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Exhibit 5

Public Information Circular for Shipments of Irradiated Reactor Fuel

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ABSTRACT

This circular has been prepared to provide information on the shipment of irradiated reactor fuel (spent fuel) subject to regulation by the U.S. Nuclear Regulatory Commission (NRC). It provides a brief description of spent fuel shipment safety and safeguards requirements of general interest, a summary of data for 1979–1995 highway and railway shipments, and a listing, by State, of recent highway and railway shipment routes.

The enclosed route information reflects specific NRC approvals that have been granted in response to requests for shipments of spent fuel. This publication does not constitute authority for carriers or other persons to use the routes described to ship spent fuel, other categories of nuclear waste, or other materials.

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1 INTRODUCTION

The Nuclear Regulatory Commission (NRC) is authorized under the Atomic Energy Act of 1954, as amended, to regulate the commercial nuclear industry for the purpose of protecting the public health and safety and the common defense and security of the United States. Included in this authority is the regulation of certain aspects of the transportation of irradiated reactor fuel (spent fuel). NRC's role in this regard is explained in Section 2 of this report. Section 3 provides descriptive statistics on spent fuel shipments in the commercial nuclear industry for the period 1979–1995. Section 4 contains a listing, by State, of highway and railway segments used in each State for transporting spent fuel in recent years (1993–1995).

2 REGULATORY REQUIREMENTS FOR SPENT FUEL SHIPMENTS

Spent fuel shipments are regulated from both the safety and safeguards standpoints. Safety deals with protection of public health and safety during routine transport as well as in the event of handling or transportation accidents, whereas safeguards deals with the protection of shipments against deliberate, malevolent acts by persons.

2.1 Safety Requirements

Federal regulatory responsibility for spent fuel transportation safety is shared by NRC and the U.S. Department of Transportation (DOT). Basically, NRC's safety role is to ensure that the spent fuel packagings meet strict regulatory design rules, and includes approving packaging designs and Quality Assurance Programs, and conducting inspections. NRC packaging requirements are specified in 10 CFR Part 71. The DOT role in regulating spent fuel shipment safety is broad, and covers all aspects of actual transportation, including route selection, vehicle condition and placarding, driver training, package marking, labeling, other shipping documentation, etc. These requirements are specified in 49 CFR Parts 171–178. Of the NRC and DOT safety requirements for spent fuel shipments, NRC's packaging standards and DOT's routing rules have been of most general interest, and are briefly described below.

2.1.1 Packaging Standards

The basic strategy for regulating spent fuel shipments is to rely on the packaging to protect the public health and safety during transportation. The packaging standards that have been established in the regulations provide that a spent fuel packaging (cask) shall prevent the loss or dispersion of the radioactive contents, provide adequate shielding and heat dissipation, and prevent nuclear criticality under both normal and accident conditions of transportation. The normal conditions of transportation that must be considered are specified in the regulations in terms of hot and cold environments, pressure differential, vibration, water spray, impact, puncture, and compression tests. Accident conditions that must be considered are specified in terms of impact, puncture, fire conditions, and immersion.

The NRC initially reviews the cask design to verify its resistance to accidents. NRC must issue a certificate before a cask fabricated from the reviewed design can be used to transport spent fuel.

The ability of packaging to provide protection has been demonstrated by the responses of packaging during actual traffic accidents. For example, an accident occurred on December 8, 1971, on a major highway near Oak Ridge, Tennessee. In this accident, the driver of a vehicle carrying a spent fuel cask swerved to avoid colliding with an oncoming vehicle, lost control, and overturned off the roadway. The cask assembly was thrown into a ditch, traveling more than 100 feet before coming to rest. No release of contents or release of radiation occurred. The outer surface of the cask sustained minor damage. The spent fuel cask was placed on another trailer and taken to its destination. The cask was returned to service after repair of the minor damage and inspection.

The accident resistance of casks has also been demonstrated in controlled tests. In one test, sponsored by the U.S. Department of Energy (DOE), a truck bearing a cask was deliberately placed in the path of and struck by a 120-ton locomotive traveling about 80 miles per hour. In another DOE test, a cask aboard a truck moving about 80 miles per hour was deliberately crashed into an immovable concrete structure. Subsequent examination in both these tests confirmed that no radioactive material would have been released

from the casks had they been loaded with spent fuel. Thus, both field experience and controlled tests have substantiated the strategy of depending on packaging design for safety in transit.

For further information on spent fuel shipment safety, please consult NUREG/BR-0111, Transporting Spent Fuel–Protection Provided Against Severe Highway and Railroad Accidents."

2.1.2 Routing Requirements

DOT requirements in 49 CFR 177.825(b) designate the use of the Interstate System of highways and available city beltways as the primary roadways over which radioactive material shipments under an NRC safeguards-approved route plan are to be carried. There is no routing rule for rail shipments. The general designation as preferred highways is given to roadways, based on their capacity for reducing transit times. Appropriate State routing agencies, following prescribed criteria, may designate an alternate route to the preferred Interstate System. It is the responsibility of spent fuel carriers to abide by the routing rule when they transport spent fuel by highway.

2.1.3 Spent Fuel Shipment Safety Record

The safety record for spent fuel shipments in the U.S. and in other industrialized nations is enviable. Of the thousands of shipments completed over the last 30 years, none has resulted in an identifiable injury through release of radioactive material.

2.2 Safeguards Requirements

In May 1979, NRC adopted new regulations, in 10 CFR 73.37, for strengthening the protection of shipments of spent fuel against radiological sabotage. The material requiring physical protection is identified in 10 CFR 73.37(a) as ". . . a quantity of irradiated fuel in excess of 100 grams in net weight of irradiated fuel, exclusive of cladding or other structural or packaging material which has a total external dose rate in excess of 100 rems per hour at a distance of 3 feet from any accessible surface without intervening shielding. . . ." These regulations were subsequently revised in May 1980, in response to public comments. The regulations require, among other actions, NRC approval of routes for the transportation of spent fuel, to ensure adequate planning for physical protection against actual or attempted acts of radiological sabotage. Physical protection requirements for NRC licensees who transport or deliver spent fuel to a carrier for transport include: shipment prenotification to NRC; procedures for coping with emergencies; a communications center; contact with the communications center every 2 hours; a written log of shipment events; arrangements with local law enforcement agencies (NRC often coordinates this item); avoidance of intermediate stops; surveillance of the shipment vehicle while stopped; armed escorts in heavily populated areas; escort training; onboard communications; immobilization devices on trucks; driver training; and notification of State governors before shipments. Of these safeguards requirements, route approval and State notification have been of most general interest, and are briefly described below.

2.2.1 Route Approval

NRC licensees planning to ship spent fuel are required to submit proposed routes for such shipments to the NRC for approval, from the safeguards standpoint, before the use of a given route. For highway shipments, the licensee must propose a route that conforms with DOT's routing rules. NRC surveys proposed routes for communication reception, location of safe havens, etc. Routes may be approved for a single shipment, or a specified series of shipments. Once a shipment series is approved, the route may be used for all shipments, without reapproval of the route for each shipment, provided that NRC is notified in advance of each shipment. The route approval is for a stated number of shipments only; any subsequent shipments not part of an approval must be additionally approved. NRC approval authorizes only spent fuel shipments, and does not include other categories of nuclear waste material. From time to time, NRC may authorize alternate routes or detours, as circumstances dictate at the time of shipment. Also, detours may be taken without prior approval, in response to unforeseen circumstances that arise during a shipment. Criteria for determining when and how such detours may be taken are provided in published regulatory guidance ("Physical Protection of Irradiated Spent Fuel," NUREG-0561, Rev. 1).

2.2.2 Notification of State Governors

NRC requires its licensees to notify the governor or the governor's designee before the transport of spent fuel within or through the State [10 CFR 73.37 (f)]. The notification must be in writing and postmarked at least 7 days before transport, if mailed, or delivered at least 4 days before transport, if sent by messenger. The notification must include:

- the name, address, and telephone number of the shipper, carrier, and receiver
- a description of the shipment, as specified by DOT
- a listing of the routes to be used within the State
- a statement that NRC requires that shipment schedule information (provided as an enclosure) be protected from unauthorized disclosure.

The enclosure to the notification provides:

- the estimated date and time of departure from the point of origin of the shipment
- the estimated date and time of entry into the governor's State
- a statement that schedule information must be protected from unauthorized disclosure until at least 10 days after the shipment (or 10 days after the last shipment of a series) has entered or originated within the State.

