

Missing or Stolen: Other incidents that involve the loss or theft of a radioactive cargo (e.g., the theft of a soil moisture-density gauge from a construction vehicle).

According to the U. S. Census Bureau (1997), RAM shipments represented less than 1% of the total number of hazardous material shipments (in terms of dollar amounts and miles traveled). The majority of the RAM shipments (again, in terms of dollar amounts and miles traveled) were made by truck, followed closely by rail (see precise values in Tables 1 and 2).

Table 1. Characteristics for Hazardous Materials Shipments (all hazard classes) versus Radioactive Materials Shipments (Hazard Class 7) (adapted from U. S. Census Bureau, 1997).

Hazard Class	Value		Tons		Ton-miles		Ave. miles per shipment
	Number (million dollars)	Percent	Number (thousands)	Percent	Number (millions)	Percent	
Total of all classes	466,407	100	1,565,196	100	263,809	100	113
RAM Class 7	2,722	0.6	87	<1	48	<1	445

*Adapted from U. S. Census Bureau, 1997.

Table 2. Characteristics for Radioactive Materials Shipments (Hazard Class 7) by Mode of Transport (adapted from U. S. Census Bureau, 1997).

Mode of Transport	Value		Tons		Ton-miles		Ave. miles per shipment
	Number (million dollars)	Percent	Number (thousands)	Percent	Number (millions)	Percent	
All Modes	2,722	100	87	100	48	100	445
Truck	1,456	53.5	56	64.4	17	35.4	77
Rail	914	33.6	20	23.0	16	33.3	1,462
Water	<1	<1	<1	<1	<1	<1	<1
Multiple Modes	352	12.9	11	12.6	15	31.3	1,087

*Adapted from U. S. Census Bureau, 1997.

Table 3 shows the transportation events reported in the RMIR database since 1971. These statistics do not include events reported to the NRC since December 1998; however, this does not affect the number of reported “accidents,” only the number of events categorized as

“missing or stolen.” Since most radioactive materials are transported on the highway, this mode of transport constitutes the largest number of reported events (73%). Highway shipments generally include industrial gauges, radioactive material used in or as a result of the nuclear fuel cycle, low-level radioactive materials or waste, and sources used in medical devices.

Table 3. Statistics for U. S. RAM transportation events: 1971–April 2000.*

Mode	Transportation Event					Total	%
	Transport Accidents	Handling Accidents	Missing or Stolen	Weeping Incidents	Other Incidents		
Highway	349	111	208	6	752	1426	73
Rail	27	3	0	1	31	62	3
Water	2	4	1	0	9	16	1
Air	25	162	40	0	149	376	19
Warehouse	0	2	3	0	1	6	<1
Courier	2	2	2	0	4	10	<1
Freight Forwarder	0	5	2	0	11	18	1
Unknown	0	4	12	0	25	41	2
Totals	405	293	268	7	982	1955	N/A
% total	21%	15%	14%	<1%	50%	N/A	NA

*Does not include NRC reports since December 1998. (This impacts the number of “missing or stolen” events but not number of reported “accidents”).

Table 4 shows the number of reported incidents categorized by type of radioactive material transported. Transportation events involving industrial materials such as nuclear moisture density gauges used in construction operations, represent the largest category of reported events.

Table 5 shows the total number of packages involved in transportation events. At least 75% of the reported events involve packages of the industrial type (strong and tight) and Type A, while Type B packages represent only 11% of the total packages involved in transportation events.

Table 6 may be more useful because it shows the number of accidents involving each package type. Recall from Table 3 that “accidents” represent only 21% of the reported events in the RMIR database. Type A packages were involved in the greatest number of accidents (56%) while Type B packages were involved in only 15% of all RAM transportation accidents.

Further, Table 7 breaks down each of the 61 accidents involving Type B packages and provides data regarding the mode of transport, type of RAM being shipped, and the number of packages shipped and damaged during transport. Shipments carrying spent fuel casks are noted in bold. A detailed description of each accident obtained from the RMIR database is contained in Appendix A.

Table 4. Classification of Reports (1971–April 2000).*

Classification of Nuclear Material	Number of Reports	Percentage of Reports
Medical	532	27%
Industrial	609	31%
Nuclear Fuel Cycle	606	31%
Low Level Waste	56	3%
Unknown	152	8%

* Does not include NRC reports since December 1998.

Table 5. Total Number of Packages Involved in Transportation Events Involving Nuclear Material (1971–April 2000).*

Package Type	Total Number of Packages	Percentage of Total
Strong-Tight	440	21%
Type A	1132	54%
Type B	240	11%
Unknown	272	13%
Total Number of Packages	2084**	

* Does not include NRC reports since December 1998.

** Number of packages exceeds number of incidents because shipments can contain multiple packages.

Table 6. Number of Accidents Involving Each Nuclear Material Package Type (1971–April 2000).

Package Type	Number of Accidents*	Percentage of Total
Strong-Tight	48	12
Type A	232	56
Type B	61	15
Unknown	69	17

*Number of accidents totals 410 (exceeds the 405 provided in Table 3) because some shipments involve multiple package types.

Table 7. Summary of Accidents Involving Type B Packages (1971–April 2000).

Date of Accident	Mode	Package Description	RAM Involved	Packages Shipped/Damaged
07/10/71	Highway	Lead container	Co-60	1/0
12/05/71	Highway	Radiography camera	Ir-192	1/0
12/08/71	Highway	Cask, spent fuel	Spent Fuel	1/1
03/10/74	Highway	Container	Ir-192	1/0
03/29/74	Rail	Cask, spent fuel	Empty spent fuel cask	1/0
08/09/75	Highway	Cask	U-235 , U-238, Pu 239	1/0
05/06/77	Highway	Radiography camera	Ir-192	1/0
08/11/77	Highway	Radiography camera	Ir-192	1/0
08/25/77	Rail	Cylinders	UF6	4/0
10/03/77	Highway	Radiography source	Ir-192	1/0
02/09/78	Highway	Cask, spent fuel	Spent fuel	1/0
04/10/78	Highway	Radiography camera	Ir-192	1/0
07/07/78	Highway	Cask	Mixed fission	1/0
07/26/78	Highway	Steel cask, lead	Cs-137	2/0
08/13/78	Highway	Cask, spent fuel	Empty spent fuel cask	1/0
08/27/78	Highway	Radiography camera	Ir-192	1/0
09/11/78	Highway	Radiograph), camera	Ir-192	1/0
09/15/78	Highway	Radiography camera	Ir-192	1/0
11/28/78	Highway	Radiography camera	Ir-192	1/0
01/10/79	Highway	Cylinder	Ir-192	5/0
08/12/79	Highway	Cask	Empty	2/0
12/11/79	Highway	Cylinder	UF6	5/0
01/14/80	Highway	Cask, teletherapy	Co-60	1/0
01/31/80	Highway	Cask	Low level Waste	2/0
07/21/80	Highway	Source	Ir-192	1/0
08/22/80	Highway	Cylinder, 30B	UF6	5/0
09/06/80	Rail	Cylinder, 30B	UF6	8/0
09/29/80	Rail	Radiography source	Sr-90, Y-90	3/0
06/09/81	Highway	Source, shielded	Am-241/be	1/0
09/02/81	Highway	Source	Ir-192	1/0
10/26/81	Highway	Radiography camera	Ir-192	1/0
11/03/82	Highway	Cask	Empty LLW	2/0
03/11/83	Highway	Cask	LLW	1/0
05/10/83	Highway	Radiography source	Ir-192	1/0
07/14/83	Air	Cask	Y-90, Ir-192	2/0
12/09/83	Highway	Cask, spent fuel	Spent fuel	1/0
07/16/84	Air	Container	Ir-192	1/0
08/08/84	Highway	Container	Reactor waste	1/0
02/11/85	Highway	Steel drum	Ir-192	1/0
02/13/85	Highway	Steel drum	Ir-192	1/1
12/04/85	Highway	Radiography camera	Ir-192	1/0
01/10/86	Highway	Source	Cs-137	1/0
08/15/86	Highway	Cylinder, 30B	UF6	3/0
03/24/87	Rail	Cask, spent fuel	Spent fuel	2/0
10/26/87	Highway	Radiography source	Ir-192	1/0
01/09/88	Rail	Cask, spent fuel	Empty Spent Fuel cask	1/0
01/23/88	Highway	Radiography camera	Ir-192	1/0

Table 7. Summary of Accidents Involving Type B Packages (1971–April 2000) (continued).

Date of Accident	Mode	Package Description	RAM Involved	Packages Shipped/Damaged
09/23/88	Highway	Radiography camera	Ir-192	1/0
03/27/89	Highway	Radiography camera	Ir-192	1/0
05/19/89	Highway	Cask	LLW	1/0
06/08/91	Highway	Radiography camera	Ir-192	1/0
09/15/91	Highway	Radiography camera	Ir-192	1/0
11/03/91	Highway	Radiography camera	Ir-192	1/0
02/07/92	Highway	Radiography camera	Ir-192	1/0
03/04/93	Highway	LLW Cask	LLW	1/0
10/10/94	Highway	Sealed Source	Ir-192	1/0
12/23/94	Rail	Cylinder (14 ton)	UF6	1/0
12/14/95	Rail	Cask, Spent Fuel	Empty Spent Fuel Cask	1/0
09/09/96	Air	Packages (no details)	Ir-192	1/0
01/24/97	Highway	UF6 Cylinders	UF-6	4/0
03/5/98	Highway	Radiography camera	Ir-192	1/0

(Shipments involving spent fuel casks are noted in bold).

Of the 61 accidents involving Type B packages reported since 1971, eight accidents involved shipments of nine spent fuel casks. Only four casks were actually carrying spent fuel (three by highway and one by rail). The remaining four accidents (three by rail and one by highway) involved empty spent fuel casks (one of the rail shipments carried two empty casks).

There have been no releases of spent nuclear fuel under accident conditions; however, there have been eight reported incidents involving releases of spent fuel since 1960 (source: RMIR database and <http://www.state.nv.us/nucwaste/trans/nucinc01.htm>, last accessed December 2000). Four of the reported incidents involved releases of contamination beyond the vehicle (Table 8) and four involved releases confined to the vehicle (Table 9). Six of these eight incidents occurred prior to the date RMIR began recording data and were identified in a series of U. S. Atomic Energy Commission (AEC) reports (source: <http://www.state.nv.us/nucwaste/trans/nucinc01.htm>).

Table 8. Incidents Involving the Release of Spent Nuclear Fuel Where Contamination Went Beyond the Vehicle.

Date	Mode	Description of Incident
6/2/60	Rail	Leak from cask, small areas at three rail yards contaminated, no runoff or aerial dispersion
8/21/62	Truck	Cask leakage, trailer and small portion of road contaminated.
11/11/64	Truck	Cask leakage, cask contaminated, contamination confined to trailer.
1/27/84	Truck	Slow drip from bottom front end of empty cask while stored in transportation terminal (See Figure 1)

Figure 1 shows the RMIR database report for the Rockwell International spent fuel cask incident. It should be noted that the cask was being stored at the transportation terminal and was not in transit when the release took place.

Incident Number: 84030208	Date: 01/27/1984	Time: 16:00
Mode: HIGHWAY	Vehicle: TRUCK, FLATBED	
Accident Code: I	Transportation Link Closed?: N	
Radioactivity Released: 0.001 UCI	Search Code: NFC	
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TRI-STATE MOTOR TRANSIT CO		MISSOURI
Location: TRI-STATE TERMINAL, TRACY		CALIFORNIA
Shipper: ROCKWELL INTERNATIONAL		WASHINGTON
Consignee: ROCKWELL INTERNATIONAL		CALIFORNIA
Remarks:		
SLOW DRIP FROM BOTTOM FRONT END OF SHIPPING CASK--STORED IN TRI-STATE TERMINAL. EMERGENCY RADIOLOGICAL ASSISTANCE TEAM AT LAWRENCE LIVERMORE SURVEYED THE TRACTOR, CASK AND TRAILER. ALL SURFACE READINGS ON THE CASK WERE LESS THAN 0.5 MR/HR WITH 2 EXCEPTIONS; ONE READING OF 5 MR/HR BETA-GAMMA ON THE REAR END CAP OF CASK AND 1 MR/HR ON THE FRONT END CAP OF CASK. MORE DATA AVAILABLE.		
TERMINAL. EMERGENCY RADIOLOGICAL ASSISTANCE TEAM AT LAWRENCE LIVERMORE SURVEYED THE TRACTOR, CASK AND TRAILER. ALL SURFACE READINGS ON THE CASK WERE LESS THAN 0.5 MR/HR WITH 2 EXCEPTIONS; ONE READING OF 5 MR/HR BETA-GAMMA ON THE REAR END CAP OF CASK AND 1 MR/HR ON THE FRONT END CAP OF CASK. MORE DATA AVAILABLE.		
--- Materials Involved ---		
Category: EMPTY		
EMPTY SPENT FUEL CASK		
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	HALLAM CASK	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: N/A		

Figure 1. Rockwell International transportation incident report from RMIR database.

Table 9 shows four incidents where spent nuclear fuel was released from a cask but the contamination was confined to the transporting vehicle. Only the fourth incident on July 4, 1976, is contained in the RMIR database (see Figure 2) because the other incidents occurred prior to DOT record keeping.

Figure 2 shows the RMIR database report for the San Onofre spent fuel cask incident on July 4, 1976.

In summary, there have been no releases of spent nuclear fuel under accident conditions. However, there have been at least eight incidents involving such a release, as described above. On the other hand, accidents involving other package types have resulted in releases of RAM. These accidents have usually involved packages of the industrial type (strong and tight) or Type A packages that were not designed to withstand accident conditions.

Table 9. Incidents Involving the Release of Spent Nuclear Fuel Where Contamination was Confined to the Vehicle.

Date	Mode	Description of Incident
11/20/60	Truck	Small leak from cask onto trailer floor, result of shifting cask, contamination confined to vehicle
9/22/61	Truck	Leak from cask onto trailer floor, result of shifting, contamination confined to vehicle
12/10/63	Rail	Cask leakage, cask contaminated, contamination confined to trailer
7/4/76	Truck	Pinhole leak of, reported as, coolant/moderator on outside jacket of cask. Shipment continued without risk to public (See Figure 2)

2.5 Case Histories (Accident Response and Site Remediation)

Four case studies are described in this section and the lessons learned are discussed at the end. Accident response times are usually on the order of minutes. The first to arrive on the scene are usually the local law enforcement, followed by the local firefighters and paramedics, and/or local hazardous materials (hazmat) team. The state, tribal, or local government has the ultimate responsibility for taking emergency actions at the radiological emergency scene, although several federal agencies play significant supporting roles, as described in Section 3 of this report.

There has never been a release from a Type B package under accident conditions in the United States, and hence, there never was a release of spent fuel or high-level waste due to a transportation accident. All accidents with RAM releases have involved packages of the industrial type (strong and tight) or Type A packages. The regulatory limit on the activity that can be transported in a Type A package, the A1 or A2 magnitude, provides a high level of environmental safety when releases from Type A packages (or industrial packages) occur. Therefore, site remediation activities are often limited to simply picking up and re-packaging the spilled contents.

2.5.1 Springfield, Colorado, September 27, 1977

On September 27, 1977, a truck carrying 50 drums of uranium oxide, or “yellow cake,” for Exxon Minerals Company collided with three horses approximately 14 miles north of Springfield, Colorado. The truck overturned and 29 of the 50 drums lost their lids, releasing between 10,000 and 12,000 pounds of yellow cake. Five thousand (5,000) pounds were contained within the trailer; however, the remaining 7,000 pounds were spilled onto a 3,000 by 4,000 square-foot area. Police and fire department personnel initially covered the truck and contaminated areas with canvas and heavy plastic sheeting. Later, the loose yellow cake was repackaged and clean-up crews worked with hand tools, vacuums, and scrub brushes to decontaminate the area. The crews worked under a tent to minimize the potential for airborne dispersion of yellow cake powder. The State of Colorado insisted upon decontamination to background levels. Within two weeks the Health Department took its final readings and released the area for public use.

```

Incident Number: 6070402      Date: 07/04/1976      Time:
Mode: HIGHWAY                Vehicle: TRUCK, TRAILER
Accident Code: I             Transportation Link Closed?: N
Radioactivity Released: NONE      Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier:   TRI-STATE MOTOR TRANSIT CO      MISSOURI
Location:  TRUCK STOP                       WYOMING
Shipper:   SAN ONOFRE NUCLEAR POWER STATION CALIFORNIA
Consignee: GENERAL ELECTRIC                ILLINOIS
Remarks:
INTERNAL PRESSURE: WHILE STOPPED IN ROCK SPRINGS, WY, THE DRIVER NOTICED A
LEAK DURING ROUTINE INSPECTION. A LEAK DEVELOPED IN THE OUTSIDE JACKET OF
THE SHIPPING CASK. THE PINHOLE LEAK ALLOWED THE LOSS OF COOLANT/MODERATOR
(BORATED ETHYLENE GLYCOL). THE ESTIMATED ACTIVITY WAS 50,000 CI. RESPONSE
TEAM FROM ID FALLS, ID, RESPONDED & DETERMINED SHIPMENT COULD CONTINUE
WITHOUT RISK TO PUBLIC SAFETY.
NOTICED A LEAK DURING ROUTINE INSPECTION. A LEAK DEVELOPED IN THE OUTSIDE
JACKET OF THE SHIPPING CASK. THE PINHOLE LEAK ALLOWED THE LOSS OF
COOLANT/MODERATOR (BORATED ETHYLENE GLYCOL). THE ESTIMATED ACTIVITY WAS
50,000 CI. RESPONSE TEAM FROM ID FALLS, ID RESPONDED & DETERMINED SHIPMENT
COULD CONTINUE WITHOUT RISK TO PUBLIC SAFETY.

--- Materials Involved ---
Category: SPENT FUEL
SPENT FUEL

--- Packages Involved ---
Description                    ID Code                    DOT
CASK                           NAC-1                      Category
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: N/A

```

Figure 2. San Onofre Nuclear Power Station transportation incident report from RMIR database.

