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RADIOACTIVE WASTE TRANSPORTATION

A Guide for Midwestern Legislators



The Council of

State Governments

MIDWESTERN

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For more than half a century, The Council of State Governments has served as a common ground for the states of the nation. The Council is a non-profit, state-supported and -directed service organization that provides research and resources, identifies trends, supplies answers and creates a network for legislative, executive and judicial branch representatives.

Through its national headquarters in Lexington, Kentucky, a state-federal office in Washington, D.C., and regional offices in New York, Atlanta, Chicago (Lombard), and San Francisco, CSG is dedicated to preserving the role of the states in America's federal system. The role of the Midwestern Office of CSG is to foster intergovernmental cooperation through the promotion of regional, as well as individual, state responses to common issues and challenges.

Radioactive Waste Transportation: A Guide for Midwestern Legislators

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The purpose of the agreement, and reports issued pursuant to it, is to identify and analyze regional issues pertaining to the transportation of high-level radioactive waste and to inform Midwestern state officials with respect to technical and institutional issues and regulatory concerns related to waste transportation.

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Introduction

Spent nuclear fuel and high-level radioactive waste: What are they? What do they have in common, and what makes them different? How are they produced, and what is their final disposition? Can these materials be moved safely from one place to another? If so, what kind of impact does or will this movement have on the Midwest?

Radioactive Waste Transportation: A Guide for Midwestern Legislators provides answers to these and other questions for Midwestern state legislators who wish to understand more about radioactive waste transportation. The *Guide* presents the most essential information in a nontechnical manner, without the jargon and acronyms that so frequently pervade “official” publications on the subject. The end result is a document that will help you, the reader, learn more about radioactive waste and its effect on your state.

The Midwestern Office of the Council of State Governments (CSG) provides this information to state officials with the support of a cooperative agreement with the U.S. Department of Energy (DOE).¹ Since 1989, this agreement has allowed CSG to work closely with state officials from the Midwest, keeping them informed of important developments at the federal level and ensuring them a role in shaping key decisions.

The cornerstone of the cooperative agreement is the Midwestern High-Level Radioactive Waste Committee, which comprises representatives of the executive and legislative branches of government in the 12 Midwestern states. Since its inception in 1990, the committee has advised DOE on various matters in the development of the federal system for transporting radioactive waste, including route selection, shipment inspections, and emergency response. Together, CSG and the committee are working to make sure that shipments of spent nuclear fuel and high-level radioactive waste that pass through the Midwest do so with minimal impact on the region’s state governments and its citizens.

Background

What is radioactive waste? Where is it stored?

The terms “radioactive waste” and “nuclear waste” apply to a wide variety of materials, ranging from slightly contaminated protective clothing to spent nuclear fuel from power plants. This *Guide* addresses only the two most highly radioactive types of waste: spent nuclear fuel and high-level radioactive waste.

Spent nuclear fuel is produced in nuclear reactors, including commercial reactors that generate electricity. The spent nuclear fuel is a solid material, consisting of bundles of uranium-filled fuel rods called fuel assemblies. Quantities of spent nuclear fuel are measured either in numbers of assemblies or in metric tons of uranium (MTU), which refer to the amount of fissionable uranium in the fuel.

Currently in the United States, spent nuclear fuel is stored in pools of water and in specially designed steel and concrete casks at 110 operating commercial power reactors, as well as at 10 shutdown reactors, one privately owned storage pool, and a handful of other federal or private facilities. Figure 1 shows the location of the nation’s commercial nuclear reactors. As of December 1994, the total amount of spent nuclear fuel in storage was approximately 30,000 metric tons of uranium in 105,000 assemblies. In the Midwest, over 8,000 metric tons of uranium of spent nuclear fuel are stored in pools or dry storage casks at 34 sites in nine states (Table 1).