The licensee must also notify the governor of schedule changes that differ by more than 6 hours from the furnished schedule. Subsequent distribution of the schedule information is at the governor's discretion, but NRC regulations require all persons who receive the schedule information to protect it from unauthorized disclosure.

2.2.3 Spent Fuel Shipment Safeguards Record

Safeguards incidents for spent fuel shipments are those that involve attempts at radiological sabotage of spent fuel, or purposeful acts that threaten or result in significant degradation of the safeguards system used to protect the shipment. Licensees are required, under existing regulations, to immediately notify law enforcement authorities upon the occurrence or discovery of a safeguards incident, for the purpose of initiating an appropriate response. In addition, licensees are required to promptly report safeguards incidents to NRC by telephone, followed by a written report. To date, no safeguards incidents involving the shipment of spent fuel have occurred. However, a number of citations have been issued for minor procedural infractions: one in 1986, two in 1987, two in 1990 and one in 1991.

3 DESCRIPTIVE STATISTICS FOR 1979–1995 HIGHWAY AND RAILWAY SPENT FUEL SHIPMENTS

NRC began approving spent fuel shipments in 1979. This section provides descriptive statistics on the shipments that have occurred through 1995. Only shipments of academic, industrial, and utility irradiated reactor fuel subject to NRC regulation are included; DOE shipments are not regulated by NRC and are excluded. Figure 3.1 and Table 3.1 provide a geographical perspective for spent fuel shipments. Figure 3.1 shows the highway and railway routes used for spent fuel transport during 1979–1995. Table 3.1 shows the number of shipments and quantity of spent fuel shipped between specific organization/destination pairs for the period.

Table 3.3 shows the pattern of highway and rail shipments throughout the period 1979–1995. The number of domestic highway shipments (except for the year 1981) rose to a high of 209 in 1984, then declined until 1988, when the recent average of 10 highway shipments per year was reached. Import shipments have generally declined since 1980, with only three imports after 1989. The number of export shipments has been low (0–4) through the entire period. Also, in 1990–1995 five international shipments have been made in which US ports were transitted.

Figure 3.2 shows that most (89 percent) of approximately 1,306 spent fuel shipments during the 1979–1995 period were completed over highways. Figure 3.3 shows that most of the shipping activity occurred during 1980–1987, with relatively low shipping activity after 1987.

Figure 3.4 shows that the larger quantity (73.3 percent) of spent fuel was shipped by railway,

which reflects the greater capacity of rail spent fuel containers versus that for trucks. In addition, a few rail shipments included multiple spent fuel containers, further increasing the rail shipment payload. The figure indicates that 1,335,200 kilograms, or more than a thousand metric tons, of spent fuel were shipped. Figure 3.5 shows that the greatest quantities of spent fuel were shipped during 1984–1987, and that since then, most spent fuel has been shipped by rail.

Figure 3.6 shows that the highway mode accounted for most (94.3 percent) of the 839,268 spent fuel shipment miles. Figure 3.7 shows that shipment mileage peaked in 1984, with a general decline in subsequent years.

Figure 3.8 shows the cumulative movement of spent fuel, calculated by summing the product of quantity and distance for all shipments, and is expressed in kilogram-miles. This unit is analogous to "ton-miles," a unit commonly used to measure the flow of commodities. The figure shows that the railway mode accounted for the majority (69.7 percent) of the 461.3 million kilogram-miles associated with spent fuel shipments. Figure 3.9 shows the kilogram–miles distribution by year.

Finally, Figures 3.10 and 3.11 provide an operational perspective for the spent fuel shipments. Figure 3.10 shows the distribution of shipments by individual shipment quantity, and the corresponding total quantity shipped. The individual shipment quantities have been grouped into ranges, with highway shipments most frequently falling within the 0–10 and 400–500 or 10–400 and 1300–1400 kilogram ranges, and with most railway shipments within the 6000–11000 kilogram range. The smallest quantity range accounts for the largest number of shipments (521, or 40 percent of highway and railway shipments combined), yet comprises only 2,000 kilograms (0.2 percent) of the combined quantity shipped. Conversely, the 54 railway shipments in the 7000–11000 kilogram shipment range comprise only 4.2 percent of the combined total shipments, but 39 percent of the combined quantity of spent fuel shipped. (All shipments less than 1400 kilograms were shipped by highway with two exceptions and all shipments greater than 1400 kilograms were shipped by railway.)

Figure 3.11 shows the distribution of shipments by distance range, and the corresponding total quantity of spent fuel shipped. For highway shipments, the number of shipments generally decreases with shipment distance, although a significant number of shipments exceeded 900 miles. Of the 356 metric tonnes shipped by highway, 173 tonnes (49 percent) traveled less than 200 miles. The number of rail shipments was somewhat uniform over the ranges, with 200–400 mile shipments accounting for 45 percent of the total quantity shipped by rail.

4 ROUTE SEGMENT LISTING FOR RECENT HIGHWAY AND RAILWAY SPENT FUEL SHIPMENTS

Table 4.1 is a listing of highway and railway routes that have recently been used to transport spent fuel. The table identifies the spent fuel shipments that occurred in each State. The table also lists the highway or railway route segments within the State that were used for each shipment, and when the shipment was completed. The table shows that highway spent fuel shipments were made in or through 31 States, and that railway shipments were made in or through 2 States during the period discussed.

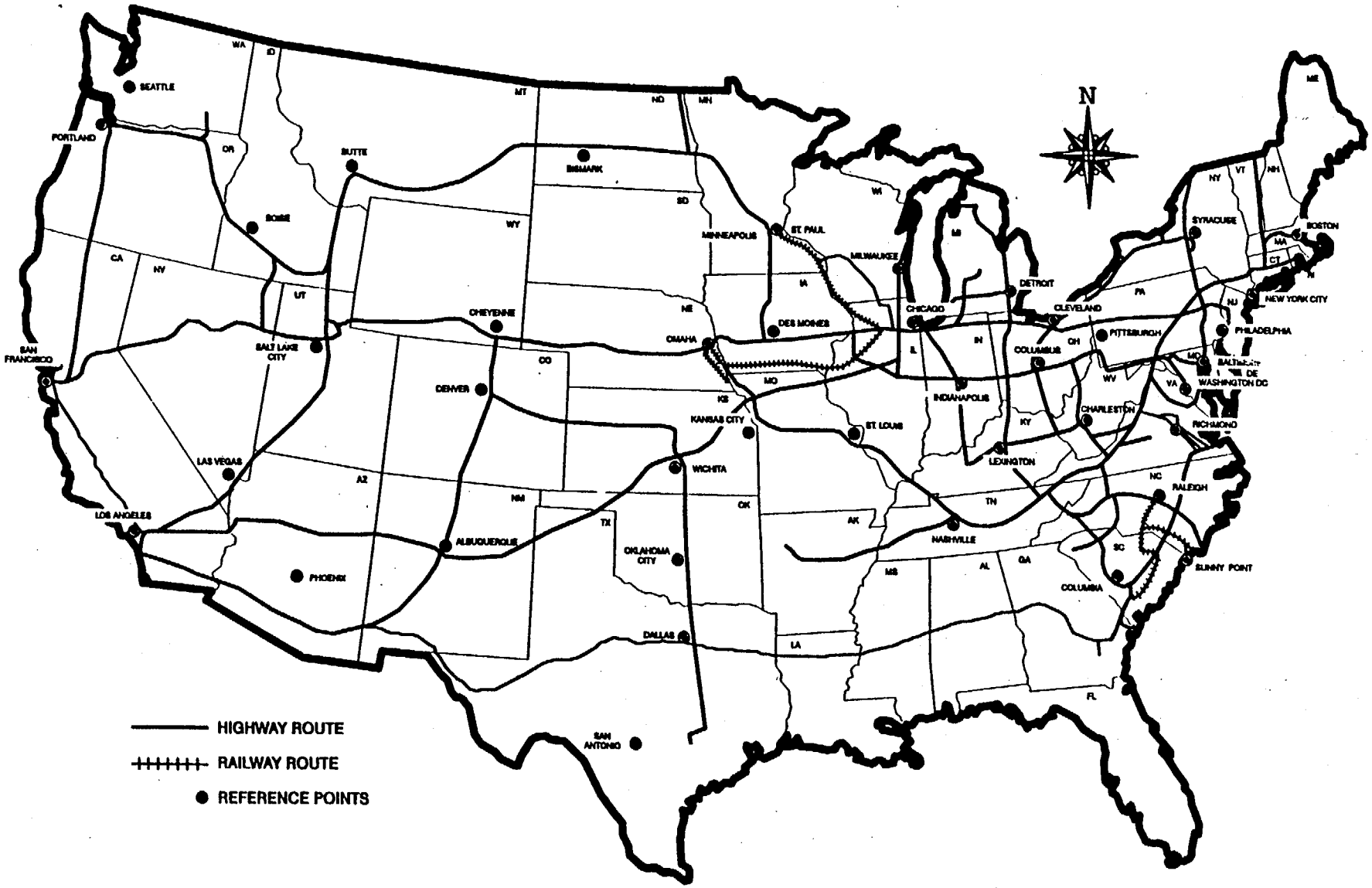

Figure 3.1 Routes Used for Spent Fuel Shipments: 1979 – 1995

Table 3.1 Number of Shipments and Quantity of Spent Fuel (Kilograms) Shipped for Origination/Destination Pairs: 1979–1995