This case is a good example of how the emergency response and subsequent site remediation activities matched the risk level associated with the released material. Often the risks associated with a RAM shipment are exaggerated but in this particular case the actions were appropriate. This example was retrieved from the RMIR database and is one of a series of similar such accidents.

2.5.2 Oak Ridge National Laboratory, December 8, 1971

Only one spent nuclear fuel accident has resulted in more than trivial damage to the cask. This was a highway accident on December 8, 1971, on U. S. 25 in Tennessee (see Figure 3). The cask was thrown into a ditch as the result of a rollover. However, radiation surveys taken at the accident scene indicated that the structural integrity of the cask was not compromised and there was no release of RAM. The driver of the truck transporting the cask was killed in the accident but these conditions were not related to the radioactive nature of the cargo.

```

Incident Number: 1120173      Date: 12/08/1971      Time: 13:50
Mode: HIGHWAY                Vehicle: TRUCK, FLATBED
Accident Code: T             Transportation Link Closed?: Y
Radioactivity Released: NONE      Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier:  KILLION MOTOR EXPRESS, INC      KENTUCKY
Location: US 25-WEST, 2.3 NORTH OF CLINTON  TENNESSEE
Shipper:  GULF ENERGY & ENVIRONMENTAL SYSTEMS  PENNSYLVANIA
Consignee: OAK RIDGE NATIONAL LABORATORY    TENNESSEE
Remarks:
TRUCK LEFT ROAD TO AVOID HEAD ON: THE TRUCK TRANSPORTING THE SPENT
REACTOR FUEL ELEMENT SWERVED TO AVOID A HEAD-ON COLLISION WITH
ANOTHER VEHICLE AND WAS FORCED OFF THE ROAD. THE DRIVER WAS KILLED BY
IMPACT AND THE SPENT FUEL CASK WAS THROWN INTO A DITCH. THE RAD
ASSISTANCE TEAM FROM OAK RIDGE ARRIVED. SURVEYS INDICATED THERE WAS
NO RELEASE. THE CASK WAS TAKEN TO OAK RIDGE FOR EXAMINATION-CASK
PAINT, TARPAULIN & THERMAL INSULATION & CENTER RING DOWELS & BOLTS
WERE DAMAGED. NO RELEASE.

--- Materials Involved ---
Category: NFC
SPENT FUEL

---Packages Involved ---
Description          ID Code          DOT
CASK                 HNPf            B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 1

```

Figure 3. Oak Ridge National Laboratory accident report from RMIR database.

2.5.3 Southern Pacific, January 7, 1982

A Southern Pacific Transportation Company Train carrying radioactive material derailed 14 cars at Thermal, California, while traveling at 57 miles per hour. The RMIR accident report is shown in Figure 4. Four individuals who illegally stowed away on the train were seriously injured and a fifth such individual died. Radioactive material was discovered in a derailed car about an hour after the accident; however, accurate information regarding the RAM shipment was not available until about five hours after the accident. The emergency response effort was hampered by erroneous information contained in the shipping documents. In addition, erroneous information had been provided to the crew, resulting in the train not being operated in accordance with Southern Pacific's rules for carrying hazardous materials. This misinformation resulted in an overreaction to the situation.

The RAM was a special form radioactive material consisting of 16 curies of americium-241 and beryllium. (A special form RAM means that the material might present some direct radiation hazard due to radiotoxicity but would have little possibility of contamination). The RAM packaging consisted of a steel cylinder with polyethylene filling the interior void. There was no obvious damage to the RAM packaging, and monitoring conducted after the accident indicated no abnormal radiation levels outside the packaging (NTSB, 1983).

Incident Number: PNOV8202	Date: 01/07/1982	Time: 22:00
Mode: RAIL	Vehicle: RAIL CAR	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE	Search Code: IND	
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: SOUTHERN PACIFIC RAILROAD		
Location: ALONGSIDE ROUTE 111		CALIFORNIA
Shipper: SCHLUMBERGER WELL SERVICES		TEXAS
Consignee: SCHLUMBERGER WELL SERVICES		CALIFORNIA
Remarks:		
DERAILMENT, NO DAMAGE TO RAM: 14 CARS DERAILED. BILL OF LADING STATED: 'RAM-NOS, URANIUM FISSILE CLASS III.' ACTUALLY, THE RAM ON BOARD WAS A 16 CI AMERICIUM SOURCE. 65 PEOPLE WERE THOUGHT TO HAVE BEEN EXPOSED TO THE URANIUM FISSILE MATERIAL AND WERE ISOLATED. ALSO, THE HOSPITAL WHERE INJURED PEOPLE WERE TAKEN WAS SEALED OFF. THE SOURCE WAS RECOVERED INTACT AND UNDAMAGED. MORE DATA AVAILABLE.		
--- Materials Involved ---		
Category: INDUSTRIAL		
AMERICIUM/BERYLLIUM		
--- Packages Involved ---		
Description	ID Code	DOT Category
DRUM	UNKNOWN	A
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Figure 4. Southern Pacific train derailment accident report from RMIR database.

2.5.4 Springfield, Massachusetts, December 16, 1991

One of the most notable transportation accidents in the United States involved the shipment of 12 Type A packages, each of which contained 2 unirradiated nuclear fuel assemblies destined for Vermont Yankee Nuclear Power Plant (U. S. NRC, 1992a and 1992b). The accident occurred early in the morning on December 16, 1991 on Interstate 91 in downtown Springfield, Massachusetts (see Figure 5). A car was traveling on the wrong side of the interstate, and although the truck driver swerved to avoid a collision, the car struck the tractor-trailer on the right side near the right fuel tank. The truck continued northbound and hit the center guardrail on the opposite side of the road. After striking the outside guardrail, the truck skidded across the highway and came to rest against the center guardrail.

A fire started in the engine compartment of the tractor and spread to the entire tractor and then the trailer. The NRC's report on the accident (U. S. NRC, 1992a and 1992b) indicated that the fire burned for at least 45 minutes before the cargo was affected. At the time, the entire cargo was entirely intact. However, since the fire was not extinguished, the flatbed trailer and the radioactive cargo also burned. The entire fire lasted approximately three hours.

The tractor-trailer was completely destroyed by the fire and there was significant damage to several Type A packages and their contents. Eight containers fell off the trailer and sustained minor damage from the impact. The wooden outer containers burned and the inner

metal containers sustained damage ranging from minor to severe. However, no release of radioactive materials occurred.

Incident Number: TTC0292	Date: 12/16/1991	Time: 3:00
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE	Search Code: FIRE	
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: MCGIL TRUCKING		GEORGIA
Location: I-91, EXIT 7, SPRINGFIELD		MASSACHUSETTS
Shipper: GENERAL ELECTRIC		NORTH CAROLINA
Consignee: VERMONT YANKEE NUCLEAR POWER PLANT		VERMONT
Remarks:		
COLLISION; NO RELEASE: PRELIMINARY DATA: EVIDENTLY, A DRUNKEN DRIVER WAS TRAVELING SOUTH IN THE NORTHBOUND LANES WITHOUT HEADLIGHTS. THE CAR GLANCED OFF THE MCCGIL TRUCK WHICH WAS TRANSPORTING 12 PACKAGES OF FRESH FUEL (2 ASSEMBLIES IN EACH PACKAGE). THE FIRE DEPT BELIEVES THAT THE TRUCK STRUCK THE RIGHT GUARDRAIL THEN HIT THE CENTER GUARDRAIL AND THE SADDLE GAS TANK RUPTURED. THE TRUCK/TRAILER WAS ENGULFED IN FLAMES. THERE WAS NO RELEASE OR CONTAMINATION. MORE DATA AVAILABLE.		
--- Materials Involved ---		
Category: NFC		
FRESH FUEL		
---Packages Involved ---		
Description	ID Code	DOT Category
CASING, METAL	USA/4986	A
# Packages: Shipped: 12; Damaged w/ Release: N/A; Damaged, No Release: 12		

Figure 5. Springfield, Massachusetts's transportation accident report from RMIR database.

The firefighters did not extinguish the blaze immediately due to lack of knowledge and training in responding to RAM accidents. Had the fire been extinguished immediately, the damage to surrounding structures would have been minimal and the media attention would have been less. This was a very high profile accident because, even though no RAM was released, the accident was significant from a public relations standpoint.

2.5.5 Lessons Learned

Important lessons were learned as a result of the four RAM transportation accidents described above. First, emergency response and site remediation activities must be consistent with the actual risk level associated with the RAM involved. Second, actions must be taken to ensure that shippers of radioactive materials know and understand the nature of the radioactive cargo they are shipping, and shipping documents must be complete and accurate. Third, emergency response personnel, including firefighters and emergency medical personnel, must be trained and drilled in responding to transportation emergencies involving RAM. Lack of knowledge seriously hampers both the response to a RAM incident and any subsequent activities, including site remediation. The philosophy of the trained response force should include an assumption that a spill will actually occur some time in the future, and that the responders can mitigate up to and including the worst-case accident. And fi-

nally, it is very important to have a good public relations team to handle public and media interactions.

2.6 Selected Resources

This section includes a sampling of the various resources available online for issues related to RAM transportation emergency response.

2.6.1 International Atomic Energy Agency (IAEA)

The IAEA provides guidelines for RAM transportation emergency response programs in Safety Series No. 37 (Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material Safety). The IAEA safety guidelines are located at <http://www.iaea.or.at/ns/>.

2.6.2 Nuclear Regulatory Commission (NRC)

The NRC maintains a website (<http://www.nrc.gov/>) containing a wealth of information, including a copy of the Federal Radiological Emergency Response Plan (located at <http://www.nrc.gov/NRC/AEOD/ER/FRERP/frerp.html>). The FRERP is discussed in detail in Section 3 of this report.

2.6.3 Environmental Protection Agency (EPA)

The EPA Radiological Emergency Response Plan (RERP) outlines EPA's approach to managing radiological releases. A copy of the RERP can be downloaded at <http://www.epa.gov/radiation/rert/>.

2.6.4 DOE Transportation Emergency Preparedness Program (TEPP)

The DOE TEPP addresses the emergency response concerns of state, tribal, and local officials affected by DOE RAM shipments. TEPP training and guidance documents for initial responders are located at <http://www.em.doe.gov/otem/>.

2.6.5 North American Emergency Response Guidebook (NAERG)

A downloadable copy of the North American Emergency Response Guidebook (NAERG) is located at <http://hazmat.dot.gov/guidebook.htm>. The NAERG was developed jointly by Transport Canada (TC), the U. S. DOT, and the Secretariat of Transport and Communications of Mexico (SCT) for use by initial responders to transportation incidents involving dangerous goods (U. S. DOT, 2000). It is primarily used to identify the hazards of the materials involved in the incident and to protect responders and the general public during the ini-

tial response phase. In the United States, first responders are required by law (under OSHA, 29 CFR 1910.120 and EPA, 40 CFR Part 311) to be trained in the use of the NAERG.

2.6.6 Hazardous Materials Emergency Preparedness (HMEP) Program

The HMEP Program is a joint effort between the U. S. DOT Research and Special Programs Administration (RSPA) and the Federal Emergency Management Agency (FEMA). The HMEP maintains links to various HAZMAT websites at <http://www.fema.gov/emi/hmep/hmlinks.htm>.

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3. Task 2: RAM Transport Emergency Response Plans

The second task for the JNC project involved reviewing RAM transportation emergency response plans in the United States. In this section, the main components of a response plan are outlined and the federal response to a radiological emergency is described in detail. Two examples are provided: one for the shipment of RAM to the DOE Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico and the second for the shipment of RAM from a location in Canada (Chalk River Laboratories) to a site in the United States (Los Alamos National Laboratories [LANL]).

3.1 Introduction

Often the transportation emergency response plan is part of a broader emergency management program plan that outlines the emergency procedures for a particular facility (for example, the Hanford Site in southeastern Washington state) or for a particular organization (for example, the U. S. DOE). Five elements exist in any effective emergency management program.

- **emergency planning**, which includes identification of hazards and threats, hazard mitigation, development and preparation of emergency plans and procedures, and identification of personnel and resources needed for an effective response;
- **emergency preparedness**, which includes acquisition and maintenance of resources, training, drills, and exercises;
- **emergency response**, which includes the application of resources to mitigate consequences to workers, the public, the environment, and the national security, and the initiation of recovery from an emergency;
- **recovery**, which includes planning for and taking actions following termination of the emergency to return the site to normal;
- **readiness assurance**, which includes assessments and documentation to ensure that stated emergency capabilities are sufficient to implement emergency plans.

In general, transportation emergency response plans follow the guidelines outlined by the IAEA (IAEA, 1985, as amended 1990), which are based on the U. S. guidelines (U. S. DOT 1979, 1980) that were later encoded in the United States in 49 CFR. France (Vallette-Fontaine and Frantz, 1998) and Canada (Karmali, 1987; AECL, 1999) adopted similar guidelines in preparing their plans.

The main goals of a transportation emergency response plan are to minimize radiation exposure to workers, emergency response individuals, and the public; to contain any release; and to clean up the accident scene. In the United States, the response to RAM transportation accidents are managed in a manner similar to responses to non-RAM hazardous material accidents with additional actions and precautions implemented as necessary due to the radiological concerns.

3.2 The Incident Command System

RAM transportation emergencies are handled using the Incident Command System (ICS), which is an organized approach to controlling and managing operations at any emergency site involving a hazardous or radioactive material. Use of the ICS is actually mandated in the United States under 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response and implemented and standardized through the NFPA 472 requirement. Use of the ICS involves having an Incident Commander (IC) who directs activity at the scene, sets up a command post, and establishes control zones, each with its own rules for entry (e.g., personal protective equipment (PPE) and monitoring requirements). Generic procedures for first responders to a RAM transportation accident are shown in Figures 6 through 9.

3.2.1 Relevant Definitions

The following terms are relevant to the ICS and were adapted from the NAERG (U. S. DOT, 2000):

Control zones are designated areas at dangerous goods incidents, based on safety and the degree of hazard. Many terms are used to describe control zones. The NAERG defines these zones as the hot/exclusion/restricted zone, warm/contamination reduction/limited access zone, and cold/support/clean zone. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472).

Hazard zones (inhalation hazard zones) include:

- HAZARD ZONE A: lethal concentration in 50% of the population (LC₅₀) of less than or equal to 200 parts per million (ppm);
- HAZARD ZONE B: LC₅₀ greater than 200ppm and less than or equal to 1000ppm;
- HAZARD ZONE C: LC₅₀ greater than 1000ppm and less than or equal to 3000ppm;
- HAZARD ZONE D: LC₅₀ greater than 3000ppm and less than or equal to 5000ppm.

The **hot zone** (also referred to as exclusion zone, red zone or restricted zone) is the area immediately surrounding a dangerous goods incident that extends far enough to prevent adverse effects from released dangerous goods to personnel outside the zone (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472).

Personal protective equipment (also referred to as personal protective clothing) includes both respiratory and physical protection. One cannot assign a level of protection to clothing or respiratory devices separately. These levels were accepted and defined by response organizations such as the U. S. Coast Guard (USCG), National Institute for Occupational Safety and Health (NIOSH), and U. S. EPA:

- Level A: self-contained breathing apparatus (SCBA) plus totally encapsulating chemical resistant clothing (permeation resistant);
- Level B: SCBA plus hooded chemical resistant clothing (splash suit);

- Level C: Full or half-face respirator plus hooded chemical resistant clothing (splash suit);
- Level D: Coverall and splash guard apparel and gloves (as appropriate), eye protection, but no respiratory protection.

The ***Radiation Authority*** is either a federal, state/provincial agency, or state/province designated official. The responsibilities of this authority include evaluating radiological hazard conditions during normal operations and during emergencies. If the identity and telephone number of the authority are not known by emergency responders, or included in the local response plan, the information can be obtained from the agencies listed on the inside back cover. They maintain a periodically updated list of radiation authorities.

The ***warm zone*** (also referred to as the contamination reduction corridor, contamination reduction zone, yellow zone or limited access zone) is the area between the hot and cold zones where personnel and equipment decontamination and hot zone support take place. It includes control points for the access corridor and thus assists in reducing the spread of contamination (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472).