High-level radioactive waste is a by-product of “reprocessing,” a technique for recovering uranium, plutonium, and other elements from spent nuclear fuel. As a liquid, high-level radioactive waste is stored in tanks at four sites in the country. Two of these sites—DOE’s Savannah River Site in South Carolina and West Valley in New York—have special facilities for vitrifying high-level radioactive waste, or converting it from a

Table 1. Spent Fuel Stored at Midwestern Reactors and Storage Facilities as of December 1994

State	Reactor Pool	1994 Inventory		Pool Space Until
		MTU	Assemblies	
Illinois	Braidwood 1 and 2	284	668	2012
	Byron 1 and 2	367	864	2011
	Clinton	133	724	2009
	Dresden 1 ^a	70	683	—
	Dresden 2	388	2,162	2001
	Dresden 3	386	2,148	2002
	LaSalle 1 and 2	433	2,360	2013
	Morris Operation	674	3,217	—
	Quad Cities 1 and 2	788	4,284	2009
	Zion 1 and 2	769	1,684	2006
Iowa	Duane Arnold	235	1,280	1998
Kansas	Wolf Creek	226	488	2006
Michigan	Big Rock	44	336	2000
	Cook 1 and 2	738	1,679	2011
	Fermi 2	162	900	2006
	Palisades	317	793	2007
Minnesota	Monticello	147	822	2004
	Prairie Island 1 and 2 ^b	501	1,329	1995
Missouri	Callaway	240	548	2007
Nebraska	Cooper Station	148	804	2002
	Fort Calhoun	205	570	2007
Ohio	Davis-Besse	244	520	1996
	Perry 1	178	972	2013
Wisconsin	Kewaunee	265	688	2013
	LaCrosse ^a	38	333	—
	Point Beach 1 and 2 ^b	506	1,306	1996
Midwest Totals		8,486	32,162	—
U.S. Totals		30,003	104,742	—

^aReactor is shut down

^bReactor uses dry storage in addition to pool storage.

Source: DOE/EIA, *Spent Nuclear Fuel Discharges from U.S. Reactors 1994* (1996), Tables 2, 10, and 11.

liquid to a solid. Both sites began vitrifying high-level radioactive waste in 1996. Plans are underway to construct a similar vitrification plant at DOE's Hanford site in Washington state. Eventually, all the liquid high-level radioactive waste in storage will be converted to a solid form for transportation and disposal.

*What is the federal government's role in managing this waste?
Who pays the cost?*

In 1946, Congress passed the Atomic Energy Act, which paved the way for the development of the nuclear power industry in the United States. In 1982, over three decades later, the Nuclear Waste Policy Act established a policy for disposing of the most dangerous wastes created by this industry. Amended in 1987, the act requires DOE to site, construct, and operate geologic, or underground, repositories for the disposal of spent nuclear fuel and high-level radioactive waste. As directed by the amended act, DOE is currently studying Yucca Mountain in Nevada to determine whether it is suitable for hosting the national repository.

To guide DOE in its work, the Nuclear Waste Policy Act established specific structural elements of the federal waste-management program, which is officially known as the Civilian Radioactive Waste Management System. The act created the Office of Civilian Radioactive Waste Management and charged it with carrying out all aspects of the program, including storing and transporting spent nuclear fuel and high-level radioactive waste. Congress also ordered DOE to interact with the states and tribal governments that would be affected by the waste-management program. In particular, the act authorized DOE to enter into a "benefits agreement" with the State of Nevada to compensate the state in the event that Yucca Mountain is selected as the repository site.

The Nuclear Waste Policy Act also set up a funding mechanism by which the consumers of nuclear energy, and not the

general taxpayers, bear the primary financial responsibility for disposing of spent nuclear fuel and high-level radioactive waste. Under this funding scheme, DOE entered into contracts (called “Standard Disposal Contracts”) with every utility that owns and operates nuclear power plants. In exchange for the utilities’ annual contributions to the Nuclear Waste Fund, DOE is obligated to pick up the spent nuclear fuel and transport it to facilities for storage or disposal starting in 1998. The federal government also contributes to the Nuclear Waste Fund for the disposal of high-level radioactive waste from the nation’s defense plants.

As of March 31, 1996, utilities had contributed \$10 billion into the fund, including interest (Table 2). Utilities in the Midwestern states alone had paid over \$2.6 billion with interest. The total life cycle cost of the waste management program, through the year 2035, is projected to be \$33 billion.