Origination (Facility, State)	Alexandria Bay, NY	Babcock & Wilcox, VA	Battelle-Columbus, OH	Brunswick, NC	Calvert Cliffs, MD	Denver Federal Center, CO	Dresden Station, IL	Dundalk, MD**	General Atomics, CA	GE/Morris, IL	GE/Vallecitos, CA	Ginna, NY	Hanford, WA	Idaho National Engineering Lab, ID	La Crosse, WI	McGuire, NC	Oconee, SC	Oyster Creek, NJ	Point Beach, WI	Port of Oakland, CA**	Portland, OR**	Portsmouth, VA**	Quad Cities, IL	Richmond, CA**	Savannah River Project, SC	Shearon Harris, NC	Zion, IL
Alexandria Bay, NY*																											
Arkansas One, AR																								14/227			
Babcock & Wilcox, VA										2/11											1/3						
Battelle-Columbus, OH				1/72					2/781	2/28	5/2632					3/556						2/488					
Big Rock Point, MI																										2/87	
Byron Station, IL	1/11																				2/14						
Brunswick, NC (via railway)			1/38																								
Calvert Cliffs, MD	1/23		3/64																						2/1188018		
Callaway, MO	1/14																										
CINTICHEM, NY																											
Cooper, NE (via railway)													3/10											14/41			
Derby Lane, VT*									(30)194546																		
Dresden Station, IL		3/56																						8/20			
Duane Arnold, IA																					1/8						
Dundalk, MD*										1/19																	
E.I. Hatch, GA		1/20								1/4									1/332								
Fort Calhoun, NE			1/1							1/14																	
Fort Erie, NY*																											
Fort St. Vrain, CO																								1/3			
General Atomics, CA								2/10					123/500														
GE/Morris, IL													2/6														
GE/Vallecitos, CA														4/939				108/46382									
GE/Wilmington, NC												3/102	18/71						7/57	1/1			3/38				
Ginna, NY							1/6																	2/18			
Haddam Neck, CT			3/1375																								
Hope Creek, NJ										1/17																	
Idaho Nat'l Eng. Lab., ID																											
McGuire, NC		1/5																		1/1							
Michigan State Univ., MI						1/6							2/11														
Millstone, CT										2/13																	

Table 3.1 (cont'd) Number of Shipments and Quantity of Spent Fuel (Kilograms) Shipped for Origination/Destination Pairs: 1979–1995

Origination (Facility, State)	Alexandria Bay, NY	Babcock & Wilcox, VA	Battelle–Columbus, OH	Brunswick, NC	Calvert Cliffs, MD	Denver Federal Center, CO	Dresden Station, IL	Dundalk, MD*	General Atomics, CA	GE/Morris, IL	GE/Vallecitos, CA	Ginna, NY	Hanford, WA	Idaho National Engineering Lab, ID	La Crosse, WI	McGuire, NC	Oconee, SC	Oyster Creek, NJ	Point Beach, WI	Port of Oakland, CA**	Portland, OR**	Portsmouth, VA**	Quad Cities, IL	Richmond, CA**	Savannah River Project, SC	Shearon Harris, NC	Zion, IL
M.I.T., MA																											
Monticello, MN (via railway)			3/67							09/186013	4/58													7/17			
Nat'l. Inst. Stds. & Tech., MD																											
Newport News, VA*																								9/28			
Norfolk Int'l Terminal, VA*																								4/24			
Nuclear Fuel Service, West Valley, NY			8/2977				31/28947					73/23339						33/12988	111/48450					1/7			
Oconee, SC		6/472													139/14339												
Ogdensburg, NY*																								14/36			
Oyster Creek, NJ			1/33																								
Pembina, ND*													1/3														
Portland, OR*													38/138														
Portsmouth, VA*											1/6		38/209											158/1057			
Port of Oakland, CA*											6/83																
Port of Savannah, GA*																								5/44			
Quad Cities, IL		3/488	1/18								4/36																
Rhode Island A.E.C., RI																								35/16			
Richmond, CA*											1/12																
Robinson, SC (via railway)				(18/6725)																						(18/16342)	
San Onofre, CA										14/5809																	
Southport, NC* (via railway)																								(1/22)			
Sunny Point, NC* (via railway)																								(1/14)			
Surry, VA			1/28																								
Univ. of California (Berkeley), CA													3/21														
Univ. of Michigan, MI																								10/50			
Univ. of Missouri, MO													15/81											31/182			
Univ. of Virginia, VA																								10/15			
Virgil Summer, SC*	2/36																										
Zion, IL			2/188																								

* Port of Entry
** Port of Departure

Table 3.2 Summary Data for 1979–1995 Spent Fuel Shipment Information

Year	Number of Shipments		Kilograms Spent Fuel Shipped (Thousand)		Shipment Miles (Thousand)		Kilogram-Miles (Million)	
	Highway	Railway	Highway	Railway	Highway	Railway	Highway	Railway
1979	16	11	0.1	30.2	8.0	2.3	0.1	6.2
1980	130	5	10.0	13.6	115.9	1.0	17.2	2.8
1981	81	2	7.9	6.0	38.5	0.4	1.7	1.2
1982	124	0	7.1	0.0	106.8	0.0	1.8	0.0
1983	117	0	36.6	0.0	83.6	0.0	12.7	0.0
1984	245	3	84.5	23.8	181.3	1.6	51.4	12.7
1985	135	18	74.0	119.4	70.9	8.7	28.3	57.8
1986	105	15	40.4	97.5	47.8	8.7	8.8	56.3
1987	107	15	82.3	101.4	41.8	8.4	14.8	56.5
1988	25	7	12.8	41.8	11.4	4.3	2.4	25.7
1989	16	6	0.1	30.8	16.7	1.7	0.1	8.7
1990	5	8	(0.03)*	70.5	1.5	1.6	(0.02)*	12.7
1991	9	10	0.1	101.1	9.6	1.5	0.1	15.0
1992	21	6	0.1	61.2	15.7	0.8	0.1	8.1
1993	16	12	0.1	113.8	23.2	2.3	0.3	21.9
1994	7	10	(0.02)*	84.0	6.6	2.2	(0.01)*	17.4
1995	9	10	(0.07)*	83.7	12.6	2.2	0.1	18.4
TOTAL	1168	138	356.2	978.8	791.9	47.7	139.9	321.4

*Entries in parentheses rounded to nearest hundredth: All others rounded to nearest tenth.

Table 3.3 Number of Domestic and International Spent Fuel Shipments: 1979–1995

Year	Domestic		International		
	Highway	Railway	Export	Import	Transient
1979	2	11	0	14	0
1980	73	5	2	55	0
1981	30	2	3	48	0
1982	80	0	1	43	0
1983	92	0	2	23	0
1984	209	3	2	34	0
1985	114	18	0	21	0
1986	88	15	0	17	0
1987	85	15	3	19	0
1988	10	7	0	15	0
1989	11	6	1	4	0
1990	0	8	3	0	2
1991	4	10	4	0	1
1992	20	6	0	0	1
1993	14	12	1	0	1
1994	6	9	1	1	0
1995	7	9	1	2	0