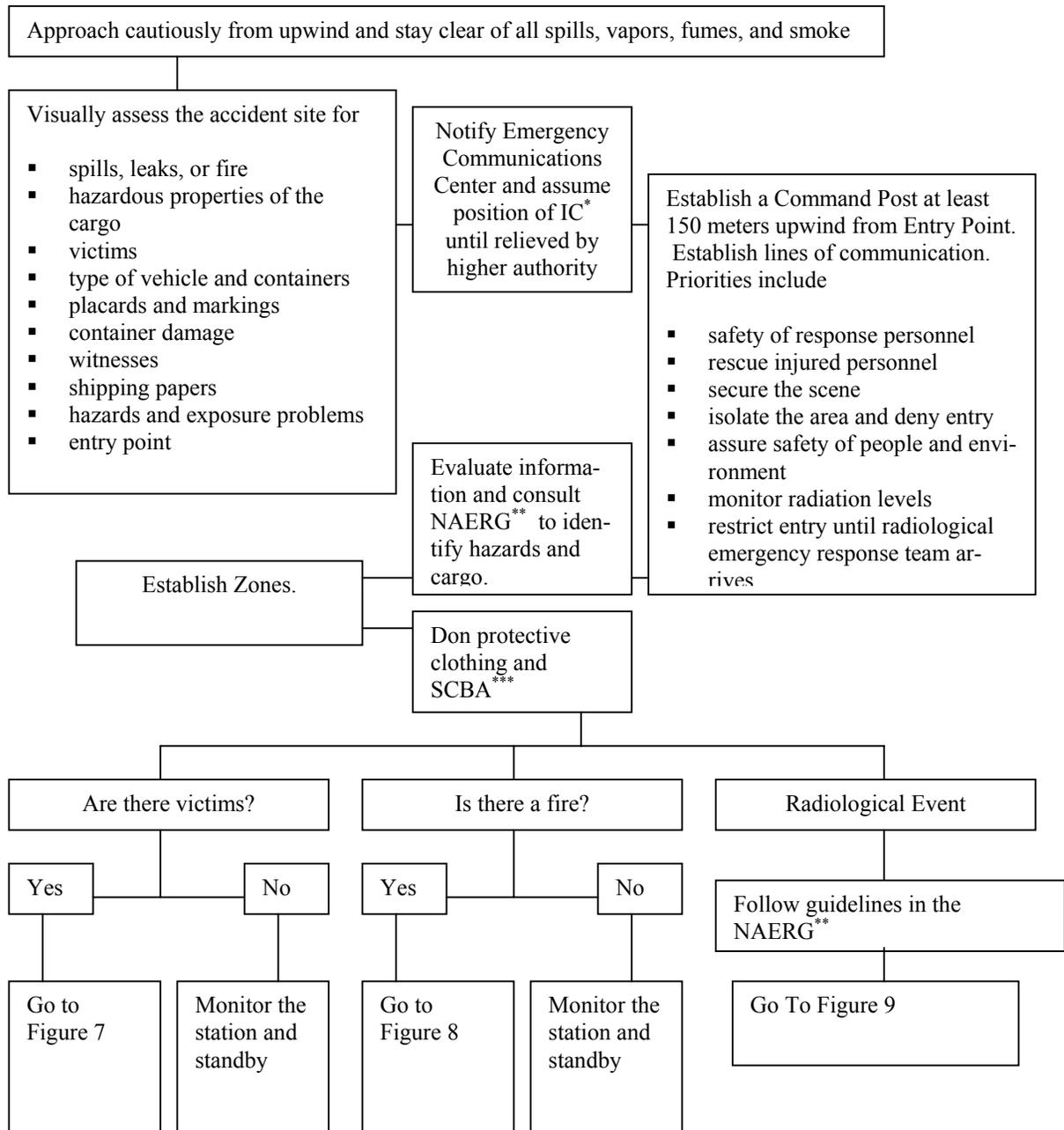
3.2.2 Emergency Response Procedures

The emergency response team should:

1. Assist in the emergency rescue and first aid procedures, as necessary;
2. Provide technical information to assist in medical treatment, and assist hospital in contamination control and decontamination;
3. Evaluate the radiological hazards, including whether there is a release from the package and whether a radiation hazard exists;
4. Minimize personnel exposure to radiation and spread of contamination;
 - Assist police to clear the area,
 - Locate and monitor exposed persons and assist in decontamination,
 - Demarcate an exclusion area,
 - Set up a control point, upwind of the accident, and
 - Provide PPE as necessary.
5. Contain the released radioactive material;
6. Carry out decontamination of equipment, vehicles, and the environment and restore to pre-accident conditions.

In addition, personnel involved in handling potentially contaminated patients and/or human remains need to take additional precautions as described in the DOE Transportation Emergency Preparedness Program (TEPP) “Model Procedure for Properly Handling and Packag-

ing

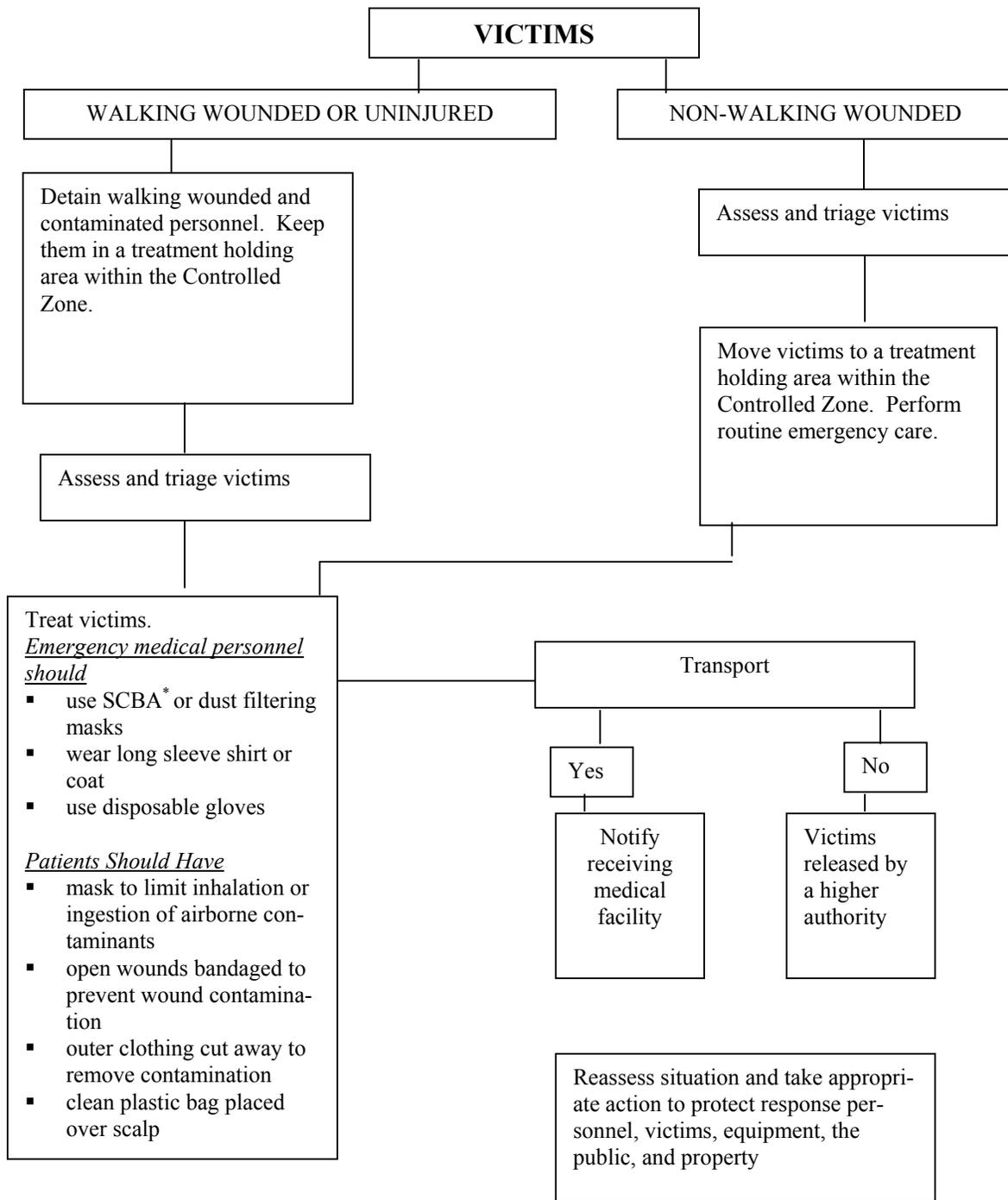


* IC = Incident Commander

** NAERG = North American Emergency Response Guidebook

*** SCBA = Self-Contained Breathing Apparatus

Figure 6. First responder flow chart for RAM transportation accidents (adapted from U. S. DOE, 2000b).



*SCBA = Self-Contained Breathing Apparatus

Figure 7. Response flow chart for RAM accidents involving injured or contaminated individuals (adapted from U. S. DOE, 2000b).

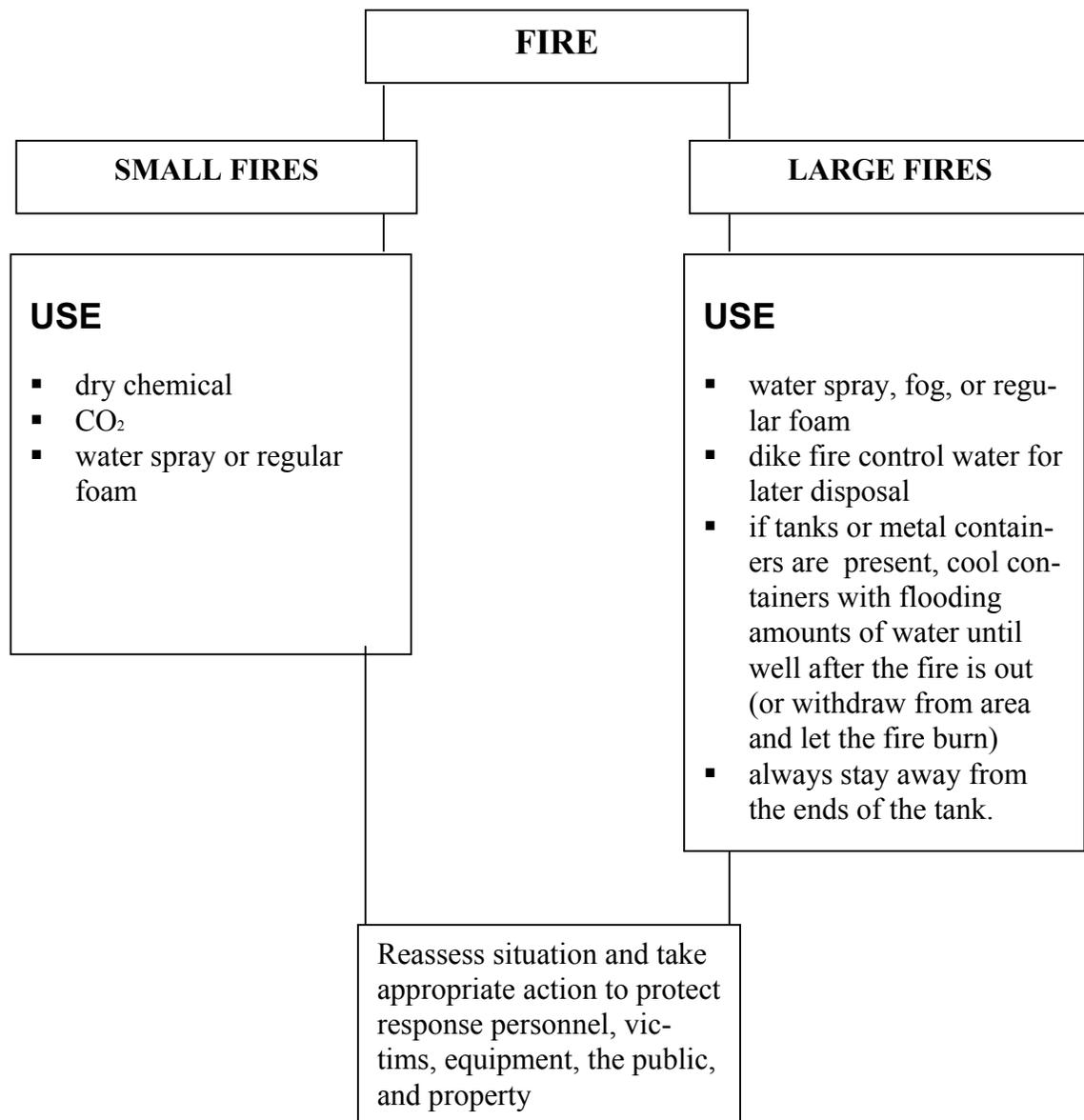
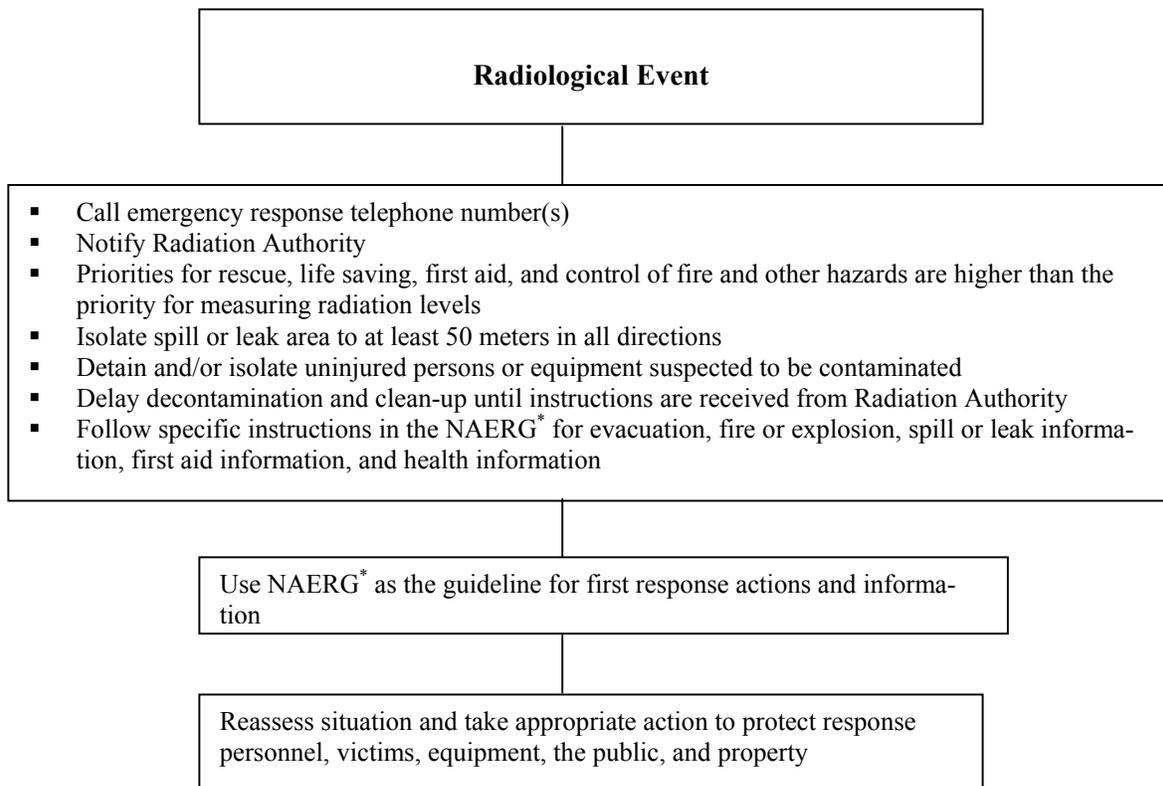


Figure 8. Response flow chart for RAM accidents involving fires (adapted from U. S. DOE, 2000b).



* NAERG = North American Emergency Response Guidebook

Figure 9. Response flow chart for radiological events (adapted from U. S. DOE, 2000b).

Potentially Radiologically Contaminated Patients” and the TEPP “Model Procedure for Medical Examiner/Coroner on the Handling of a Body/Human Remains that are Potentially Radiologically Contaminated” (U. S. DOE, 2000b).

3.3 U.S. Federal Response to RAM Accidents

U. S. roles and responsibilities and lines of authority concerning emergency response for RAM transportation accidents in the United States vary from state to state and even from region to region, in accordance with the procedures outlined in each state’s and/or tribal region’s emergency response plan. The federal response to a RAM transportation accident is outlined in the U. S. “Federal Radiological Emergency Response Plan” (FRERP) was approved in 1985 and revised in 1996. According to the FRERP, one agency is designated as the Lead Federal Agency (LFA) and interagency response centers are then established. The LFA coordinates all federal onscene actions and assists state and local governments in determining measures to protect life, property, and the environment (FRERP, 1996). However, the state or local government has the ultimate responsibility for taking emergency actions (with support from the federal agencies, upon request).

In the event of a transportation accident involving a nuclear weapon, special nuclear material, classified components, or all three, the owner (i.e., Department of Defense (DOD), DOE, or National Aeronautics and Space Administration (NASA)) will declare a National Defense Area (NDA) or National Security Area (NSA). NDAs and NSAs are established to safeguard classified information and/or restricted data, or equipment and material. Establishment of these areas places non-federal lands under federal control and results only from an emergency event (FRERP, 1996).

As summarized in Table 10, the NRC, DOD, DOE, and EPA are the LFAs for the emergency response to radioactive materials transportation accidents. The NRC is the LFA for an emergency that involves RAM licensed by the NRC or an Agreement State. For materials shipped by or for DOD or DOE, the LFA is either DOD or DOE depending on which of these agencies has custody of the material at the time of the accident. The EPA is the LFA for a transportation emergency that involves RAM not licensed or owned by a federal agency or an Agreement State.

Table 10. Identification of the Lead Federal Agency for Radioactive Materials Transportation Accidents.*

Radioactive Materials Transportation Accident Involving:	Lead Federal Agency
Shipment of materials licensed by NRC or an NRC Agreement State	NRC
Materials shipped by or for DOD	DOD
Materials shipped by or for DOE	DOE
Shipment of materials not licensed or owned by a federal agency or an Agreement State	EPA

*Adapted from the U. S. "Federal Radiological Emergency Response Plan (FRERP)" (FRERP, 1996).

The RAM transportation accident notification process in the United States is outlined in Figure 10. Each federal agency has a specific response function, as outlined in Table 11.

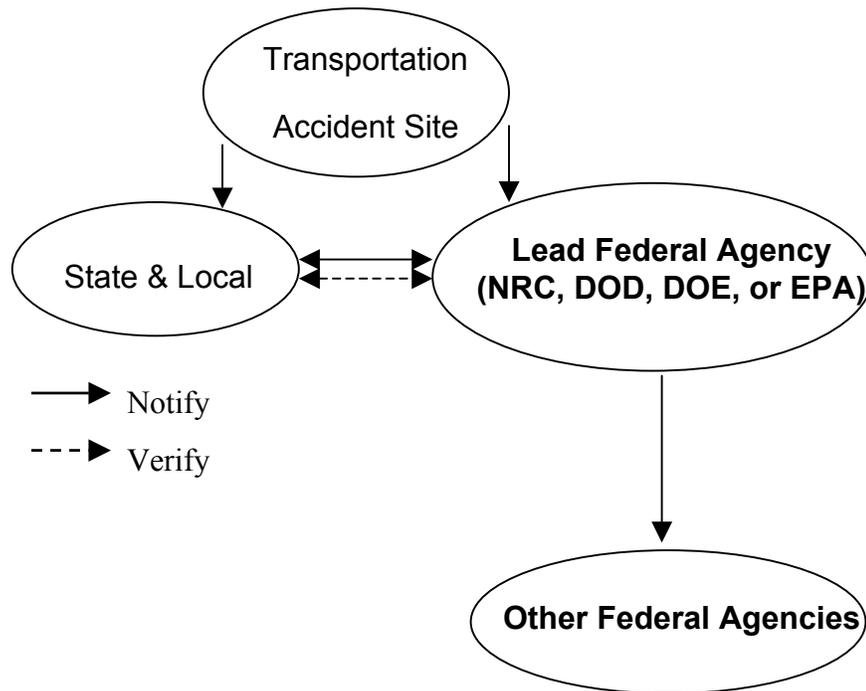


Figure 10. Radioactive materials transportation accident notification process in the United States (adapted from FRERP, 1996).