Table 2. Midwestern State Contributions to the Nuclear Waste Fund (payments, with interest, as of March 31, 1996)

<u>State</u>	<u>Payment</u> <u>(millions)</u>
Illinois	966.5
Indiana	149.2
Iowa	165.8
Kansas	68.4
Michigan	140.3
Minnesota	249.1
Missouri	139.6
Nebraska	136.8
North Dakota	11.4
Ohio	239.6
South Dakota	0.8
Wisconsin	339.2
Total Midwest	2,606.7
Total U.S.	9,961.0

Source: NARUC Nuclear Waste Program Office (1996).

With little tangible progress being made by the waste-management program, many state regulatory agencies have begun to question whether they should allow utilities to continue contributing to a fund that, in their view, was not being used for its intended purpose. Each year, utilities pay approximately \$600 million to the Nuclear Waste Fund, all of which is charged to utility customers. For the last two years, however, DOE's federal appropriation has been closer to \$400 million—with only a little more than half of that amount drawn from the Nuclear Waste Fund (the remainder has come from the defense nuclear waste fund).

The utilities and their regulators claim that Congress is using the balance—on the order of \$200 million per year—to offset the federal budget deficit rather than saving the money for future waste-management expenditures. Concerned by what they see as a blatant misuse of money paid by consumers, utility regulatory agencies in the states have begun investigating the option of suspending payments to the Nuclear Waste Fund and instead putting this money into escrow accounts. In June 1996, Minnesota's Department of Public Service became the first state agency to recommend doing just that. The Iowa Utilities Board is also investigating this option.

*Why is storing spent nuclear fuel such a controversial issue?
Why did so many states and utilities sue DOE over storage?
What does Congress have to say about the matter?*

Until relatively recently, storage was an equal partner with transportation and disposal in DOE's plans to manage the nation's spent nuclear fuel. In fact, since the repository is not scheduled to open until 2010 at the earliest, a centralized storage facility is the only way the department can meet its statutory and contractual deadline of 1998 for accepting spent nuclear fuel from utilities. Since 1994, however, the storage of spent nuclear fuel has gradually become an enormous thorn in the side of DOE, the nuclear industry, and state regulators.

The problem is simple: utilities have paid \$10 billion to the Nuclear Waste Fund; in return, DOE agreed to take the utilities' spent nuclear fuel and transport it for storage and disposal. DOE's contractual date for accepting spent nuclear fuel is January 31, 1998. In 1994, however, the department canceled its plans to construct a storage facility for the waste and instead announced that shipments would be deferred until 2010, the projected opening date for the permanent repository.

Outraged at what they perceived as nothing short of a swindle, the nuclear industry, with the help of state regulators, mounted a massive campaign to secure storage space for its spent nuclear fuel. This multimillion dollar effort took place on three separate fronts: the private sector, the federal courts, and the U.S. Congress.

Beginning in 1994, a consortium of utilities, headed by Minnesota's Northern States Power Company, worked closely with the Mescalero Apache tribe of New Mexico to develop a private storage facility on tribal lands.² The venture looked promising at first. At one point, as many as 33 utilities had signed on to the project. As negotiations proceeded, however, it became clear that there were irreconcilable differences between the tribe and the utilities. In April 1996, the two parties formally called an end to the project. The Mescalero tribe has expressed interest in pursuing a private storage facility without utility involvement.

During this same period, various utilities and states sued DOE in federal court. In June 1994, 14 utilities and 27 state agencies in 20 states filed suit with the U.S. Circuit Court of Appeals, seeking a declaration from the court that the Nuclear Waste Policy Act places an unconditional obligation on DOE to begin accepting spent nuclear fuel in 1998. In all, seven Midwestern states were involved in the lawsuit (Table 3).

DOE argued that the 1998 date had always been contingent upon the existence of an operating storage or disposal facility.

The department insisted that, even if it wanted to accept the spent nuclear fuel, it lacked sufficient space to store the waste. The plaintiffs, rejected this claim, however, pointing out that the department planned to accept 20 metric tons of spent nuclear fuel from foreign research reactors.³ They argued that, if necessary, the department could also find storage space for domestic spent nuclear fuel.