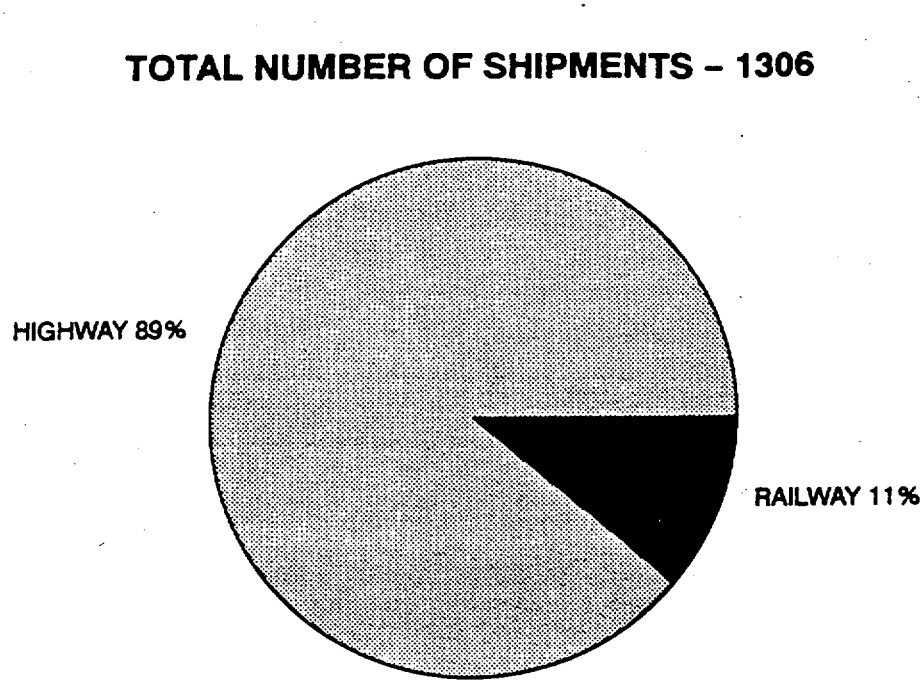

Figure 3.2 Number of Spent Fuel Shipments by Mode: 1979–1995

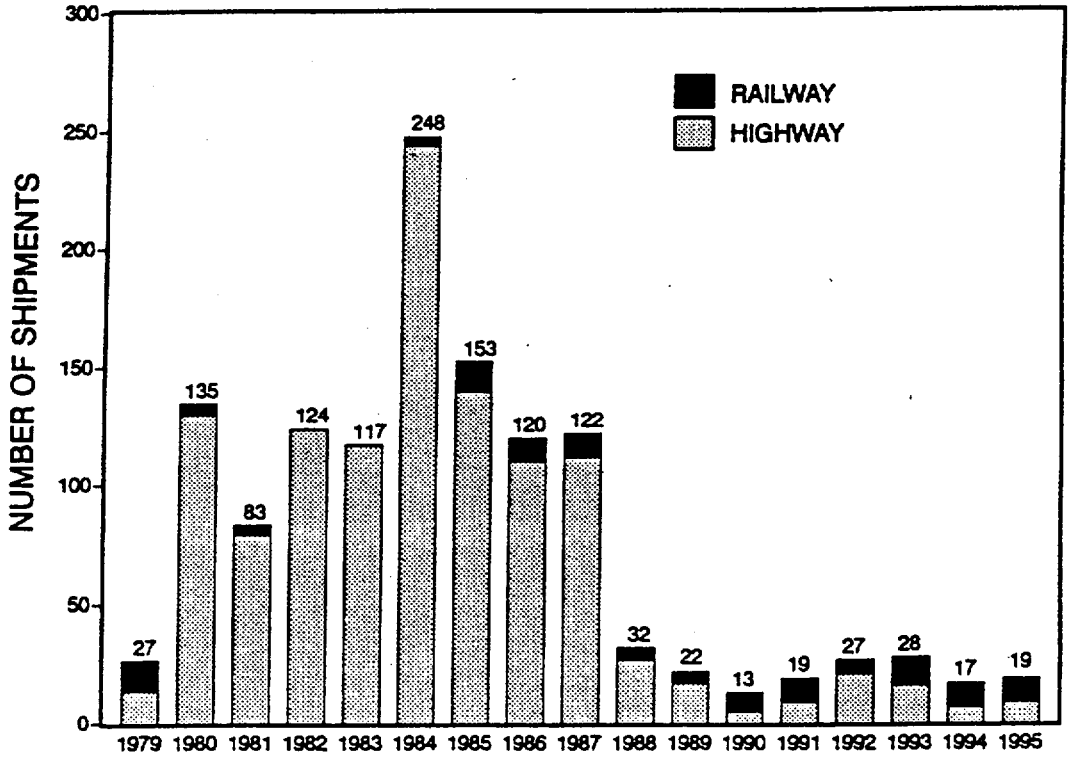

Figure 3.3 Number of Spent Fuel Shipments by Year: 1979–1995

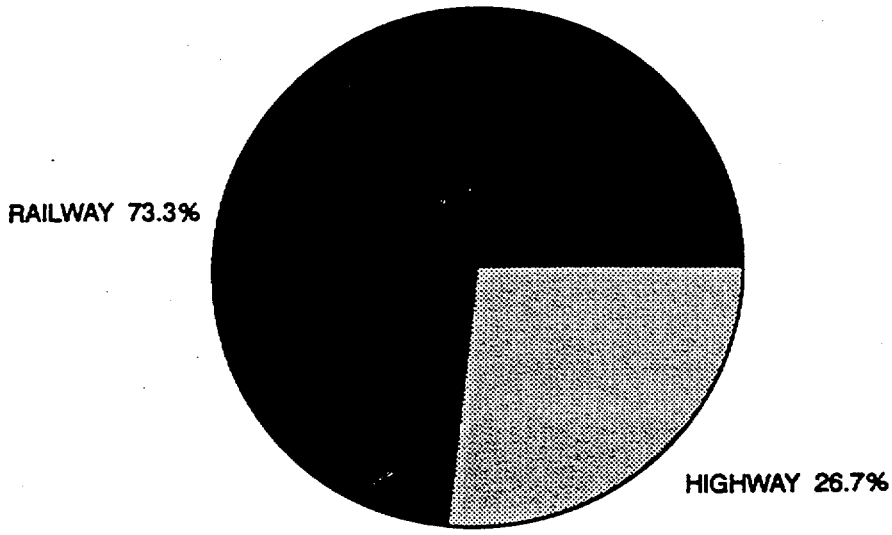

Figure 3.4 Quantity of Spent Fuel Shipped by Mode: 1979–1995

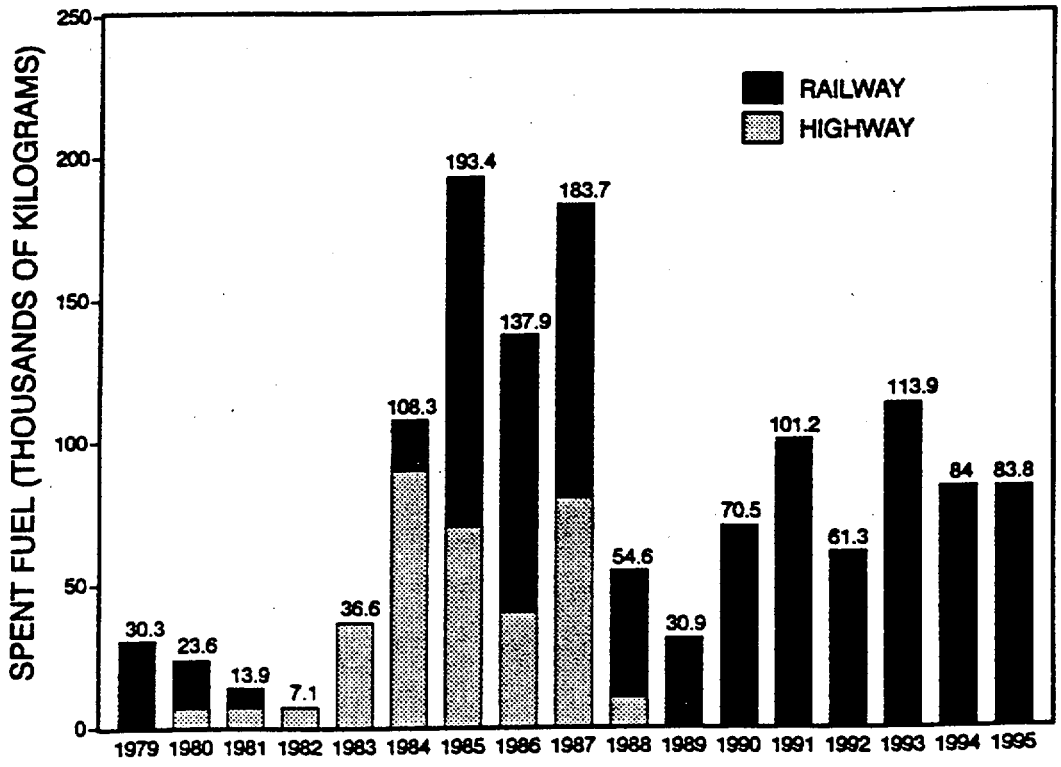