The LFA assists state and local governments in determining measures to protect life, property, and the environment, and ensures that other federal agencies assist the state and local government agencies in implementing protective actions, if requested. The LFA coordinates all federal onscene actions from an onscene location known as the Joint Operations Center (JOC). The LFA is the principal federal source of information about onsite conditions.

The DOE coordinates the initial radiological monitoring and assessment at the accident scene. Long-term monitoring is handled by the EPA. The Department of Justice (DOJ) and the Federal Bureau of Investigation (FBI) coordinate the law enforcement aspects of a criminal act (e.g., sabotage) involving radioactive material. The Department of the Interior (DOI) acts as a liaison between Indian tribal governments and the LFA, state, and local agencies for accidents that occur on tribal lands.

Table 11. Response Functions.

Response Action	Responsible Agency
Maintain cognizance of the federal response conduct and manage federal onsite actions	LFA
Coordinate initial federal offsite radiological monitoring and assessment	DOE
Coordinate intermediate and long-term federal offsite radiological monitoring and assessment	EPA
Develop and evaluate recommendations for offsite protective actions for the public	LFA, in coordination with other agencies
Present recommendations for protective actions to the appropriate state and/or local officials	LFA, in coordination with other agencies
Coordinate release of federal information to LFA	Congress
Provide reports to the President and keep the White House informed on all aspects of the emergency.	LFA
Coordinate the law enforcement aspects of a criminal act involving radioactive material	Department of Justice (DOJ) and Federal Bureau of Investigation (FBI)

* Adapted from the U. S. "Federal Radiological Emergency Response Plan (FRERP)" (FRERP, 1996).

The five stages of the federal response include:

- A. Notification
- B. Activation and Deployment
- C. Response Operations
- D. Response Deactivation
- E. Recovery.

A. Notification

The owner of the RAM shipment performs the initial notification to the state and local authorities and the LFA. The notification includes:

- Location and nature of the accident;
- Assessment of the severity of the problem;
- Potential and actual consequences;
- Initial response actions.

If any federal agency receives notification from any source other than the LFA, the agency notifies the LFA. The LFA is then responsible for:

- Verifying the accuracy of the notification;
- Notifying the advisory team agencies and providing them with information;
- Verifying that other federal agencies have been notified;
- Verifying that the state has been notified.

B. Activation and Deployment

Responsibilities of the LFA include:

- Deploying response personnel to the scene and providing liaison to the state and local authorities as appropriate;
- Designating a federal Onscene Commander (OSC) at the scene of the emergency to manage onsite activities and coordinate the overall federal response to the emergency;
- Establishing bases of federal operation, such as the JOC and the Joint Information Center (JIC);
- Coordinating the federal response with the owner of the RAM shipment; and
- Providing advice on the radiological hazard to the federal responders.

C. Response Operations

The LFA and other federal agencies exchange liaison personnel and maintain staffs at their Emergency Operating Centers (EOCs) to support their respective onscene operations. Federal agencies may also activate a regional or field office EOC in support of the emergency. The following response centers are established at onscene locations in coordination with state and local authorities and other federal agencies:

- The JOC is established by the LFA under the operational control of the federal OSC as the focal point for management and direction of onsite activities, establishment of state requirements and priorities, and coordination of the overall federal response;
- The Federal Radiological Monitoring and Assessment Center (FRMAC) is established by DOE (with subsequent transfer to EPA for intermediate and long-term actions) for the coordination of federal radiological monitoring and assessment activities with that of state and local agencies;
- The JIC is established by the LFA, under the operational control of the LFA-designated Public Information Officer, as a focal point for the coordination and provision of information to the public and media concerning the federal response to the emergency.

D. Response Deactivation

Each agency discontinues its emergency response operations when its assistance is no longer required or when its statutory responsibilities have been fulfilled. The LFA consults with participating federal agencies and the state and local government to determine when the JIC and the JOC operations should be terminated. The agency managing the FRMAC consults with the LFA and other participating federal agencies, and state and local officials to determine when a formal FRMAC structure and organization is no longer required. Normally, this will occur when operations move into the recovery phase and extensive federal multi-agency resources are no longer required to augment state and local radiological monitoring and assessment activities.

E. Recovery

The state or local governments have the primary responsibility for planning the recovery of the affected area. (The term recovery as used here encompasses any action dedicated to the

continued protection of the public and resumption of normal activities in the affected area). Recovery planning is initiated at the request of the states, but doesn't take place until after the initiating conditions of the emergency have stabilized and immediate actions to protect public health and safety and property have been accomplished. The LFA coordinates the overall activity of federal agencies involved in the recovery process.

The radiological monitoring and assessment activities are terminated when the EPA, after consultation with the LFA and other participating federal agencies, and state and local officials, determines that:

- There is no longer a threat to the public health and safety or to the environment;
- State and local resources are adequate for the situation; and
- There is mutual agreement of the agencies involved to terminate the response.

3.4 DOE Waste Isolation Pilot Plant (WIPP) Plan

The initial response to a WIPP transportation emergency will be from state, tribal, or local emergency response agencies followed by the appropriate DOE Radiological Assistance Team (RAT). The DOE divides the U. S. into eight regions and WIPP is located in DOE RAP Region 4. The procedures that the RATs follow are outlined in the DOE "Radiological Assistance Team (RAT) Procedures for TRU Waste Transportation Incidents" (U. S. DOE, 199X).

DOE's response to a WIPP RAM transportation emergency is based on a tiered approach that ranges from "0" for a minor incident to "3" for an incident involving a release of RAM. If it is necessary to repackage the RAM, the procedures contained in DOE's "Recovery Guide for Packaging" (U. S. DOE, 1995) are followed. Depending on the severity of the transportation incident, the DOE may dispatch the Incident/Accident Response Team (IART). The IART follows supplementary procedures outlined in the "Incident/Accident Response Team Guide" (U. S. DOE, 1998).

Response actions considered in the WIPP plan include:

- Determine if a RAM release has occurred;
- Determine the status of the package(s);
- Determine if DOT requirements and regulations can be met, or if an exemption is required;
- Determine if a recovery team is necessary to perform the mechanical and logistical activities associated with returning the shipment to a roadworthy condition;
- Keep the state, tribal and local officials informed on evaluation and assessment progress.

The notification procedures for a transportation incident or accident involving RAM shipments to the WIPP site in Carlsbad, New Mexico, are shown in Figure 11 (U. S. DOE, 1995).

3.5 Chalk River Laboratories (CRL) Plan

Figure 12 is a site-specific flow chart that outlines the emergency response procedures for shipments from the Chalk River Laboratories (CRL) in Canada to Los Alamos, New Mexico (AECL, 1999). The emergency response process under the CRL plan includes:

- Initial Response Phase
- Accident Control Phase
- Post-Emergency Phase.

If an accident occurs, either the Radiation Protection Escort or the Physical Security Escort notifies:

- Local police (through the Ontario Provincial Police)
- CRL Security Monitoring Room Operator (SMRO)

If neither of the escort personnel is available, the notification may be made by the carrier driver, emergency personnel such as police or firefighters, or a private citizen. The SMRO contacts the Senior Emergency Officer (SEO) immediately upon receiving notification of an accident. The SEO determines whether activation of the response plan is required, including the need to establish the Emergency Operations Center (EOC) and the extent of the initial response required. This process is outlined in Figure 12.

The SEO may activate the Initial Response Team, which consists of a RAT and a Public Affairs Representative, to respond to the accident scene and assist the OSC. Activities of the Initial Response Team include:

- Locate and, if required, reestablish control and containment of the material;
- Provide a thorough assessment of the situation;
- Assist the OSC in establishing response zones;
- Assist response groups with radiological control, monitoring, and decontamination activities.

Activities conducted by the Initial Response Team during the accident control phase will depend on the nature of the accident. In the event of a minor accident, the response team will confirm that the RAM package sustained no damage. In the event of a serious accident, the Initial Response Team Leader will act as a liaison between the OSC and the Initial Response Team. The Radiation Protection Escort is usually the Initial Response Team Leader. He or she coordinates briefings with the Response Team, as well as responders from all agencies. The RAT Leader and the Public Affairs Representative both report to the Initial Response Team Leader.

Activities conducted during the post-emergency phase also depend on the severity of the accident. In the case of a minor accident, activities focus on getting the shipment underway again. In a major collision, the initial assessments conducted by the Initial Response Team are used to determine the amount of decontamination and the degree of site remediation re-

quired. Additional assessments are conducted to confirm the effectiveness of the restoration activities.

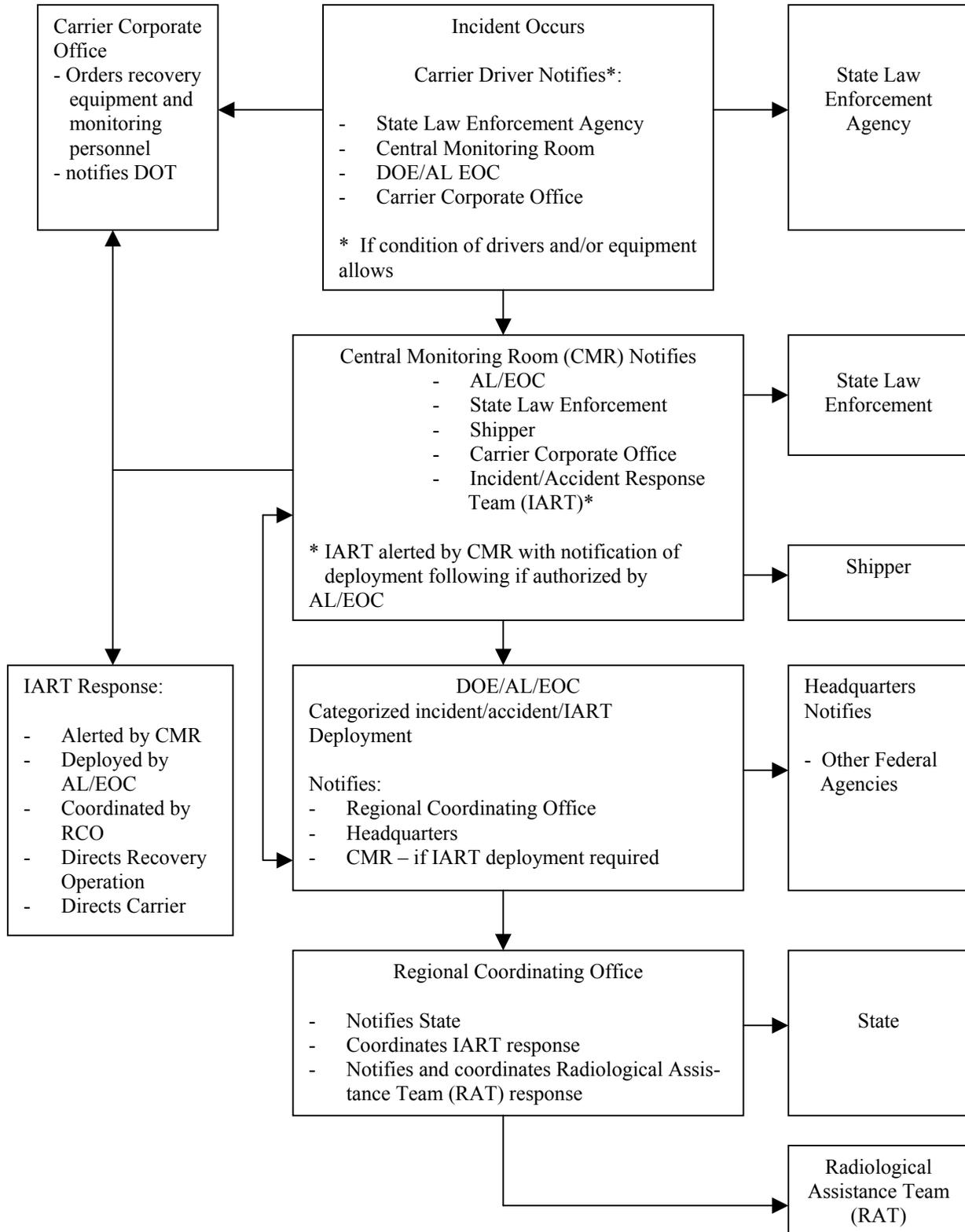
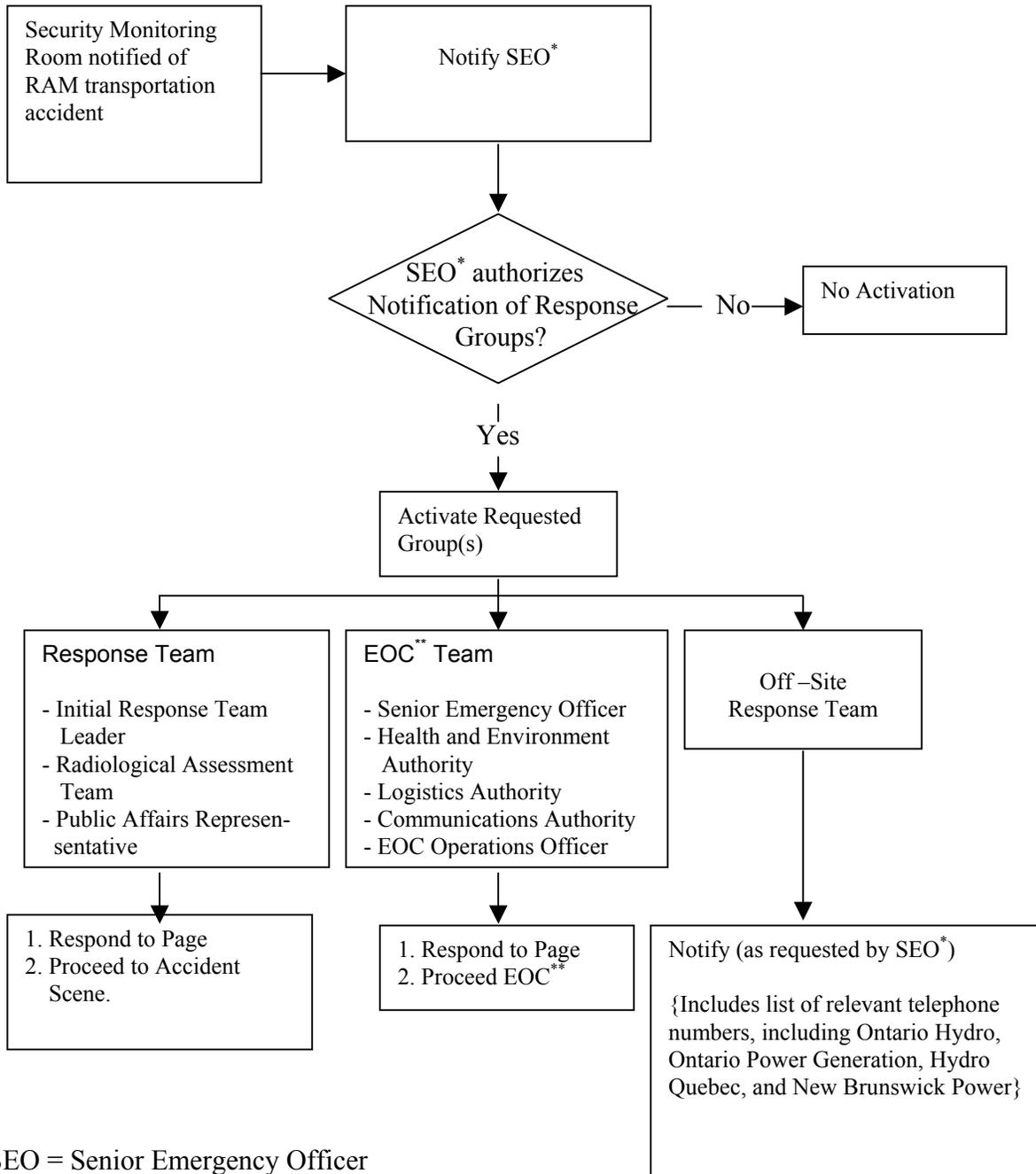


Figure 11. DOE Carlsbad Area Office (CAO) emergency notification flowchart (U. S. DOE, 1995).



*SEO = Senior Emergency Officer
 **EOC = Emergency Operations Center

Figure 12. Emergency response flow chart for shipments from CRL to LANL (adapted from AECL, 1999).

3.6 Lessons Learned

This section describes some of the important lessons learned from both actual RAM transportation emergency response events and from independent audits of emergency management programs. Lack of training and drills accounted for most of the problems encountered in responding to a transportation emergency. Other problems were related to poor coordinating, inadequate communications systems, and lack of dedicated radio and phone equipment. Lessons learned include:

A. Training and Drills

- Programs need to be sufficiently rigorous and comprehensive to adequately prepare personnel for their roles and responsibilities in emergency response situations and establish definite links of communication as well as command and control.
- Routinely evaluate the proficiency and level of knowledge of emergency responders in using site emergency plans and procedures.
- Develop and implement strategies to improve performance for those individuals who are identified as lacking proficiency and understanding.
- Local fire and medical personnel along the transportation route also need to be trained in responding to transportation accidents involving radioactive materials and they should be proficient in interpreting and employing shipping manifests and the procedures in the NAERG (U. S. DOT, 2000).