Figure 3.5 Quantity of Spent Fuel Shipped by Year: 1979–1995

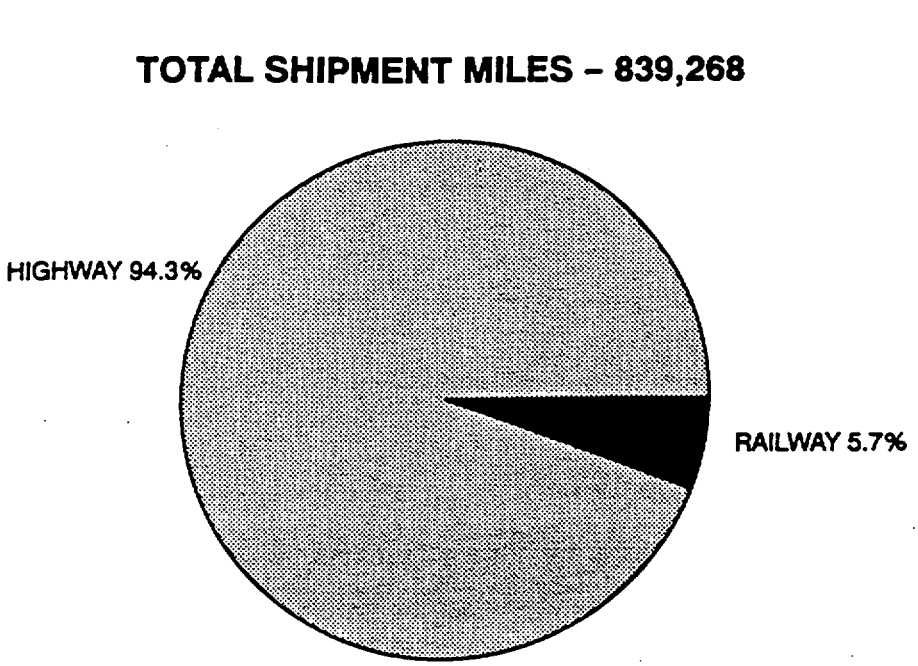

Figure 3.6 Spent Fuel Shipment Miles by Mode: 1979–1995

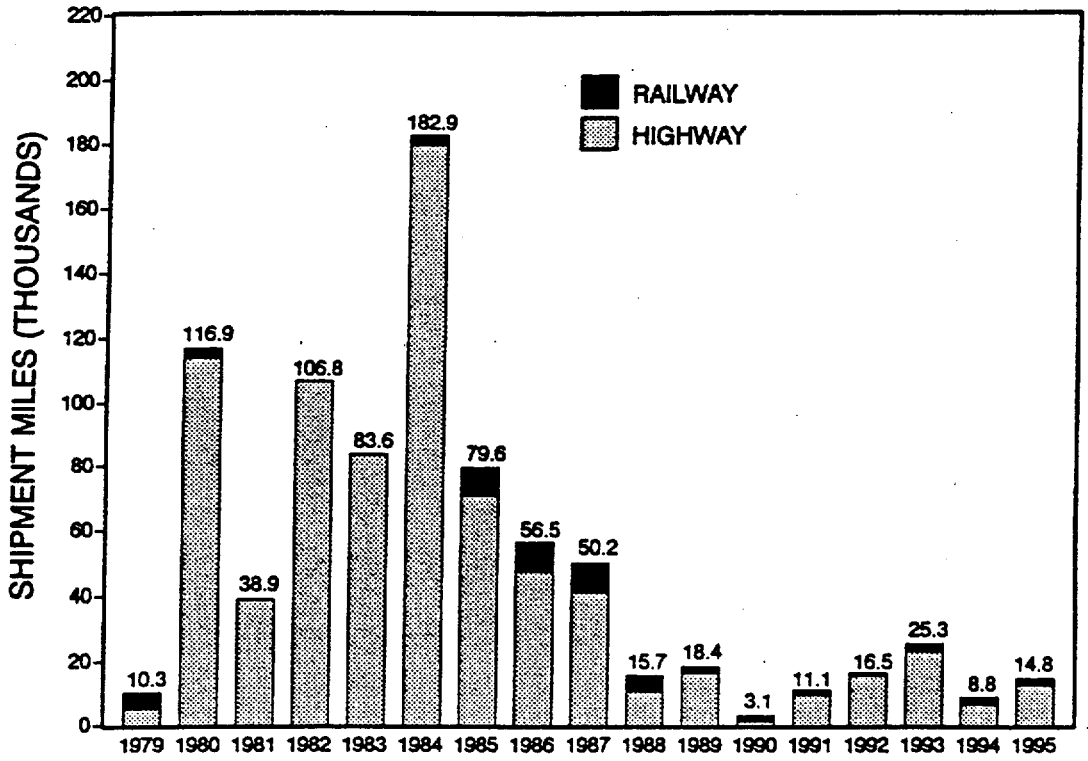

Figure 3.7 Spent Fuel Shipment Miles by Year: 1979–1995

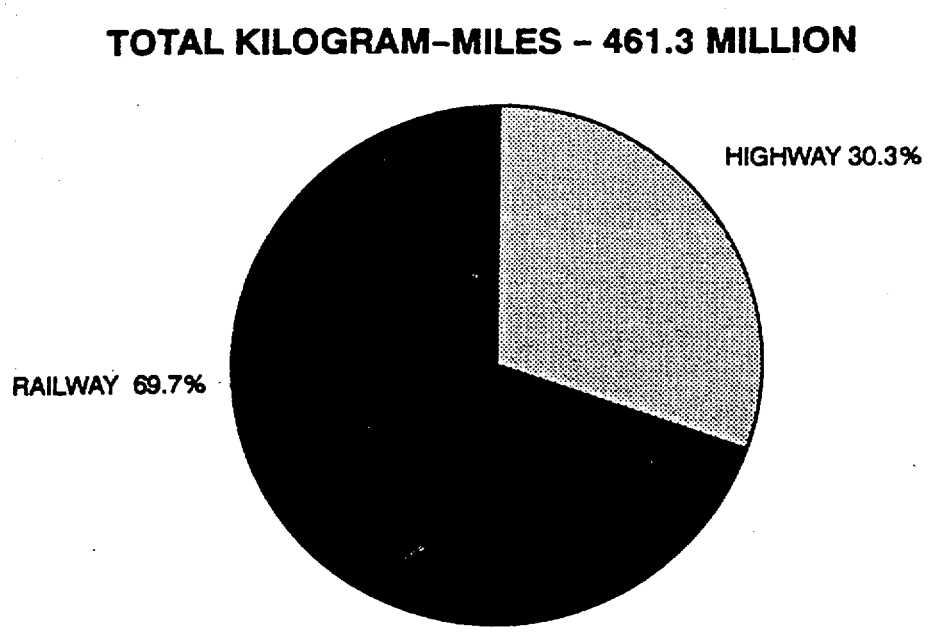

Figure 3.8 Spent Fuel Shipment Kilogram–Miles by Mode: 1979–1995

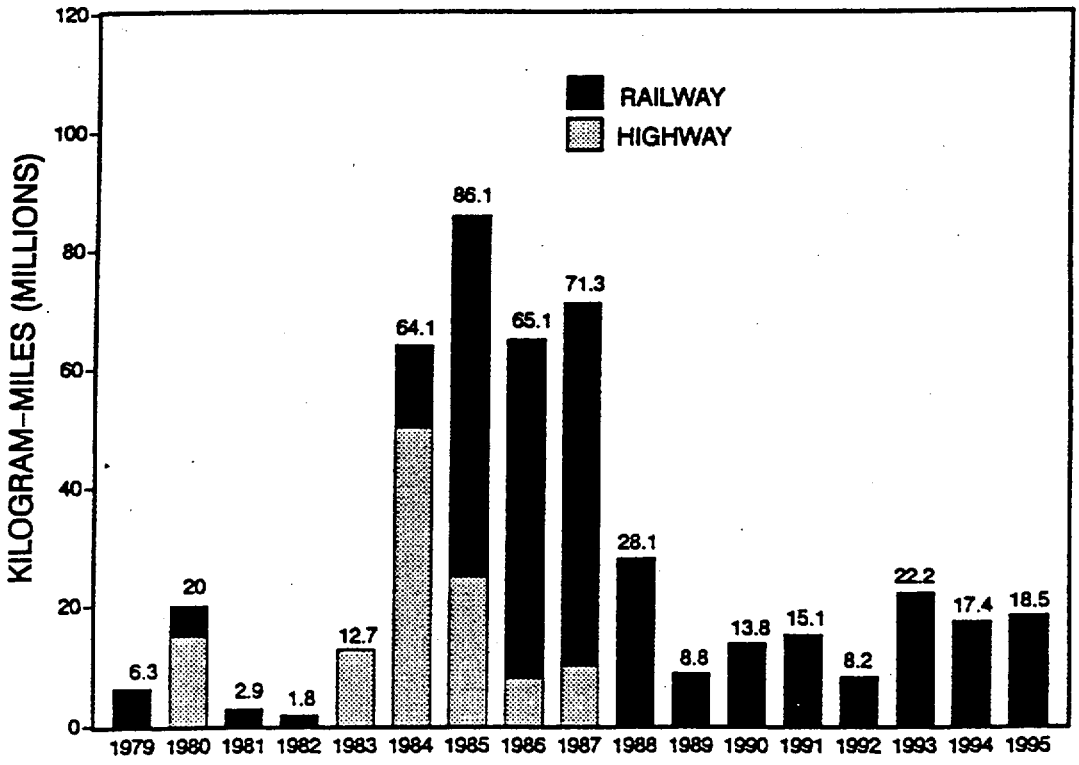

Figure 3.9 Spent Fuel Shipment Kilogram–Miles by Year: 1979–1995

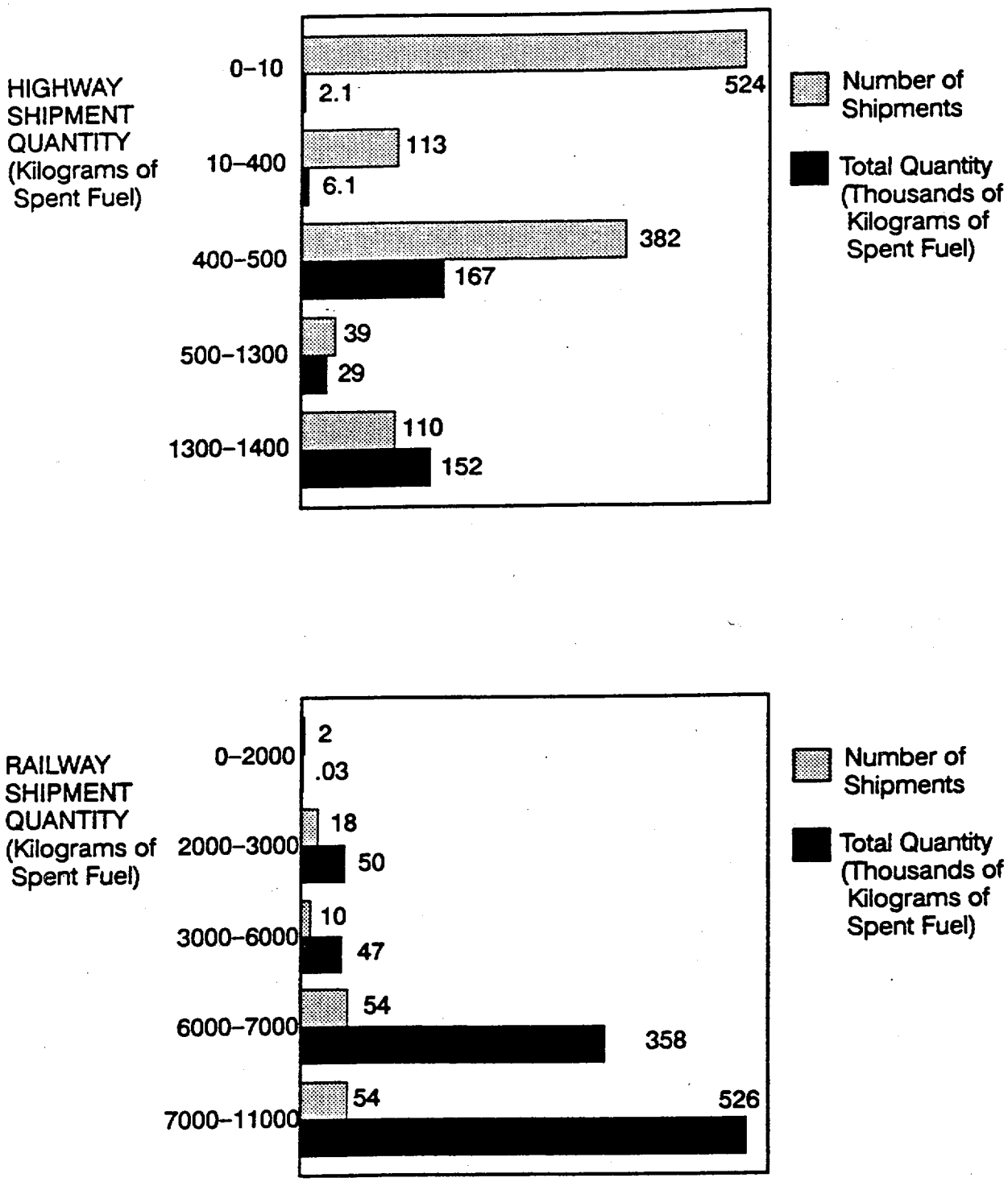

Figure 3.10 Number and Total Quantity of Spent Fuel Shipments by Shipment Quantity Range: 1979–1995

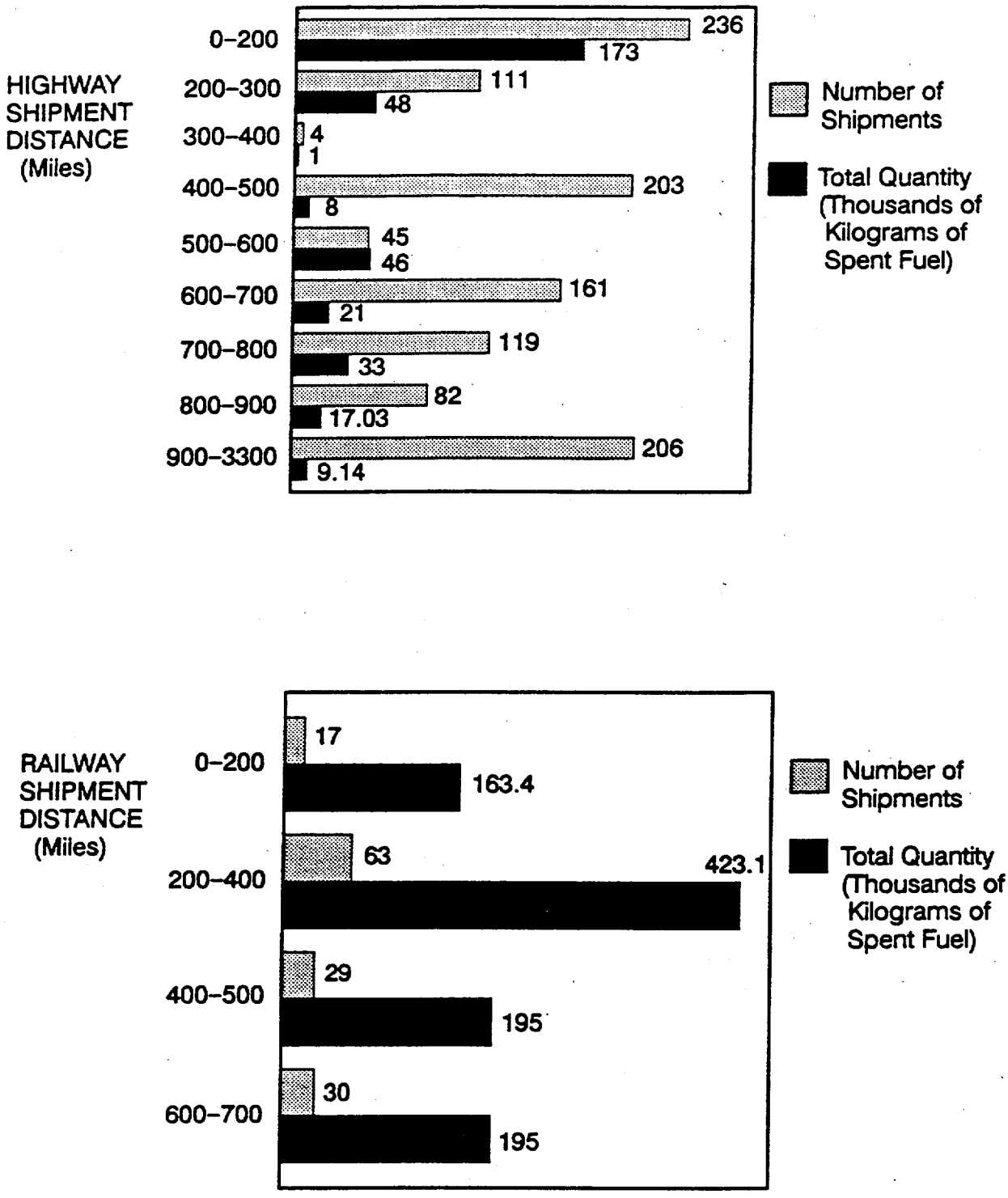

Figure 3.11 Number and Total Quantity of Spent Fuel Shipments by Shipment Distance Range: 1979–1995