B. Communication Systems and Equipment

- Emergency response personnel should carry appropriate identification so they have immediate access to the accident scene.
- Radiation monitoring equipment needs to be readily available along the shipping route.
- Emergency response personnel should have dedicated communication equipment and lists of telephone numbers available.

C. Contingencies

- Response personnel need to be prepared for adverse meteorological conditions and for response to remote locations (may require a helicopter in some cases).

D. Corrective Actions

- Implement a comprehensive corrective action process to address any deficiencies.
- Hold emergency response council meetings to address issues and concerns and develop minutes for each meeting.

4. Task 3: Recommendations

The third task was to provide JNC with specific recommendations for their RAM transportation emergency response plan.

4.1 Introduction

A transportation emergency response plan needs to fit into the context of a broader emergency management program that contains the elements of planning, preparedness, response, recovery, and readiness assurance. An integrated and comprehensive emergency management program must be developed that ensures:

- effective and efficient response to transportation emergencies, including measures to protect workers, the public, the environment, and the national security;
- prompt recognition and classification of emergency conditions;
- prompt reporting and notification of transportation emergencies;
- safe and proper reentry activities (e.g., recovery and post-emergency activities).

4.2 Emergency Response Procedures

Emergency response procedures must clearly delineate:

- the operation of the Incident Command System (ICS) and responsibilities of the ICS organization;
- the responsibilities of an emergency operations center, which includes a policy team, a management team, and an information or communication center;
- recognition, categorization/classification (severity), and notification of transportation emergencies;
- protective action recommendations, including actions to protect human health and the environment.

4.3 Elements of the Emergency Response Program

The JNC RAM transportation emergency response program should address the following elements.

Unified Command

1. Drill all responsible organizations
2. Establish ICS structure
3. Memoranda of understanding between state, towns/cities, agencies, etc.

4.3.1 Notification and Communication

A notification system and communications network should be established and responding sites should be selected to provide good coverage of the transportation routes. In addition, emergency response personnel should have dedicated communication equipment and lists of telephone numbers readily available.

As an example, the U. S. DOE uses the Transportation Tracking and Communications System (TRANSCOM) system which combines satellite communications, computerized database management, user networks, and ground communications to follow the progress of shipments of radioactive materials. The primary objective of TRANSCOM is to provide a central monitoring and communications center for DOE shipments of spent fuel, high-level waste, and other high visibility shipping campaigns.

In addition, the DOE Enterprise Transportation Analysis System (ETAS) database provides centralized collection, validation, analysis, and reporting of transportation data for shipments made by and on behalf of DOE. The automated system allows current information to be retrieved and provides an assortment of querying capabilities. ETAS also serves as a program management tool for DOE, facilitating coordination across several contractors and sites. Transportation managers can use the database for transportation cost analyses, rate evaluation, carrier evaluation, packaging utilization, and for preparing traffic activity reports required under DOE Order 460.2. ETAS also has a Prospective Shipment Module (PSM) that forecasts shipments for a year.

4.3.2 Public Information

Due to the high visibility of an accident involving radioactive materials, plans should be established for dissemination of public information. A lead public information officer should be designated. A database similar to the RMIR database should be initiated in Japan for accident and incident occurrence data. A transparency office should be established to provide accurate and readily available public information. An Internet web site would be an efficient and responsive method to accomplish public information exchange. This web site should be in at least two languages: Japanese for the Japanese National information exchange, and English for foreign dissemination of interested public and officials.

4.3.3 Fire and Rescue

Special consideration should be made regarding procedures for fire and rescue at a transportation accident involving radioactive materials. Personnel should be trained to recognize radiological hazards. Specific response procedures should be developed for radioactive hazards by fire and rescue organizations.

4.3.4 Emergency Medical Services

Planning considerations should be made by emergency medical services for radiologically contaminated victims. Plans and coordination should be developed between the paramedics and hospitals to prepare for the management and care of contaminated victims. Personnel should receive training for radiological hazards and procedures for decontamination of victims, equipment and response personnel, and the roles and responsibilities of all medical services organizations should be clearly delineated.

4.3.5 Law Enforcement

Law enforcement personnel should receive training to recognize radiological hazards, and procedures for notification to appropriate agencies in the event of an accident involving radioactive materials. Law enforcement officials should be responsible for traffic control and area security. Coordination agreements and roles and responsibilities for government and law enforcement agencies should be clearly delineated.

4.3.6 Radiation Exposure Control

Plans should be provided for evacuation of the incident area. Recommended evacuation distances are contained in the NAERG (U. S. DOT, 2000). Response personnel should cordon off the area and ensure as few personnel as necessary enter into this zone.

4.3.7 Medical Monitoring

Plans should be provided for long term medical monitoring of contaminated response personnel and victims.

4.3.8 Recovery and Reentry

The agencies tasked with determining when the site is safe for reentry must be determined. Typically the radiological monitoring team will advise the IC of reentry safety. The criteria for recovery should also be delineated.

4.3.9 Equipment

Consideration of equipment needed for response to a radiological incident should be made and dedicated radiation monitoring equipment should be readily available along the shipping route. Planning should be conducted to determine which agency (or agencies) will conduct monitoring. Communication equipment should be planned with the appropriate usage and supplied to all cognizant agencies and personnel.

4.3.10 Training Program

A training program, including emergency response exercises and drills, should be established. In addition to vehicle drivers and other workers, local fire and medical personnel along the transportation route also need to be trained in responding to transportation accidents involving radioactive materials.

4.3.11 Contingencies

Contingencies should be in place in the event of an accident in a remote region or under adverse weather conditions. For example, a helicopter may be required in some cases.

4.4 Conclusions

Sandia National Laboratories (SNL) was tasked by the Japan Nuclear Cycle Development Institute (JNC) to provide assistance in developing an emergency response plan for radioactive material transport. Those tasks included compiling radioactive materials (RAM) transportation accident data from the open literature and databases, investigating emergency response plans for radioactive materials transport in the United States (U. S.), and developing specific recommendations for the JNC's nuclear material transport emergency response plan, based on information gathered during the first two tasks.

Several sources of data and information were consulted, including national and international organizations, and the results are documented in this report. RAM transportation accident data were compiled from the Radioactive Material Incident Report (RMIR) database developed at SNL. In addition, four RAM transportation accident case studies were examined. These case studies illustrate the importance of accurately assessing RAM risks, the importance of good communication and training, including educating the public, and the importance of a good public relations team.

There have been no releases from Type B packages under accident conditions in the U. S. and hence, no releases of spent fuel or high-level waste. However, accidents involving other packages, such as the strong and tight and Type A packages, have resulted in releases of RAM. Accident response times are usually on the order of minutes and the first responders are usually the local law enforcement, followed by the local firefighters and paramedics, and/or local hazardous materials (hazmat) team. In the U. S., the response to RAM transportation accidents is managed in a manner similar to responses to non-RAM hazardous material accidents using the Incident Command System (ICS). The state, tribal, or local government has the ultimate responsibility for taking emergency actions at the radiological emergency scene, although several federal agencies play significant supporting roles. The DOE emergency response directives are provided to show an example of governmental rules. The U. S. roles and responsibilities for emergency response are shown, together with examples of lessons learned concerning the U. S. programs.

A transportation emergency response plan needs to fit into the context of a broader emergency management program that contains the elements of planning, preparedness, response, recovery, and readiness assurance. The main goals are to minimize radiation exposure to workers, emergency response individuals, and the public, to contain any release, and to clean up the accident scene. Special consideration should be given in the plan to issues related to training, notification and communication, public information, fire and rescue, emergency medical services, law enforcement, medical monitoring, equipment, and of course, contingencies.

A set of recommendations for JNC includes establishing a database for Japan similar to the RMIR database, a public transparency Internet site to include this database, the development of an emergency response infrastructure specifically designed for transportation needs, and the development of a set of clear directives to provide authority in the case of accidents or incidents involving nuclear material transport. This infrastructure would include the necessary equipment, training, procedures, and clearly understood roles and responsibilities agreed to in advance by all potentially involved governmental authorities.

The report identifies specific elements that the JNC RAM transportation emergency response program should address.

- Notification and Communication
- Public Information
- Fire and Rescue
- Emergency Medical Services
- Law Enforcement
- Radiation Exposure Control
- Medical Monitoring
- Recovery and Reentry
- Equipment
- Training Program
- Contingencies.

A full description of these elements is outside the scope of this tasking. A recommendation for further study is to evaluate each of these areas in terms of the U. S. program and determine which components would be applicable to JNC's program on emergency response.

A second recommendation concerning these elements is to establish a cooperative JNC/SNL program that coordinates the U. S. emergency response program for JNC needs. This program would be an ongoing effort to provide continuity and the latest updates to JNC.

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Appendix A

RMIR Database Retrieval for Type B Accidents (1971 - April 2000)

Incident Number: 1080013	Date: 07/10/1971	Time: 12:05
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TIME-DC INC		TENNESSEE
Location: US 63, CITY LIMITS		MISSOURI
Shipper: AUTOMATION INDUSTRIES INC		PENNSYLVANIA
Consignee: ATLAS FOUNDRY & MACHINE CO		WASHINGTON
Remarks:		
COLLISION: DRIVER WAS ENROUTE TO SPRINGFIELD, MO WITH EQUIPMENT. HE STARTED TO PASS A CAMPER TRAILER ON A TWO LANE BRIDGE - HE STRUCK THE CAMPER AND LOST CONTROL OF HIS VEHICLE AND IT OVERTURNED, DEMOLISHING THE TRACTOR TRAILER. MOST OF THE CARGO BURNED. IT WAS RAINING AND THE PAVEMENT WAS WET WHEN THE ACCIDENT OCCURRED.		
--- Materials Involved ---		
Category: SOURCE		
COBALT-60		
---Packages Involved ---		
Description	ID Code	DOT Category
CONTAINER, METAL	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		
DRUM	UNKNOWN	S
# Packages: Shipped: 44; Damaged w/ Release: 1; Damaged, No Release: 0		

Incident Number: 1120173 **Date: 12/08/1971** **Time: 13:50**
 Mode: HIGHWAY Vehicle: TRUCK, FLATBED
 Accident Code: T Transportation Link Closed?: Y
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: KILLION MOTOR EXPRESS, INC KENTUCKY
 Location: US 25-WEST, 2.3 NORTH OF CLINTON TENNESSEE
 Shipper: GULF ENERGY & ENVIRONMENTAL SYSTEMS PENNSYLVANIA
 Consignee: OAK RIDGE NATIONAL LABORATORY TENNESSEE

Remarks:
 TRUCK LEFT ROAD TO AVOID HEAD ON: THE TRUCK TRANSPORTING THE SPENT REACTOR FUEL ELEMENT SWERVED TO AVOID A HEAD-ON COLLISION WITH ANOTHER VEHICLE AND WAS FORCED OFF THE ROAD. THE DRIVER WAS KILLED BY IMPACT AND THE SPENT FUEL CASK WAS THROWN INTO A DITCH. THE RAD ASSISTANCE TEAM FROM OAK RIDGE ARRIVED. SURVEYS INDICATED THERE WAS NO RELEASE. THE CASK WAS TAKEN TO OAK RIDGE FOR EXAMINATION-CASK PAINT, TARPAULIN & THERMAL INSULATION & CENTER RING DOWELS & BOLTS WERE DAMAGED. NO RELEASE.

--- Materials Involved ---
 Category: NFC
 SPENT FUEL

---Packages Involved ---

Description	ID Code	DOT Category
CASK	HNPF	B

Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 1

Incident Number: 4030399	Date: 03/10/1974	Time: 20:15
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: ALLEGHANY CORP, JONES MOTOR DIV		PENNSYLVANIA
Location: RTE 422 AND 645, MYERSTOWN		PENNSYLVANIA
Shipper: GENERAL MOTORS (TEREX DIV)		OHIO
Consignee: RADIATION PRODUCTS		MASSACHUSETTS
Remarks:		
COLLISION, NO DAMAGE TO RAM: JONES MOTOR WAS INVOLVED IN AN ACCIDENT BUT THERE WAS NO RELEASE NOR DAMAGE TO THE RADIOACTIVE MATERIALS (AN IRIDIUM SOURCE). THE PA STATE POLICE RESPONDED & CONTACTED THE HAZARDOUS MATERIAL BOARD. A HAZ MAT REPRESENTATIVE RESPONDED & SURVEYED THE TRUCK AND AREA AND FOUND NO RELEASE OR CONTAMINATION. THE SOURCE WAS INTACT.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CONTAINER	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: 4040129 **Date: 03/29/1974** **Time: 21:05**
 Mode: RAIL Vehicle: RAIL CAR
 Accident Code: T Transportation Link Closed?: N
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: SEABOARD COAST LINE RAILROAD NORTH CAROLINA
 Location: RAILYARD IN HAMLET NORTH CAROLINA
 Shipper: U. S. DEPARTMENT OF ENERGY PENNSYLVANIA
 Consignee: CHARLESTON NAVAL SHIPYARD SOUTH CAROLINA

Remarks:
 DERAILED CAR, NO DAMAGE TO RAM: DERAILED TANK CAR HIT FLAT CAR. THERE WAS MINOR DAMAGE TO A WOOD BOX CONTAINING PLASTIC WRAPPED TOOLS. THE BOX WAS LOCATED NEAR ONE CORNER OF THE CAR. THE SPENT FUEL CASK WAS EMPTY AND WAS NOT DAMAGED. THERE WAS NO CONTAMINATION. (NC REPORT #37).

--- Materials Involved ---

Category: NFC
 RAM LSA

---Packages Involved ---

Description	ID Code	DOT Category
CASK	M-130	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		
BOX, WOOD	UNKNOWN	S
# Packages: Shipped: 2; Damaged w/ Release: 0; Damaged, No Release: 1		

Incident Number: 5080654 **Date: 08/09/1975** **Time: 18:00**
 Mode: HIGHWAY Vehicle: TRUCK, TRAILER
 Accident Code: T Transportation Link Closed?: Y
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: TRI-STATE MOTOR TRANSIT CO MISSOURI
 Location: US 20-18MI WEST OF IDAHO FALLS IDAHO
 Shipper: ARGONNE NATIONAL LABORATORY IDAHO
 Consignee: ARGONNE NATIONAL LABORATORY ILLINOIS

Remarks:
 TRUCK OVERTURNED, NO RELEASE: TRACTOR/TRAILER RAN OFF ROAD AND ROLLED OVER ON U. S. HIGHWAY 20. THE TRUCK WAS LOADED WITH 9 PACKAGES OF RADIOACTIVE MATERIAL FROM EBR-II. ABOUT 10 EMPTY WOODEN BOXES SPILLED ON THE SHOULDER OF THE ROAD. ALL RADIOACTIVE PACKAGES REMAINED INSIDE THE TRAILER-NONE WERE DAMAGED. THERE WAS NO RELEASE. THE DRIVER RECEIVED MINOR INJURIES. MORE DATA AVAILABLE.

--- Materials Involved ---

Category: NFC
 COBALT-58 PLUTONIUM-239
 URANIUM-235 URANIUM-238

---Packages Involved ---

Description	ID Code	DOT Category
BOX	UNKNOWN	S
# Packages: Shipped: 2; Damaged w/ Release: 0; Damaged, No Release: 0		
CASK	5607/B	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		
DRUM	UNKNOWN	S
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: NRC0003	Date: 05/06/1977	Time:
Mode: HIGHWAY	Vehicle: VEHICLE, SMALL	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: NUCLEAR ENERGY SERVICES, INC		ILLINOIS
Location: ADAIR		ILLINOIS
Shipper: NUCLEAR ENERGY SERVICES, INC		ILLINOIS
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
COLLISION; NO DAMAGE TO RAM: LICENSEE'S PICKUP TRUCK WAS INVOLVED IN AN ACCIDENT. THERE WAS NO DAMAGE TO THE SOURCE (IRIDIUM 192, 86 CI). A LEAK TEST WAS PERFORMED AT THE LICENSEE'S OFFICE IN ROSEMOUNT, IL AND THE DEVICE WAS FOUND TO BE INTACT. THE SOURCE WAS RETURNED TO SERVICE ON 5/9/77.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: NRC0007	Date: 08/11/1977	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: DAVIS X-RAY CO		ARKANSAS
Location: SPRINGSBORO		OHIO
Shipper: DAVIS X-RAY CO		ARKANSAS
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
COLLISION: TRUCK IN ACCIDENT WITH GASOLINE TANK TRUCK. THE SOURCE AND ITS CAMERA REMAINED INTACT. THE DRIVER WAS TREATED AT A LOCAL HOSPITAL AND RELEASED.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0185	Date: 08/25/1977	Time: 20:00
Mode: RAIL	Vehicle: RAIL CAR	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE		Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: ILLINOIS CENTRAL & GULF RAILROAD		
Location: 4TH AND RIVER RD, LOUISVILLE		KENTUCKY
Shipper: UNION CARBIDE CORP		KENTUCKY
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
TRAIN DERAILED; NO DAMAGE TO RAM: AN ILLINOIS CENTRAL TRAIN DERAILED 6 CARS; 1 FLAT CAR CONTAINED URANIUM HEXAFLUORIDE (UF6) THAT PARTIALLY DERAILED. THERE WAS NO DAMAGE TO THE UF6 CAR OR THE CYLINDERS. A CAR OF HYDROCYANIC ACID WAS BEHIND THE UF6 CAR. SURVEYS REVEALED THERE WAS NO CONTAMINATION. SHIPMENT WAS ON ITS WAY 8/26 AT 1330. (KY REPORT; MORE DATA AVAILABLE).		
--- Materials Involved ---		
Category: NFC		
URANIUM HEXAFLUORIDE		
--- Packages Involved ---		
Description	ID Code	DOT Category
OVERPACK	TIGER	B
# Packages: Shipped: 4; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: NRC0008 **Date:** 10/03/1977 **Time:**
Mode: HIGHWAY Vehicle: TRUCK, TRAILER
Accident Code: T Transportation Link Closed?: U
Radioactivity Released: NONE Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: TESTMASTER INC
Location: NEAR BLOOMFIELD INDIANA
Shipper: TESTMASTER INC
Consignee: NONE; ACCIDENT IN TRANSIT

Remarks:
ONE VEHICLE ACCIDENT: THE RADIOGRAPHER'S TRUCK WAS INVOLVED IN A ONE VEHICLE ACCIDENT. THE SOURCE CONTAINER REMAINED INTACT. THERE WAS NO CONTAMINATION OR RADIATION PROBLEM.