Table 4.1 Highway and Railway Spent Fuel Shipment Routes Used in 1993–1995

State	Shipment	Highway Shipment Route Segment			Shipments Completed
		From:	Route	To:	
AL	Hatch Nuclear Power Station to GE/Vallecitos	GA line I-20 I-459	I-20 SW I-459 SW I-20 SW	I-459 I-20 MS line	1995
AZ	Hatch Nuclear Power Station to GE/Vallecitos	NM line I-10 I-17	I-10 W I-17 NW I-10 W	I-17 I-10 CA line	1995
CA	Duane Arnold to GE/Vallecitos	NV line I-80 I-5 I-205 I-580 I-680	I-80 W I-5 S I-205 W I-580 W I-680 S CA-84 E	I-5 I-205 I-580 I-680 CA-84 GE/VAL	1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	Hope Creek to GE/Vallecitos		(same as above route)		1993
	GE/Vallecitos to Dundalk Marine Terminal	GE/VAL CA-84 I-580 I-205 I-5	CA-84 E I-580 E I-205 E I-5 N I-80 E	I-580 I-205 I-5 I-80 NV line	1994
	Hatch Nuclear Power Station to GE/Vallecitos	AZ line I-10 I-210 I-5 I-580 I-680	I-10 W I-210 W I-5 NW I-580 NW I-680 S CA-84 E	I-210 I-5 I-580 I-680 CA-84 GE/VAL	1995
	Babcock & Wilcox, Lynchburg to GE/Vallecitos	NV line I-80 I-5 I-205 I-580 I-680	I-80 W I-5 S I-205 W I-580 W I-680 S CA-84 E	I-5 I-205 I-580 I-680 CA-84 GE/VAL	1993
	Quad Cities to GE/Vallecitos		(same as above route)		1993
CT	Massachusetts Institute of Technology to Savannah River Project	MA line I-84	I-84 W	NY line	1993/94
	RI Nuclear Science Center to Savannah River Project	RI line I-95 CT-9 I-91 I-691	I-95 W CT-9 NW I-91 S I-691 W I-84 W	CT-9 I-91 I-691 I-84 NY line	1995

Table 4.1 (Continued)

State	Shipment	Highway Shipment Route Segment			Shipments Completed
		From:	Route	To:	
DE	Hope Creek to GE/Vallecitos	Hope Creek I-295	I-295 S I-95 S	I-95 MD line	1993
GA	Hatch Nuclear Power Station to GE/Vallecitos	Hatch US-1 I-16 I-75 I-285	US-1 N I-16 NW I-75 NW I-285 S I-20 W	I-16 I-75 I-285 I-20 AL line	1995
IL	Babcock & Wilcox, Lynchburg to GE/Vallecitos	IN line I-74 I-474 I-74	I-74 W I-474 W/N I-74 W I-280 W	I-474 I-74 I-280 IA line	1993
	Hope Creek to GE/Vallecitos		(same as above route)		1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	GE/Vallecitos to Dundalk Marine Terminal		(reverse of above route)		1994
	Quad Cities to GE/Vallecitos	Plant IL-84	IL-84 S I-80 W	I-80 IA line	1993
	University of Missouri to Savannah River Project	MO line I-255 I-64 I-57	I-255 E I-64 E I-57 S I-24 S	I-64 I-57 I-24 KY line	1993/94/95
IN	Hope Creek to GE/Vallecitos	OH line I-70 I-465	I-70 W I-465 S/W/N I-74 W	I-465 I-74 IL line	1993
	Babcock & Wilcox, Lynchburg to GE/Vallecitos		(same as above route)		1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	GE/Vallecitos to Dundalk Marine Terminal		(reverse of above route)		1994
IA	Duane Arnold to GE/Vallecitos	Plant Local Rds. I-380 I-80	Local Roads E I-380 S I-80 W I-680 SW	I-380 I-80 I-680 NE line	1993
	Quad Cities to GE/Vallecitos	IL line I-80 I-35 I-80	I-80 W I-35 S I-80 W I-680 W	I-35 I-80 I-680 NE line	1993

Table 4.1 (Continued)

State	Shipment	Highway Shipment Route Segment			Shipments Completed
		From:	Route	To:	
IA (Cont.)	GE/Vallecitos to Dundalk Marine Terminal		(reverse of above route)		1994
	Babcock & Wilcox, Lynchburg to GE/Vallecitos	IL line I-280 I-80	I-280 W/N I-80 W I-680 W	I-80 I-680 NE line	1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	Hope Creek to GE/Vallecitos		(same as above route)		1993
KY	University of Missouri to Savannah River Project	IL line I-24	I-24 S	TN line	1993/94/95
LA	Hatch Nuclear Power Station to GE/Vallecitos	MS line I-20 I-220	I-20 W I-220 W I-20 W	I-220 I-20 TX line	1995
MA	Massachusetts Institute of Technology to Savannah River Project	MIT Albany St. Mass. Ave. I-90	Albany St. Mass. Ave. I-90 W I-84 S	Mass. Ave. I-90 I-84 CT line	1993/94
MD	Ginna Plant to Dundalk Marine Terminal	PA line I-83 I-695	I-83 S I-695 E/S Dundalk Ave.	I-695 Dundalk Ave. Terminal	1993
	Massachusetts Institute of Technology to Savannah River Project	PA line I-81	I-81 S	WV line	1993/94
	RI Nuclear Science Center to Savannah River Project		(same as above route)		1995
	Summer Station to Alexandria Bay (Chalk River)		(reverse of above route)		1995
	GE/Vallecitos to Dundalk Marine Terminal	WV line I-68 I-70	I-68 E I-70 E I-695 E	I-70 I-695 Dundalk Marine Terminal	1994
	Dundalk Marine Terminal to GE/Vallecitos		(reverse of above route)		1995
	Hope Creek to GE/Vallecitos	DE line I-95 I-695 I-70	I-95 S I-695 N/W/S I-70 NW I-68 W	I-695 I-70 I-68 WV line	1993

Table 4.1 (Continued)

State	Shipment	Highway Shipment Route Segment			Shipments Completed
		From:	Route	To:	
MS	Hatch Nuclear Power Station to GE/Vallecitos	AL line I-20	I-20 S	LA line	1995
MO	University of Missouri to Savannah River Project	Univ. of Missouri MO-163 MO-740 MO-63 I-70 I-270	MO-163 N MO-740 E MO-63 N I-70 E I-270 S/E I-255 E	MO-740 MO-63 I-70 I-270 I-255 IL line	1993/94/95
NE	Babcock & Wilcox, Lynchburg to GE/Vallecitos	IA line I-680	I-680 W I-80 W	I-80 WY line	1993
	Duane Arnold to GE/Vallecitos		(same as above route)		1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	Hope Creek to GE/Vallecitos		(same as above route)		1993
	GE/Vallecitos to Dundalk Marine Terminal		(reverse of above route)		1994
NJ	Hope Creek to GE/Vallecitos	Plant Local Rd. NJ-49	Local Rd. NJ-49 NW I-295 S	NJ-49 I-295 DE line	1993
NM	Hatch Nuclear Power Station to GE/Vallecitos	TX line I-10	I-10 NW	AZ line	1995
NV	Babcock & Wilcox, Lynchburg to GE/Vallecitos	UT line I-80	I-80 W	CA line	1993
	Duane Arnold to GE/Vallecitos		(same as above route)		1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	Hope Creek to GE/Vallecitos		(same as above route)		1993
	Quad Cities to GE/Vallecitos		(same as above route)		1993
	GE/Vallecitos to Dundalk MarineTerminal		(reverse of above route)		1994
NY	Ginna Plant to Dundalk Marine Terminal	Plant Local Rds. NY-104 NY-590 I-490 I-90 I-690	Local Rds. NY-104 W NY-590 S I-490 E I-90 E I-690 E I-81 S	NY-104 NY-590 I-490 I-90 I-690 I-81 PA line	1993

Table 4.1 (Continued)

State	Shipment	Highway Shipment Route Segment			Shipments Completed
		From:	Route	To:	
NY (Cont.)	Massachusetts Institute of Technology to Savannah River Project	CT line I-84	I-84 W	PA line	1993/94
	RI Nuclear Science Center to Savannah River Project		(reverse of above route)		1995
	Summer Station to Alexandria Bay (Chalk River)	PA line I-81 I-481	I-81 N I-481 E/N/W I-81 N	I-481 I-81 US/Canadian Border	1995
NC	McGuire Plant to Babcock & Wilcox, Lynchburg	NC-73 I-77	NC-73 E I-77 N	I-77 VA line	1994
	University of Virginia to Savannah River Project	VA line I-77	I-77 S	SC line	1993/94
	Massachusetts Institute of Technology to Savannah River Project		(same as above route)		1993/94
	RI Nuclear Science Center to Savannah River Project		(same as above route)		1995
	Summer Station to Alexandria Bay (Chalk River)		(reverse of above route)		1995
	University of Missouri to Savannah River Project	TN line I-40	I-40 E I-26 E	I-26 SC line	1993/94/95
OH	Hope Creek to GE/Vallecitos	WV line I-470 I-70 I-270	I-470 W I-70 W I-270 S/W/N I-70 W	I-70 I-270 I-70 IN line	1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	GE/Vallecitos to Dundalk Marine Terminal		(reverse of above route)		1994
	Babcock & Wilcox, Lynchburg to GE/Vallecitos	WV line I-77 I-70 I-270	I-77 N I-70 W I-270 S/W/N I-70 W	I-70 I-270 I-70 IN line	1993
PA	Ginna Plant to Dundalk Marine Terminal	NY line I-81	I-81 S I-83 S	I-83 MD line	1993

Table 4.1 (Continued)

State	Shipment	Highway Shipment Route Segment			Shipments Completed
		From:	Route	To:	
PA (Cont.)	Massachusetts Institute of Technology to Savannah River Project	NY line I-84 I-380 I-80	I-84 W I-380 S I-80 W I-81 S	I-380 I-80 I-81 MD line	1993/94
	RI Nuclear Science Center to Savannah River Project		(same as above route)		1995
	Summer Station to Alexandria Bay (Chalk River)	MD line I-81	I-81 N	NY line	1995
	Hope Creek to GE/Vallecitos	WV line I-79	I-79 N I-70 W	I-70 WV line	1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	GE/Vallecitos to Dundalk Marine Terminal		(reverse of above route)		1994
RI	RI Nuclear Science Center to Savannah River Project	Center S.Ferry Rd Brdgtwn Rd RI-138	S.Ferry W Brdgtwn W RI-138 W I-95 S	Bridgetown RI-138 I-95 CT line	1995
SC	Massachusetts Institute of Technology to Savannah River Project (SRP)	NC line I-77 I-20	I-77 S I-20 W SC-19 S	I-20 SC-19 SRP	1993/94
	RI Nuclear Science Center to Savannah River Project		(same as above route)		1995
	University of Virginia to Savannah River Project		(same as above route)		1993/94
	University of Missouri to Savannah River Project	NC line I-26 I-20	I-26 S I-20 SW SC-19 S	I-20 SC-19 SRP	1993/94/95
	Summer Station to Alexandria Bay (Chalk River)	Station SC-215 SC-213 SC-34	SC-215 N SC-213 E SC-34 E/N I-77 N	SC-213 SC-34 I-77 NC line	1995
TX	Hatch Nuclear Power Station to GE/Vallecitos	LA line I-20 I-10	I-20 W I-10 W	I-10 NM line	1995
TN	University of Missouri to Savannah River Project	KY line I-24 I-65 I-40 I-640	I-24 SE I-65 S I-40 E I-640 E I-40 E	I-65 I-40 I-640 I-40 NC line	1993/94/95

Table 4.1 (Continued)

State	Shipment	Highway Shipment Route Segment From:	Route	To:	Shipments Completed
UT	Babcock & Wilcox, Lynchburg to GE/Vallecitos	WY line I-80	I-80 W	NV line	1993
	Duane Arnold to GE/Vallecitos		(same as above route)		1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	Hope Creek to GE/Vallecitos		(same as above route)		1993
	GE/Vallecitos to Dundalk Marine Terminal		(reverse of above route)		1994
	Quad Cities to GE/Vallecitos	WY line I-80 I-15	I-80 W I-15 N I-80 W	I-15 I-80 NV line	1993
VA	McGuire Plant to Babcock & Wilcox, Lynchburg	NC line I-77 I-81 Alt-220 US-460	I-77 N I-81 N Alt-220 S US-460 E VA-726 N	I-81 Alt-220 US-460 VA-726 B&W	1994
	University of Virginia to Savannah River Project	UVA Local Rds. US-250 US-29 I-64 I-81	Local Rds. US-250 W US-29 S I-64 W I-81 S I-77 S	US-250 US-29 I-64 I-81 I-77 NC line	1993/94
	Massachusetts Institute of Technology to Savannah River Project	WV line I-81 I-77	I-81 SW I-77 S	I-77 NC line	1993/94
	RI Nuclear Science Center to Savannah River Project		(same as above route)		1995
	Summer Station to Alexandria Bay (Chalk River)		(reverse of above route)		1995
	E. I. Hatch to Babcock & Wilcox, Lynchburg	SC line I-95 I-85 US-460	I-95 N I-85 W US-460 W VA-726 N	I-85 US-460 VA-726 B&W	1994
	Babcock & Wilcox, Lynchburg to GE/Vallecitos	Site VA-726 US-460 Alt-220 US-11 I-81	VA-726 S US-460 W Alt-220 N US-11 N I-81 N I-64 W	US-460 Alt-220 US-11 I-81 I-64 WV line	1993

Table 4.1 (Continued)

State	Shipment	Highway Shipment Route Segment			Shipments Completed
		From:	Route	To:	
WV	Massachusetts Institute of Technology to Savannah River Project	MD line I-81	I-81 S	VA line	1993/94
	RI Nuclear Science Center to Savannah River Project		(same as above route)		1995
	Summer Station to Alexandria Bay (Chalk River)		(reverse of above route)		1995
	GE/Vallecitos to Dundalk Marine Terminal	OH line I-470 PA line I-70 I-79	I-470 E I-70 E I-70 E I-79 S I-68 E	I-70 PA line I-79 I-68 MD line	1994
	Dundalk Marine Terminal to GE/Vallecitos		(reverse of above route)		1995
	Hope Creek to GE/Vallecitos		(reverse of above route)		1993
	Babcock & Wilcox, Lynchburg to GE/Vallecitos	VA line I-64	I-64 W I-77 N	I-77 OH line	1993
WY	Babcock & Wilcox, Lynchburg to GE/Vallecitos	NE line I-80	I-80 W	UT line	1993
	Duane Arnold to GE/Vallecitos		(same as above route)		1993
	Dundalk Marine Terminal to GE/Vallecitos		(same as above route)		1995
	Quad Cities to GE/Vallecitos		(same as above route)		1993
	Hope Creek to GE/Vallecitos		(same as above route)		1993
	GE/Vallecitos to Dundalk Marine Terminal		(reverse of above route)		1994

Table 4.1 (Continued)

State	Shipment	Railway Shipment Route Segment			Shipments Completed
		From:	Route	To:	
NC	Brunswick to Shearon Harris	Brunswick	Military Ocean Term. track	Leland	1993/94/95
		Leland	CSX	Hamlet	
		Hamlet	CSX	Bonsal (Shearon Harris)	
	Robinson to Shearon Harris	SC line	CSX	Hamlet	1993
		Hamlet	CSX	Bonsal (Shearon Harris)	
	Military Ocean Terminal Sunny Point, NC to Savannah River Project	Sunny Point	CSX	SC line	1995
SC	Robinson to Shearon Harris	Robinson	CSX	NC line	1993
	Military Ocean Terminal Sunny Point, NC to Savannah River Project	NC line	CSX	Aiken (SRP)	1995

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ABSTRACT *(200 words or less)*

This circular has been prepared to provide information on the shipment of irradiated reactor fuel (spent fuel) subject to regulation by the Nuclear Regulatory Commission (NRC), and to meet the requirements of Public Law 96-295. The report provides a brief description of NRC authority for certain aspects of transporting spent fuel. It provides descriptive statistics on spent fuel shipments regulated by the NRC from 1979 to 1995. It also lists detailed highway and railway segments used within each state from January 1, 1993, through December 31, 1995.

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