--- Materials Involved ---
Category: INDUSTRIAL
IRIDIUM-192

---Packages Involved ---		DOT
Description	ID Code	Category
SOURCE, SEALED	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNO7827	Date: 02/09/1978	Time: 20:20
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE	Search Code: NFC	
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TRI-STATE MOTOR TRANSIT CO		MISSOURI
Location: US 54, NEAR GIBSON CITY		ILLINOIS
Shipper: COMMONWEALTH EDISON CO		ILLINOIS
Consignee: BABCOCK & WILCOX CO		VIRGINIA
Remarks:		
TRAILER BED BUCKLED: TRAILER BUCKLED FROM WEIGHT OF CASK. CASK CONTAINED 6 MIXED OXIDE SPENT FUEL RODS. CASK REMAINED ON TRAILER. NO LEAKAGE. RESPONDERS INCLUDED EMERGENCY SERVICES & DISASTER AGENCY, STATE RAD ASSISTANCE, STATE POLICE, & DEPTS OF HEALTH & TRANSPORTATION. CASK WAS TRANSFERRED TO A NEW VEHICLE AND THE ROAD WAS OPENED AT 10 A.M. ON 2/10/78. THERE WAS NO RELEASE OR CONTAMINATION.		
--- Materials Involved ---		
Category: SPENT FUEL		
SPENT FUEL		
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	NAC-1	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNO7876 **Date:** 04/10/1978 **Time:**
 Mode: HIGHWAY Vehicle: TRUCK, TRAILER
 Accident Code: T Transportation Link Closed?: U
 Radioactivity Released: NONE Search Code: IND
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: UNIVERSAL TECHNICAL TESTING LABS PENNSYLVANIA
 Location: RTE 623, GLEN COVE RD, CASTLETON MARYLAND
 Shipper: UNIVERSAL TECHNICAL TESTING LABS PENNSYLVANIA
 Consignee: PHILADELPHIA ELECTRIC CO PENNSYLVANIA

Remarks:
 TRUCK OVERTURNED; NO DAMAGE TO RAM: A RADIOGRAPHER'S TRUCK OVERTURNED ON THE HIGHWAY. THE TRUCK WAS UPRIGHTED AND PROCEEDED TO ITS JOB SITE AT PEACH BOTTOM NUCLEAR POWER PLANT. THE SOURCE WAS IN THE CAMERA AND SECURED INSIDE ITS STORAGE BOX WHICH WAS BOLTED TO THE TRUCK. THERE WAS NO RELEASE OF RADIOACTIVITY.

--- Materials Involved ---

Category: INDUSTRIAL
 IRIDIUM-192

---Packages Involved ---

Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B

Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0

Incident Number: TTC0220 **Date:** 07/07/1978 **Time:**
 Mode: HIGHWAY Vehicle: TRUCK, TRAILER
 Accident Code: T Transportation Link Closed?: U
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: TRI-STATE MOTOR TRANSIT CO MISSOURI
 Location: U. S. 301, SOUTH OF ORANGEBURG SOUTH CAROLINA
 Shipper: MILLSTONE NUCLEAR POWER PLANT CONNECTICUT
 Consignee: CHEM-NUCLEAR SYSTEMS SOUTH CAROLINA

Remarks:
 TRUCK HIT UTILITY POLE, NO DAMAGE TO RAM: A TRI-STATE TRUCK HAULING A PEACH BOTTOM CASK LOADED WITH NON FUEL BEARING REACTOR COMPONENTS WAS TRAVELING DOWNGRADE AND APPROACHED AN INTERSECTION. CAR IN FRONT OF TRUCK STOPPED & TO AVOID COLLISION, TRUCK SWERVED AND HIT A UTILITY POLE. NO DAMAGE TO TRAILER OR CASK. CHEM-NUCLEAR EMERGENCY TEAM RESPONDED & TOOK SMEARS OF CASK & SUPPORTS - NOTHING UNUSUAL IN READINGS. MORE DATA AVAILABLE. (SC REPORT)

--- Materials Involved ---

Category: LLW
 COBALT-58 COBALT-60
 IRON-59 NICKEL-63

---Packages Involved ---

Description	ID Code	DOT Category
CASK	CNSI	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: NRC0020 **Date:** 08/13/1978 **Time:** 21:00
 Mode: HIGHWAY Vehicle: TRUCK, TRAILER
 Accident Code: T Transportation Link Closed?: U
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: CHEM-NUCLEAR SYSTEMS SOUTH CAROLINA
 Location: NEW JERSEY TURNPIKE NEW JERSEY
 Shipper: CHEM-NUCLEAR SYSTEMS INC SOUTH CAROLINA
 Consignee: BOSTON EDISON CO MASSACHUSETTS

Remarks:
 TRAILER BED FAILURE: AN EMPTY CASK (MODEL-1600) BROKE THROUGH THE TRAILER BED OF A CHEM-NUCLEAR TRUCK WHILE ENROUTE TO BOSTON EDISON. THERE WAS NO PERONNEL INJURY NOR WAS THERE ANY RELEASE OF RADIOACTIVITY. THE CASK OVERPACK AND BASE PLATE WERE DAMAGED. THE CASK IS BEING RETURNED TO BARNWELL FOR EXAMINATION. THE NEW JERSEY STATE PATROL RESPONDED.

--- Materials Involved ---
 Category: EMPTY
 EMPTY SPENT FUEL CASK

---Packages Involved ---			DOT
Description	ID Code		Category
CASK	GE-1600		B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0			

Incident Number: PNO78154	Date: 08/27/1978	Time:
Mode: HIGHWAY	Vehicle: VEHICLE, SMALL	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: AMERICAN X-RAY AND INSPECTION INC		MICHIGAN
Location: I-75 NEAR SAGINAW		MICHIGAN
Shipper: AMERICAN X-RAY AND INSPECTION		MICHIGAN
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
COLLISION, NO DAMAGE TO SOURCE: A PICKUP TRUCK CARRYING AN IRIDIUM 192 SOURCE WAS INVOLVED IN AN ACCIDENT. THE DRIVER WAS INJURED IN THE CRASH AND THE TRUCK WAS DAMAGED BY FIRE. THERE WAS NO DAMAGE TO THE RADIOACTIVE SOURCE. INTERSTATE 75 WAS CLOSED FOR 4.5 HOURS.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: NRC0023	Date: 09/11/1978	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: PEABODY PIPELINE TESTING		PENNSYLVANIA
Location: NEAR WOODWARD		OKLAHOMA
Shipper: PEABODY PIPELINE TESTING		PENNSYLVANIA
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
TRUCK OVERTURNED, NO DAMAGE TO SOURCE: A PEABODY PIPELINE TRUCK OVERTURNED; THE DRIVER WAS KILLED. THE RADIOGRAPHIC CAMERA (IRIDIUM 192 SEALED SOURCE) THAT THE TRUCK WAS TRANSPORTING WAS UNDAMAGED.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: NRC0025	Date: 09/15/1978	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: N/A
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: UNKNOWN		
Location: NEAR DOUBLE SPRINGS		ALABAMA
Shipper: UNKNOWN		
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
TRUCK OVERTURNED; NO DAMAGE TO SOURCE: A TRUCK WITH APPROXIMATELY 100 CURIES OF RADIUM OVERTURNED NEAR DOUBLE SPRINGS, AL. THE DRIVER WAS INJURED BUT THERE WAS NO RELEASE OF MATERIAL. THE STATE OF ALABAMA INVESTIGATED THE ACCIDENT.		
--- Materials Involved ---		
Category: INDUSTRIAL		
RADIUM		
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: NRC0026 **Date:** 11/28/1978 **Time:** 23:45
Mode: HIGHWAY Vehicle: TRUCK, TRAILER
Accident Code: T Transportation Link Closed?: N
Radioactivity Released: NONE Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: EXAM CO

Location: U. S. 12, 5 MI SOUTH OF SAUK CITY WISCONSIN

Shipper: EXAM CO

Consignee: NONE; ACCIDENT IN TRANSIT

Remarks:

TRUCK OVERTURNED, NO DAMAGE TO SOURCE: THE TRUCK CARRYING THE RADIOGRAPHIC CAMERA (120 CI IRIDIUM 192 SOURCE) WENT OFF THE ROAD AND OVERTURNED. THE DRIVER WAS NOT INJURED. THE SOURCE AND THE CAMERA WERE INTACT; THERE WAS NO RELEASE OF RADIOACTIVITY.

--- Materials Involved ---

Category: INDUSTRIAL
IRIDIUM-192

---Packages Involved ---

Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B

Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0

Incident Number: 9020490 **Date: 01/10/1979** **Time:**
 Mode: HIGHWAY Vehicle: TRUCK, TRAILER
 Accident Code: T Transportation Link Closed?: U
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: HOME TRANSPORTATION CO SOUTH CAROLINA
 Location: I-81 NEAR MORRISTOWN TENNESSEE
 Shipper: OAK RIDGE NATIONAL LABORATORY TENNESSEE
 Consignee: TRANSNUCLEAR INC MARYLAND

Remarks:
 TRUCK REAR-ENDED ANOTHER VEHICLE: A TRUCK CARRYING A SHIPMENT OF SLIGHTLY ENRICHED URANIUM-235 (UF6) REAR-ENDED ANOTHER TRUCK. THE TRUCK WITH THE UF6 CAME TO REST IN THE MEDIAN. THERE WAS NO DAMAGE TO THE TYPE B OVERPACKS OF UF6. RESPONDERS INCLUDED THE HAMBLLEN COUNTY DEPT OF CIVIL DEFENSE & THE OAK RIDGE RADIOLOGICAL TEAM. THE DRIVER WAS TAKEN TO THE HOSPITAL FOR TREATMENT AND RELEASED.

--- Materials Involved ---
 Category: UF6
 URANIUM HEXAFLUORIDE

---Packages Involved ---

Description	ID Code	DOT Category
CYLINDER	21PF-1	B
# Packages: Shipped: 5; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0045	Date: 08/12/1979	Time: 12:05
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE		Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TRI-STATE MOTOR TRANSIT CO		NEBRASKA
Location: I-95 AT FOUR OAKS EXIT		NORTH CAROLINA
Shipper: CHEM-NUCLEAR SYSTEMS INC		SOUTH CAROLINA
Consignee: UNION CARBIDE CORP		NEW YORK
Remarks:		
COLLISION, NO DAMAGE TO CASKS: (N.C. REPORT# 85) TRI-STATE TRUCK IN LEFT NORTH BOUND LANE WHEN TRUCK ON THE RIGHT HAD A BLOWOUT AND COLLIDED WITH LEFTSIDE OF THE TRI-STATE TRUCK. THERE WAS NO DAMAGE TO THE CASKS. RESPONDERS: NC STATE HIGHWAY PATROL, RADIATION SERVICES, AND WENDELL RESCUE SQUAD. MORE DETAILS ARE AVAILABLE.		
--- Materials Involved ---		
Category: EMPTY		
EMPTY CASK		
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	USA/6058/B	B
# Packages: Shipped: 2; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0193	Date: 12/11/1979	Time: 12:00
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TRI-STATE MOTOR TRANSIT CO		MISSOURI
Location: I-80, JUST EAST OF ALTOONA EXIT		IOWA
Shipper: GOODYEAR ATOMIC CORP		OHIO
Consignee: EXXON NUCLEAR INC		WASHINGTON
Remarks:		
COLLISION: A TRUCK CARRYING URANIUM HEXAFLUORIDE JACKKNIFED ON AN ICY ROAD AND CAME TO REST UPRIGHT IN THE CENTER MEDIAN. SURVEYS WERE TAKEN AND SHOWED NO RADIOACTIVE RELEASE NOR DAMAGE TO THE CYLINDERS. RESPONDERS INCLUDED HIGHWAY PATROL, DEPT OF ENVIRONMENTAL QUALITY, ETC. (IA REPORT; MORE DATA AVAILABLE).		
--- Materials Involved ---		
Category: NFC		
URANIUM HEXAFLUORIDE		
---Packages Involved ---		
Description	ID Code	DOT Category
CYLINDER	4909/B	B
# Packages: Shipped: 5; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOI8006	Date: 01/14/1980	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE		Search Code: MED
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: GATEWAY TRANSPORTATION CO INC		
Location: I-80, 8 MI. WEST OF DU BOIS		PENNSYLVANIA
Shipper: ADVANCED MEDICAL SYSTEMS INC		OHIO
Consignee: HOSPITAL		NEW YORK
Remarks:		
COLLISION, NO DAMAGE TO RAM: A SNOW/ICE STORM CAUSED A TRUCK TRANSPORTING A TELETHERAPY SOURCE TO HIT A TRUCK CARRYING TURKEYS. THE CASK WAS UNDAMAGED AND THE TRUCK CONTINUED TO NEW YORK. PA STATE POLICE RESPONDED TO EVENT.		
--- Materials Involved ---		
Category: INDUSTRIAL		
COBALT-60		
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOII8018	Date: 01/31/1980	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TRI-STATE MOTOR TRANSIT CO		MISSOURI
Location: I 95 NEAR ROANOKE RAPIDS		NORTH CAROLINA
Shipper: UNION CARBIDE CORP		NEW YORK
Consignee: CHEM-NUCLEAR SYSTEMS		SOUTH CAROLINA
Remarks:		
TRAILER JACKKNIFED, NO DAMAGE TO RAM; SEMI JACKKNIFED ON ICY I-95, CAME TO REST ON MEDIAN. NO CASK DAMAGE. ONE CASK HAD 230 GRAMS OF URANIUM AND 700 CI OF MIXED FISSION PRODUCTS. THE OTHER CASK CONTAINED 238 GRAMS OF URANIUM AND 933 CI OF MIXED FISSION PRODUCTS. TWO OTHER VEHICLES WERE INVOLVED BUT THERE WERE NO INJURIES. RESPONDERS: NC RADIATION PROTECTION. NO ABNORMAL RADIATIONLEVELS REPORTED. (SEE NC REPORT #91)		
--- Materials Involved ---		
Category: LLW		
MIXED FISSION PRODUCTS	URANIUM	
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	USA/6058/B	B
# Packages: Shipped: 2; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOI80106	Date: 07/21/1980	Time: 17:00
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: PEABODY PIPELINE TESTING		PENNSYLVANIA
Location: US 22, 40 MI EAST OF PITTSBURG		PENNSYLVANIA
Shipper: PEABODY PIPELINE TESTING		PENNSYLVANIA
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
COLLISION, NO DAMAGE TO RAM: A TRUCK TRANSPORTING A MAGNAFLUX EXPOSURE DEVICE CROSSED TRAFFIC LANES AND COLLIDED WITH A CAR. THE SOURCE WAS THROWN FROM THE TRUCK. THE RADIATION SAFETY OFFICER RECOVERED THE SOURCE AND MEASURED THE RADIATION LEVELS WHICH WERE DETERMINED TO BE NORMAL. THERE WAS NO RELEASE.		
--- Materials Involved ---		
Category: SOURCE		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
SOURCE, SEALED	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOII80142	Date: 08/22/1980	Time: 13:30
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TRI-STATE MOTOR TRANSIT CO		MISSOURI
Location: US 421 WEST NEAR NC HIGHWAY 68		NORTH CAROLINA
Shipper: GOODYEAR ATOMIC CORP		OHIO
Consignee: GENERAL ELECTRIC		NORTH CAROLINA
Remarks:		
TRUCK FORCED OFF HIGHWAY, NO DAMAGE TO RAM: TRUCK TRANSPORTING FIVE FULL OR-30B UF6 CYLINDERS IN OVERPACKS WAS FORCED OFF I-85 NEAR GREENSBORO, NC. THE TRUCK WENT INTO A DITCH BUT DID NOT OVERTURN. THERE WAS NO DAMAGE TO THE CYLINDERS AND NO INJURIES. NC HIGHWAY PATROL RESPONDED & SURVEYED AREA - NO RELEASE. (NC REPORT #106)		
--- Materials Involved ---		
Category: UF6		
URANIUM HEXAFLUORIDE		
---Packages Involved ---		
Description	ID Code	DOT Category
CYLINDER	OR-30B	B
# Packages: Shipped: 5; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0005 **Date:** 09/06/1980 **Time:**
 Mode: RAIL Vehicle: RAIL CAR
 Accident Code: T Transportation Link Closed?: Y
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: NORFOLK & WESTERN RR
 Location: TUG RIVER TRESTLE, HEMPHILL WEST VIRGINIA
 Shipper: GOODYEAR ATOMIC CORP OHIO
 Consignee: TRANSNUCLEAR INC VIRGINIA

Remarks:
 HEAD ON COLLISION, NO DAMAGE TO RAM: FREIGHT TRAIN COLLIDED HEAD-ON WITH AN EMPTY COAL TRAIN. 2 CREW DIED & A THIRD MISSING; DIESEL FUEL FIRE. FREIGHT HAD A FLAT CAR WITH 2 PIGBACK TRAILERS, EACH WITH 4 30B CYLINDERS WITH DOT 21PF1 OVERPACKS. THERE WAS NO DAMAGE TO THE CYLINDERS. CYLINDERS DESTINED FOR NORFOLK 9/8/80 FOR EURATOM. MORE DETAILS AVAILABLE. (URANIUM HEXAFLUORIDE, FISSILE).

--- Materials Involved ---
 Category: UF6
 URANIUM HEXAFLUORIDE

---Packages Involved ---

Description	ID Code	DOT Category
CYLINDER	30B	B
# Packages: Shipped: 8; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOIV8033	Date: 09/29/1980	Time:
Mode: RAIL	Vehicle: RAIL CAR	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: BURLINGTON NORTHERN		
Location: BAINVILLE		MONTANA
Shipper: U. S. ARMY		NEW JERSEY
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
TRAIN ACCIDENT, NO DAMAGE TO RAM: A RAIL ACCIDENT OCCURRED NEAR BAINVILLE, MT. THREE 100 MCI SOURCES OF STRONTIUM-90/YTTRIUM-90 SOURCES WERE BEING TRANSPORTED IN A TRUCK TRAILER ON A FLAT CAR. THE TRAILER WAS REPORTED TO BE HEAVILY DAMAGED BUT THE SOURCES REMAINED INTACT AND THERE WAS NO RELEASE OR DAMAGE TO THE CONTAINERS.		
--- Materials Involved ---		
Category: INDUSTRIAL		
STRONTIUM-90	YTTRIUM-90	
---Packages Involved ---		
Description	ID Code	DOT Category
SOURCE, SEALED	UNKNOWN	B
# Packages: Shipped: 3; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOIV8125	Date: 09/02/1981	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code:
FIRE		
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: H & H X-RAY SERVICES INC		LOUISIANA
Location: NEAR ROLL		OKLAHOMA
Shipper: H & H X-RAY SERVICES		LOUISIANA
Consignee: H & H X-RAY SERVICES INC		LOUISIANA
Remarks:		
CRASH AND FIRE, NO RAM DAMAGE: A MOBILE RADIOGRAPHIC VEHICLE WITH A 40 CI IRIDIUM-192 SOURCE CRASHED AND CAUGHT FIRE. THE SOURCE WAS UNDAMAGED. H&H X-RAY AND STATE OF OKLAHOMA REPS RESPONDED TO ACCIDENT.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
SOURCE, SEALED	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0189	Date: 10/26/1981	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: BILL MILLER, INC.		KANSAS
Location: HAVERHILL RD & OLD KECHI RD, EL DORADO		KANSAS
Shipper: UNKNOWN		
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
COLLISION AND FIRE; NO DAMAGE TO RAM: A BILL MILLER RADIOGRAPHY TRUCK CARRYING A 102 CI IRIDIUM-192 SOURCE WAS INVOLVED IN AN ACCIDENT. THE ACCIDENT SITE WAS SURVEYED AND NO RADIATION ABOVE BACKGROUND WAS NOTED. EL DORADO PUBLIC SAFETY AND DEPT OF HEALTH RESPONDED. (KS REPORT).		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	MODEL 62	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOII82122 **Date:** 11/03/1982 **Time:** 18:00
 Mode: HIGHWAY Vehicle: TRUCK, TRAILER
 Accident Code: T Transportation Link Closed?: Y
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: TRI-STATE MOTOR TRANSIT CO MISSOURI
 Location: NEAR HILDA SOUTH CAROLINA
 Shipper: CHEM-NUCLEAR SYSTEMS INC SOUTH CAROLINA
 Consignee: UNION CARBIDE CORP NEW YORK

Remarks:
 COLLISION; NO DAMAGE TO RAM: A TRI-STATE TRACTOR-TRAILER WAS RETURNING FROM A DELIVERY TO CHEM-NUCLEAR'S BARNWELL LOW LEVEL WASTE SITE WHEN A CAR PULLED IN FRONT OF THE TRUCK. THE TRUCK WAS CARRYING TWO 28,000 LB EMPTY CASKS. THE TRUCK OVERTURNED AND BOTH CASK TIE-DOWNS GAVE WAY AND THE CASKS WERE THROWN FROM THE TRAILER. BOTH CASKS WERE INTACT. THE TRACTOR CAUGHT FIRE AND THE DRIVER WAS KILLED. THE STATE RESPONDED. THERE WAS NO RELEASE.

--- Materials Involved ---
 Category: LLW
 EMPTY CASK

---Packages Involved ---

Description	ID Code	DOT Category
CASK	UNKNOWN	B

Packages: Shipped: 2; Damaged w/ Release: 0; Damaged, No Release: 0

Incident Number: TTC0072	Date: 03/11/1983	Time: 15:00
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: HITTMAN NUCLEAR		MARYLAND
Location: ILL 59 & ILL 64		ILLINOIS
Shipper: POINT BEACH NUCLEAR POWER		WISCONSIN
Consignee: U. S. ECOLOGY		WASHINGTON
Remarks:		
COLLISION; NO DAMAGE TO RAM: TRUCK CARRYING CASK WAS SIDE-SWIPED BY ANOTHER TRUCK. NO DAMAGE TO CASK. NO RELEASE. RADIATION READINGS WERE 15 MR/HR AT CONTAINER SURFACE. (ILL ID# I0007A)		
--- Materials Involved ---		
Category: LLW		
LOW LEVEL WASTE		
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	HN-400	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0100	Date: 05/10/1983	Time:
Mode: HIGHWAY	Vehicle: VEHICLE, SMALL	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: INSPECTION AND TESTING INC		IDAHO
Location: US-40, 5 MI N. OF HEBER CITY		UTAH
Shipper: INSPECTION AND TESTING INC		IDAHO
Consignee: INSPECTION AND TESTING INC		IDAHO
Remarks:		
COLLISION; NO DAMAGE TO RAM: (UTAH STATE REPORT) A PICKUP TRUCK CARRYING AN IRIDIUM-192 SOURCE WAS STRUCK HEAD ON BY ANOTHER VEHICLE. THE OTHER VEHICLE CROSSED THE CENTER LINE AND HIT THE INSPECTION AND TESTING TRUCK. THE IRIDIUM SOURCE WAS INTACT; THERE WAS NO CONTAMINATION NOR UNUSUAL READINGS.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	USA/9157/B	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: 83080070	Date: 07/14/1983	Time: 21:15
Mode: AIR	Vehicle: AIRCRAFT	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code: MED
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: EMERY AIR FREIGHT CORP		TENNESSEE
Location: TRI-CITY AIRPORT, BLOUNTVILLE		TENNESSEE
Shipper: UNION CARBIDE CORP		TENNESSEE
Consignee: GEORGIA TECH		GEORGIA
Remarks:		
FIRE: ORION AIR INC SUBCONTRACT AIRLINE FOR EMERY AIR FRT. PLANE APPARENTLY OVERSHOT THE RUNWAY, CRASHED, BURNED. CASKS REMAINED IN FUSELAGE. TYPE A THROWN FROM PLANE & FOUND 30 FT. AWAY FROM WRECKAGE. OCCUPANTS OF 4 HOMES WERE EVACUATED BECAUSE OF RADIOACTIVE CARGO. AIRPORT WAS CLOSED BECAUSE OF CRASH. MORE DATA AVAILABLE.		
--- Materials Involved ---		
Category: MEDICAL		
IRIDIUM-192	YTTRIUM-90	
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	USA/5597	B
# Packages: Shipped: 2; Damaged w/ Release: 0; Damaged, No Release: 0		
BOX, FIBERBOARD	UNKNOWN	A
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOIII83127	Date: 12/09/1983	Time: 14:00
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE	Search Code: NFC	
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TRANSNUCLEAR INC		NEW YORK
Location: 3 MI E IND/ILL STATE LINE		INDIANA
Shipper: WEST VALLEY NUCLEAR SERVICES		PENNSYLVANIA
Consignee: COMMONWEALTH EDISON CO		ILLINOIS
Remarks:		
NO DAMAGE TO CASK: TRACTOR SEPARATED FROM INTERMEDIATE SET OF AXLES (NEE JOE DOG) BUT REMAINED CONNECTED TO TRAILER. TRAILER STOPPED; THERE WAS NO LOSS OF INTEGRITY. SHIPMENT DELIVERED TO DRESDEN NUCLEAR PLANT.		
--- Materials Involved ---		
Category: SPENT FUEL		
SPENT FUEL		
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOII84044	Date: 07/16/1984	Time: 20:00
Mode: AIR	Vehicle: AIRCRAFT	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: EMERY AIR FREIGHT CORP		TENNESSEE
Location: TRI-CITIES AIRPORT, BLOUNTVILLE		TENNESSEE
Shipper: OAK RIDGE NATIONAL LABORATORY		TENNESSEE
Consignee: RADIATION PRODUCTS		MASSACHUSETTS
Remarks:		
PLANE LOST HYDRAULIC FLUID: AN EMORY AIR FREIGHT PLANE (CONVAIR-240) LOST HYDRAULIC FLUID & RAN INTO THICK MUD AT THE END OF THE RUNWAY WHILE LANDING. THREE SHIPMENTS WERE ON THE PLANE: 2 SHIPMENTS FOR RADIATION PRODUCTS IN MA TOTALING 17,982 CI OF IR-192 AND A 3RD TO INDUSTRIAL NUCLEAR CO, FOSTER CITY, CA WITH 3,846 CI OF IR-192. THERE WERE NO INJURIES & NO DAMAGE TO RAM. DEPT OF ENERGY FROM OAK RIDGE SURVEYED THE SHIPMENTS.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
UNKNOWN	UNKNOWN	B
# Packages: Shipped: 3; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0149	Date: 08/08/1984	Time: 11:10
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: UNKNOWN	Search Code: NFC	
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: WESTINGHOUSE ELECTRIC CORP		IDAHO
Location: WESTINGHOUSE NRF 400FT NW ECF		IDAHO
Shipper: WESTINGHOUSE ELECTRIC CORP		IDAHO
Consignee: EG&G IDAHO		IDAHO
Remarks:		
FELL IN TRANSIT: 125 TON IRRADIATED REACTOR CORE BARREL CONTAINER TRANSFERRED FROM NRF TO RAD WASTE MGMT COMPLEX FOR BURIAL. TRAILER TIPPED OVER WHEN I WENT THRU 90 DEGREE TURN. CONTAINER FELL, TIEDOWNS BROKE.		
--- Materials Involved ---		
Category: NFC		
REACTOR WASTE		
---Packages Involved ---		
Description	ID Code	DOT Category
CONTAINER	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0134 **Date: 02/11/1985** **Time: 22:30**
Mode: HIGHWAY Vehicle: TRUCK, TRAILER
Accident Code: T Transportation Link Closed?: N
Radioactivity Released: NONE Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: SCHAEFER TRUCKING CO CALIFORNIA
Location: I-57 EASTBOUND AT MP 160 ILLINOIS

Shipper: UNKNOWN

Consignee: NONE; ACCIDENT IN TRANSIT

Remarks:
ACCIDENT; NO CONTAMINATION: (IL ID 0018) THE SEMI-TRAILER JACKKNIFED
DUE TO ROAD CONDITIONS. THERE WAS \$1,000 DAMAGE TO THE TRAILER. THERE
WAS NO RELEASE OR CONTAMINATION. (IR-192 SOURCE).

--- Materials Involved ---
Category: INDUSTRIAL
IRIDIUM-192

---Packages Involved ---
Description ID Code DOT
DRUM UNKNOWN B
Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0

Incident Number: TTC0135	Date: 02/13/1985	Time: 14:30
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: YELLOW FREIGHT SYSTEM INC		KANSAS
Location: I-55 NORTH BOUND AT MP 228		ILLINOIS
Shipper: MAGNAFLUX CORP		ILLINOIS
Consignee: INDUSTRIAL NUCLEAR CO		CALIFORNIA
Remarks:		
COLLISION; NO DAMAGE TO RAM: (IL ID 0019) THE VEHICLE OVERTURNED ON ITS SIDE DUE TO ROAD CONDITIONS. THERE WAS A DENT ONLY IN A DRUM - THERE WAS NO CONTAMINATION. THE TRANSPORT INDEX (TI) WAS 0.5 WITH 2.0 MR/HR MAX LEVEL AT THE SURFACE. (IR-192 SOURCE).		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
DRUM	USA/9156	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 1		

Incident Number: TTC0195 **Date:** 12/04/1985 **Time:** 21:50
 Mode: HIGHWAY Vehicle: TRUCK, TRAILER
 Accident Code: T Transportation Link Closed?: N
 Radioactivity Released: NONE Search Code: IND
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: SIERRA TESTING, TULSA OKLAHOMA
 Location: S.E. 14TH ST., DES MOINES IOWA
 Shipper: SIERRA TESTING OKLAHOMA

Consignee: NONE; ACCIDENT IN TRANSIT

Remarks:
 COLLISION, NO DAMAGE TO RAM: A TRUCK CARRYING A RADIOGRAPHY SOURCE
 (AN IRIIDIUM-192 GAUGE) COLLIDED WITH A CAR WHILE PULLING OUT OF A
 PARKING SPACE. THERE WAS NO DAMAGE TO THE SOURCE. A SURVEY INDICATED
 THERE WAS NO LEAK; NO RELEASE. THE SIERRA TRUCK WAS PLACARDED. (IOWA
 REPORT; MORE DATA AVAILABLE).

--- Materials Involved ---
 Category: INDUSTRIAL
 IRIIDIUM-192

---Packages Involved ---

Description	ID Code	DOT Category
CAMERA, SOURCE	SPEC 11-T	B

Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0

Incident Number: 86010198	Date: 01/10/1986	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: BAKER TUBULAR SERVICES		OKLAHOMA
Location: ST HIGHWAY 63 WEST, NEAR BLANCO		OKLAHOMA
Shipper: BAKER TUBULAR SERVICES		OKLAHOMA
Consignee: BAKER TUBULAR SERVICES		OKLAHOMA
Remarks:		
TRUCK OVERTURNED; NO DAMAGE TO RAM (CS-137 GAUGE): A TRAILER WAS TRAVELING ON A NARROW ROAD. WHEN THE TRUCK MOVED OVER TO LET A CAR PASS, THE TRUCK WHEELS WENT ON TO THE SOFT SHOULDERS & THEN INTO THE DITCH; THE CAB FLIPPED OVER. THE TRIPLY ENCAPSULATED SEALED SOURCES WERE INTACT. LEAK TESTS CONFIRMED THERE WAS NO RELEASE.		
--- Materials Involved ---		
Category: INDUSTRIAL GAUGE		
CESIUM-137		
---Packages Involved ---		
Description	ID Code	DOT Category
GAUGE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOII8658	Date: 08/15/1986	Time: 0:00
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE		Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TRANSNUCLEAR INC		
Location: I-81 NEAR FAIRFIELD		VIRGINIA
Shipper: LEHAVRE		FRANCE
Consignee: EXXON NUCLEAR INC		WASHINGTON
Remarks:		
COLLISION: TRACTOR-TRAILER WITH UF6 COLLIDED WITH A CAR TOWING ANOTHER CAR. 1 O 3 OVERPACKS HOLDING THE CYLINDERS BROKE LOOSE, ANOTHER CYLINDER HAD A 14-INCH GASH IN ITS SIDE. MORE INFORMATION IS AVAILABLE.		
--- Materials Involved ---		
Category: UF6		
URANIUM HEXAFLUORIDE		
---Packages Involved ---		
Description	ID Code	DOT Category
CYLINDER	30B	B
# Packages: Shipped: 3; Damaged w/ Release: 0; Damaged, No Release: 1		

Incident Number: PNOTMI8702 **Date:** 03/24/1987 **Time:**
 Mode: RAIL Vehicle: RAIL CAR
 Accident Code: T Transportation Link Closed?: Y
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: UNION PACIFIC RAILROAD
 Location: 5200 MANCHESTER RR, ST LOUIS MISSOURI
 Shipper: GENERAL PUBLIC UTIL PENNSYLVANIA
 Consignee: U. S. DEPARTMENT OF ENERGY IDAHO

Remarks:
 COLLISION: A TRAIN CARRYING 2 SHIPPING CASKS CONTAINING TMI CORE DEBRIS (SPENT FUEL) STRUCK AN AUTOMOBILE AT A RAILROAD CROSSING. THE DRIVER OF THE AUTO SUSTAINED MINOR INJURIES AND WAS TAKEN TO A HOSPITAL. HE WAS ALSO CITED FOR FAILING TO OBEY A TRAFFIC SIGNAL AT THE CROSSING. THE SHIPPING CASKS WERE UN-DAMAGED; THE TRAIN'S ENGINE RECEIVED MINOR DAMAGE. THERE WAS NO RELEASE OF RADIOACTIVITY. THE TRAIN WAS DELAYED 45 MINUTES. MORE INFO AVAILABLE IN HARD COPY REPORTS.

--- Materials Involved ---
 Category: NFC
 CORE DEBRIS

---Packages Involved ---

Description	ID Code	DOT Category
CASK	NUPAC 125	B

Packages: Shipped: 2; Damaged w/ Release: 0; Damaged, No Release: 0

Incident Number: PNOI87100 **Date:** 10/26/1987 **Time:** 11:00
Mode: HIGHWAY Vehicle: TRUCK, TRAILER
Accident Code: T Transportation Link Closed?: Y
Radioactivity Released: NONE Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: UNKNOWN

Location: NJ TURNPIKE, EXIT 8, HIGHSTOWN NEW JERSEY
Shipper: EASTERN TESTING & INSPECTION NEW JERSEY
Consignee: NONE; LOST

Remarks:
LOST IN TRANSIT: A TRUCK CARRYING A RADIOGRAPHY EXPOSURE DEVICE
(IRIDIUM-192) OVERTURNED. THE RADIOGRAPHY SOURCE REMAINED INTACT AND
IN THE SHIELDED SHIPPING CONTAINER. THERE WAS NO RELEASE, BUT 2
PEOPLE WERE INJURED AS A RESULT OF THE VEHICULAR NATURE OF THE
ACCIDENT.

--- Materials Involved ---
Category: INDUSTRIAL
IRIDIUM-192

--- Packages Involved ---
Description ID Code DOT Category
SOURCE, SEALED UNKNOWN B
Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0

Incident Number: PNOIV8803	Date: 01/09/1988	Time: 13:30
Mode: RAIL	Vehicle: RAIL CAR	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: NEBRASKA PUBLIC POWER		NEBRASKA
Location: COOPER NUCLEAR PLANT, BRWNVILLE		NEBRASKA
Shipper: NEBRASKA-COOPER NUCLEAR PLANT		NEBRASKA
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
DERAILED: ONE SET OF RAIL CAR WHEELS DERAILED. A TRACK SWITCH WAS IN THE WRONG POSITION WHEN THE CAR WAS BEING MOVED BETWEEN 2 SETS OF TRACKS. (EMPTY SPENT FUEL).		
--- Materials Involved ---		
Category: NFC		
SPENT FUEL		
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOI8823	Date: 01/23/1988	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: CONAM INSPECTION SERVICE		PENNSYLVANIA
Location: MONTCHENEN RD & RT 100, WILMINGTON		DELAWARE
Shipper: NUCLEAR ENERGY SERVICES		TEXAS
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
TRUCK RAN OFF ROAD: A CONAM INSPECTION TRUCK RAN OFF THE ROAD AT MONTCHENEN RD AND ROUTE 100 NEAR WILMINGTON, DELAWARE. THE NEW CASTLE COUNTY POLICE RESPONDED TO THE ACCIDENT AND REQUESTED ASSISTANCE FROM THE DE DEPT OF TRANSPORTATION. THE DE DEPT OF TRANSPORTATION SENT A PERSON TO SURVEY THE AREA. THERE WAS NO RELEASE AND THE SOURCE (IR-92 RADIOGRAPHY SOURCE) WAS INTACT.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOIV8880	Date: 09/23/1988	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: CENTRAL TESTING INC		LOUISIANA
Location: LAKE CHARLES		LOUISIANA
Shipper: CENTRAL TESTING, INC.		LOUISIANA
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
COLLISION & FELL OFF TRUCK: A RADIOGRAPHY TRUCK RAN OFF THE ROAD ROUNDING A CURVE NEAR LAKE CHARLES. THE RADIOGRAPHY CAMERA WAS THROWN OFF THE TRUCK BUT IT WAS RECOVERED INTACT.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
SOURCE, SEALED	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOIII8922	Date: 03/27/1989	Time: 6:50
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: THE AMERICAN INSPECTION CO.		ILLINOIS
Location: NEWTON SQUARE		PENNSYLVANIA
Shipper: THE AMERICAN INSPECTION CO.		ILLINOIS
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
COLLISION: DELAWARE CO. (PA) EMERG. MGMT RESPONDED TO A TRUCK ACCIDENT INVOLVING A RADIOGRAPHIC CAMERA WITH A 25-CI IRIDIUM-192 SOURCE. SOURCE WAS CONTAINED IN A SPEC 2T CAMERA WHICH WAS THROWN FROM THE TRUCK, BUT WAS INTACT & UNDAMAGED. AN AMERICAN INSPECTION SAFETY OFFICER PERFORMED A RADIATION SURVEY & FOUND DEVICE HAD NOT BEEN IMPAIRED.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
SOURCE, SEALED	SPEC 2T	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0232	Date: 05/19/1989	Time: 23:15
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE	Search Code: NFC	
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: HITTMAN NUCLEAR		MARYLAND
Location: RT 90, EAST OF BOZEMAN		MONTANA
Shipper: GPU NUCLEAR CORP		PENNSYLVANIA
Consignee: U. S. ECOLOGY		WASHINGTON
Remarks:		
CAR STRUCK TRACTOR, NO DAMAGE TO RAM: A PASSENGER CAR WAS PASSING THE HITTMAN TRACTOR TRAILER ON THE RIGHT WHEN THE DRIVER LOSS CONTROL OF THE CAR AND STRUCK THE TRACTOR FRONT TIRE AND FUEL SADDLE TANK. THE FUEL TANK LEAKED AND FOLLOWING REPAIRS, THE SHIPMENT CONTINUED TO HANFORD. THERE WAS NO DAMAGE TO THE TRAILER OR CASK. (REPORT FROM GPU #50-320-89-022.)		
--- Materials Involved ---		
Category: LLW		
CLASS C WASTE		
--- Packages Involved ---		
Description	ID Code	DOT Category
CASK	10-142	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOIV9115	Date: 06/08/1991	Time:
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: HIGH MOUNTAIN INSPECTION, INC		WYOMING
Location: MINNEWAUKAN		NORTH DAKOTA
Shipper: HIGH MOUNTAIN INSPECTION, INC		WYOMING
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
TRUCK OVERTURNED: A TRUCK TRANSPORTING A RADIOGRAPHY CAMERA ROLLED OVER ON A RAIN-SLICKED HIGHWAY. THE DRIVER RECEIVED MINOR INJURIES. THE STATE RADIOLOGICAL RESPONSE TEAM RESPONDED AND RECOVERED THE CAMERA INTACT.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: 91100100	Date: 09/15/1991	Time: 4:00
Mode: HIGHWAY	Vehicle: VEHICLE, SMALL	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: X-RAY INSPECTION		LOUISIANA
Location: I-10, HANCOCK		MISSISSIPPI
Shipper: X-RAY INSPECTION, INC		LOUISIANA
Consignee: X-RAY INSPECTION, INC		LOUISIANA
Remarks:		
TRUCK CAUGHT ON FIRE: A PICKUP TRUCK CARRYING A 34-CI IRIDIUM 192 CAMERA WAS INVOLVED IN A FIRE. IT IS BELIEVED THAT A FUEL LEAK IN THE ENGINE STARTED THE FIRE. THE MS HIGHWAY PATROL & MS EMERGENCY MGMT RESPONDED. THE SPEC 2T RADIOGRAPHY DEVICE WAS UNDAMAGED. THE DEVICE WAS TAKEN TO SOURCE PRODUCTION & EQUIPMENT FOR TESTING & VERIFIED THAT THERE WAS NO RELEASE OF RADIOACTIVE MATERIAL.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
--- Packages Involved ---		
Description	ID Code	DOT Category
DRUM	USA/9056	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOI9179	Date: 11/03/1991	Time: 4:00
Mode: HIGHWAY	Vehicle: UNKNOWN	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: CERTIFIED TESTING LABORATORIES		NEW JERSEY
Location: HIGHWAY 34, HOWELL TOWNSHIP		NEW JERSEY
Shipper: CERTIFIED TESTING LABORATORIES		NEW JERSEY
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
COLLISION: AN EMPLOYEE OF CERTIFIED TESTING WAS DRIVING A COMPANY VEHICLE WITH AN IR-192 SOURCE WHEN HE WAS INVOLVED IN A ONE-VEHICLE ACCIDENT. THE DRIVER WAS KILLED & A PASSENGER WAS INJURED. THE SOURCE WAS BEING TRANSPORTED IN AN OVERPACK. THERE WAS NO DAMAGE TO THE DEVICE & ITS OVERPACK. THERE WAS NO RELEASE. THE COMPANY'S RADIATION OFFICER RETRIEVED THE SOURCE.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
GAUGE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC0300	Date: 02/07/1992	Time: 19:00
Mode: HIGHWAY	Vehicle: VEHICLE, SMALL	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: TEI ANALYTICAL INC		PENNSYLVANIA
Location: RT 51, 6 MILES NORTH OF UNIONTOWN		PENNSYLVANIA
Shipper: TEI ANALYTICAL INC		PENNSYLVANIA
Consignee: NONE; ACCIDENT IN TRANSIT		
Remarks:		
TRUCK OVERTURNED; NO DAMAGE TO RAM: A TEI ANALYTICAL PICKUP TRUCK WAS SOUTHBOUND ON ROUTE 51 WHEN IT OVERTURNED. THE TRUCK WAS CARRYING A RADIOGRAPHY CAMERA WITH A 29 CI IRIIDIUM-192 SOURCE. THE DRIVER, A RAD TECHNICIAN, AND A FRANKLIN CO RAD OFFICER SURVEYED THE AREA AND FOUND NO CONTAMINATION. THE CAMERA WAS INTACT. THE PA DEPT OF ENVIRONMENTAL RESOURCES WAS NOTIFIED. THE POLICE RESPONDED. THE TRUCK WAS UPRIGHTED AND CONTINUED ON.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
CAMERA, SOURCE	UNKNOWN	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNOIV938	Date: 03/04/1993	Time: 6:00
Mode: HIGHWAY	Vehicle: TRUCK, TRAILER	
Accident Code: T	Transportation Link Closed?: U	
Radioactivity Released: NONE		Search Code: LLW
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: FT. ST. VRAIN		COLORADO
Location: I-82, NEAR CABBAGE MOUNTAINS		OREGON
Shipper: PUBLIC SERVICE CO OF COLORADO		COLORADO
Consignee: U. S. ECOLOGY		WASHINGTON
Remarks:		
TRUCK SLID OFF ROAD: A SHIPMENT OF LOW LEVEL WASTE FROM FT ST VRAIN LEFT THE HIGHWAY AND STRUCK A GUARD RAIL. THERE WAS NO DAMAGE TO THE TRAILER & CASK BUT THERE WAS SOME DAMAGE TO THE TRACTOR BUT IT WAS FUNCTIONAL. WHILE WAITING FOR THE ROAD TO BE SANDED, THE SEMI WAS STRUCK BY ANOTHER SEMI THAT SLID OFF THE ROAD; THIS TIME DAMAGING THE TRAILER. THERE WAS NO RELEASE AND NO DAMAGE TO THE CASK.		
--- Materials Involved ---		
Category: LLW		
COBALT-57	COBALT-58	
COBALT-60	TRITIUM	
---Packages Involved ---		
Description	ID Code	DOT Category
CASK	USA/6574	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: 94110502	Date: 10/10/1994	Time: 15:05
Mode: HIGHWAY	Vehicle: OTHER	
Accident Code: T	Transportation Link Closed?: Y	
Radioactivity Released: NONE		Search Code: IND
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: SUN-RAY TESTING INTERNATIONAL		CALIFORNIA
Location: POMONA		CALIFORNIA
Shipper: SUN-RAY TESTING INTERNATIONAL		CALIFORNIA
Consignee: SUN-RAY TESTING INTERNATIONAL		CALIFORNIA
Remarks:		
A SUN-RAY PICKUP WITH CAMPER WAS INVOLVED IN A ONE VEHICLE ACCIDENT WHEN ITS RIGHT REAR TIRE HAD A BLOW OUT. AS THE DRIVER WAS STEERING THE TRUCK TO AN EMERGENCY LANE, THE TRUCK SWAYED AND THEN TIPPED OVER AND SKIDDED ACROSS THE FREEWAY AND INTO A CONCRETE RETAINING WALL. THE CAMPER BROKE AWAY FROM THE TRUCK. THE AREA WAS SURVEYED BY THE DRIVER; READINGS WERE NORMAL. THE FIRE DEPARTMENT CLOSED THE HIGHWAY.		
--- Materials Involved ---		
Category: INDUSTRIAL		
IRIDIUM-192		
---Packages Involved ---		
Description	ID Code	DOT Category
SOURCE, SEALED	MODEL 660	B
# Packages: Shipped: 1; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: TTC-0365 **Date: 12/23/1994** **Time:**
 Mode: RAIL Vehicle: RAIL CAR
 Accident Code: T Transportation Link Closed?: Y
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: UNKNOWN

Location: LOUISVILLE KENTUCKY

Shipper: PADUCAH GASEOUS DIFFUSSION PLANT KENTUCKY

Consignee: PORTSMOUTH GASEOUS DIFFUSSION PLANT OHIO

Remarks:

THE PADUCAH GASEOUS DIFFUSION PLANT NOTIFIED THE NRC THAT A RAIL CAR
 CARRYING A 14-TON CYLINDER OF LOW ENRICHED URANIUM HEXAFLUORIDE (UF6)
 HAD DERAILED IN LOUISVILLE, KY. THE CAR WAS ONE OF 5 DESTINED FOR
 THE PORTSMOUTH GASEOUS DIFFUSION PLANT NEAR PIKETON, OH. THE
 CYLINDER OF UF6 WAS NOT DAMAGED AND THE RAIL CAR HAD BEEN PLACED BACK
 ONTO THE TRACK AND WAS AWAITING FINAL INSPECTION PRIOR TO COMPLETING
 THE TRIP TO THE PORTSMOUTH PLANT.

---Packages Involved ---

Description	ID Code	DOT Category
CYLINDER	*	B

Packages: Shipped: 5; Damaged w/ Release: 0; Damaged, No Release: 0

Incident Number: EN-29722 **Date: 12/14/1995** **Time: 17:45**
 Mode: RAIL Vehicle: RAIL CAR
 Accident Code: T Transportation Link Closed?: N
 Radioactivity Released: NONE Search Code: NFC
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: CP&L RAIL
 Location: NORTH CAROLINA
 Shipper: HARRIS NORTH CAROLINA
 Consignee: NONE; ACCIDENT IN TRANSIT

Remarks:
 A RAILWAY CAR, USED BY CP&L TO TRANSPORT SPENT FUEL, WITH EMPTY CASKS (HAD BEEN USED BEFORE TO TRANSPORT SPENT FUEL) ON IT, HAD 4 OF ITS 8 WHEELS SLOP OFF THE RACK, CAUSING DERAILMENT INSIDE THE EXCLUSION AREA BOUNDARY. NO PLANT DAMAGE OR PERSONNEL INJURY OCCURRED. RADIATION SURVEYS AROUND THE CAR WERE BEING TAKEN. STATE AND LOCAL OFFICIALS WERE NOTIFIED OF THE EVENT.

---Packages Involved ---

Description	ID Code	DOT Category
CASK		B
# Packages: Shipped: N/A; Damaged w/ Release: N/A; Damaged, No Release: N/A		

Incident Number: 96100714	Date: 09/09/1996	Time:
Mode: AIR	Vehicle: AIRCRAFT	
Accident Code: T	Transportation Link Closed?: N	
Radioactivity Released: NONE		Search Code:
FIRE		
Injuries and Deaths Due to Radioactivity Released: 0, 0		
Carrier: FEDERAL EXPRESS		
Location: NEWBURG		NEW YORK
Shipper: UNKNOWN		MASSACHUSETTS
Consignee: UNKNOWN		TENNESSEE
Remarks:		
WHILE THE AIRCRAFT WAS IN ROUTE TO BOSTON, MA FROM MEMPHIS, TN SMOKE ALARMS IN POSITIONS 7, 8, 9 WENT OFF. THE AIRCRAFT DIVERTED TO NEWBURG, NY AIRPORT. UPON LANDING THE CREW AND ONE JUMPSEATER EXITED. THE PLANE WAS SUBSEQUENTLY ENGULFED IN FLAMES FROM A STILL UNDETERMINED SOURCE. THERE WAS 8 TYPE A PACKAGES AND 2 TYPE B PACKAGES ABOARD. NONE OF THE PACKAGES RELEASED THEIR CONTENTS. FOR FURTHER INFORMATION ON INDIVIDUAL PACKAGES PLEASE SEE 96100714 A-J OR PNO-I-96063.		
---Packages Involved ---		
Description	ID Code	DOT Category
BOX, FIBERBOARD		A
# Packages: Shipped: 8; Damaged w/ Release: 0; Damaged, No Release: 0		
CONTAINER, METAL		B
# Packages: Shipped: 2; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: PNO-III-97004 **Date:** 01/24/1997 **Time:** 7:00
Mode: HIGHWAY **Vehicle:** TRUCK, FLATBED
Accident Code: T **Transportation Link Closed?:** Y
Radioactivity Released: NONE **Search Code:** NFC
Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: UNKNOWN
Location: INTERSTATE 80 NEAR WALCOTT IOWA
Shipper: PORTSMOUTH GASEOUS DIFFUSION PLANT
Consignee: SIMENS POWER CORPORATION WASHINGTON

Remarks:
 A FLAT BED TRAILER TRANSPORTING FOUR 2.5 TON SOLID URANIUM
 HEXAFLUORIDE CYLINDERS IN PROTECTIVE OVERPACKS, WAS INVOLVED IN AN
 ACCIDENT ON INTERSTATE 80 IN SCOTT COUNTY NEAR WALCOTT, IOWA. THE
 ACCIDENT WAS DUE TO A SNOW AND ICE STORM. THE TRUCK WAS TRANSPORTING
 CYLINDERS FROM THE PORTSMOUTH GASEOUS DIFFUSION PLANT TO SIEMENS
 POWER CORP. IN RICHLAND, WA. ALL FOUR CYLINDERS AND THEIR OVERPACKS
 REMAINED INTACT AND NO INJURIES WERE REPORTED. SURVEYS SHOWED NO
 CONTAMINATION.

---Packages Involved ---

Description	ID Code	DOT Category
CYLINDER		B
# Packages: Shipped: 4; Damaged w/ Release: 0; Damaged, No Release: 0		

Incident Number: EN-33838 **Date: 03/05/1998** **Time: 14:15**
 Mode: HIGHWAY Vehicle: TRUCK, TRAILER
 Accident Code: T Transportation Link Closed?: Y
 Radioactivity Released: NONE Search Code: N/A
 Injuries and Deaths Due to Radioactivity Released: 0, 0

Carrier: NATIONAL RESPONSE CENTER FLORIDA
 Location: INGLIS FLORIDA
 Shipper: UNKNOWN
 Consignee: UNKNOWN

Remarks:
 A TRAFFIC ACCIDENT INVOLVING A TRUCK TOWING A TRAILER WITH A PORTABLE DARKROOM FACILITY WHICH CONTAINED AN IRIDIUM-192 SOURCE OCCURRED AT THE CORNER OF U. S. 19 AND HIGHWAY 121 IN INGLIS, FLORIDA. THERE WAS NO DAMAGE TO THE VEHICLES OR TO THE SOURCE, AND THERE WERE NO PERSONNEL INJURIES. THERE WAS NO RELEASE OF RADIOACTIVE MATERIAL. THIS ACCIDENT DID INVOLVE A TYPE B PACKAGE.

---Packages Involved ---			DOT
Description	ID Code		Category
UNKNOWN			B
# Packages: Shipped: N/A; Damaged w/ Release: N/A; Damaged, No Release: N/A			

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