The court dismissed the suit in 1994 on the grounds that DOE had not issued a final decision concerning the 1998 deadline. When DOE published its final decision in 1995, the states and utilities again filed suit. In July 1996, the court ruled in favor of the utilities. In its decision, the Court agreed with DOE that, in

Table 3. Midwestern States and Utilities Involved in Acceptance Lawsuits

States:

Iowa Utilities Board
State of Kansas and Kansas Corporation Commission
State of Michigan and Michigan Public Service Commission
State of Minnesota, Minnesota Department of Public Service, and Minnesota Public Utilities Commission
Missouri Public Service Commission
State of Nebraska
South Dakota Public Utilities Commission
Wisconsin Public Service Commission

Utilities:

Centerior Energy Corp. (Ohio)
Commonwealth Edison Co. (Illinois)
Illinois Power Co. (Illinois)
Kansas City Power & Light Co. (Missouri)
Kansas Electric Power Cooperative, Inc. (Kansas)
Kansas Gas and Electric Co. (Kansas)
Northern States Power Co. (Minnesota)
Wolf Creek Nuclear Operating Corp. (Kansas)

Source: *State of Michigan et al. versus U.S. Department of Energy* (1994); *Northern States Power Company et al. versus U.S. Department of Energy* (1994); Larry Pearce, *State of Nebraska* (1997).

crafting the Nuclear Waste Policy Act, Congress had assumed a storage or disposal facility would be available in 1998. The Court went on to say, however, that this assumption “does not mean that Congress conditioned DOE’s obligation to begin acceptance of spent nuclear fuel on the availability of [such] a facility.”

DOE decided not to appeal the court’s decision. In mid-December, DOE notified the utilities that the department “anticipates a delay” in the 1998 deadline for accepting spent nuclear fuel. DOE asked the utilities to submit comments on “how the delay can best be accommodated.” The utilities had earlier declared their intent to sue DOE for breach of contract if the department did not begin accepting spent nuclear fuel in 1998. It is likely, therefore, that further legal action will result from DOE’s announcement.⁴

Against the backdrop of lawsuits and private negotiations, the political arm of the nuclear industry campaigned tirelessly to amend the Nuclear Waste Policy Act. In 1995–96, 12 bills were introduced in the 104th Congress, some addressing particular provisions of the act, others rewriting virtually the whole thing. The aim of most of the broad revisions was to make it possible for DOE to begin storing spent nuclear fuel as early as possible—in some cases even specifying 1998 as the target date.

Eventually, none of these bills succeeded. Only one bill, S. 1936, actually made it to the Senate floor, where it was approved by a vote of 63 to 37 in July 1996. Congress adjourned, however, two months later without the House having considered similar legislation.

Several factors contributed to the ultimate demise of the amendments legislation. First, several bills would have permitted (even required) the construction of a storage facility near Yucca Mountain, Nevada—a move that many saw as potentially compromising the ongoing scientific evaluation of

the site for the permanent repository. Indeed, President Clinton threatened to veto any legislation that identified Yucca Mountain as the storage site on just such grounds.

Second, some of the proposed amendments brought strong opposition from many observers by removing or weakening the regulatory requirements of the act. Of equal importance, though, the proposed amendments to the Nuclear Waste Policy Act fell victim to election-year politics. Very few legislators were willing to champion a cause as politically charged as nuclear waste management. Senator Bob Dole's resignation from the Senate also set back S. 1936's movement to the floor of the Senate. President Clinton's threatened veto—and the failure of the amendment supporters to muster enough votes to override a veto—led the House to drop consideration of S. 1936 or a companion bill from its calendar.

The nuclear industry hopes to have the 105th Congress revisit the Nuclear Waste Policy Act in 1997. Some observers feel that amending the act might be easier the second time around since so many members of Congress have gone on record with their support of various pieces of legislation. Now that DOE has acknowledged that it will not meet the 1998 acceptance deadline, Congress is certain to address the storage issue again in 1997.

DOE's Transportation System

Is it safe to transport spent nuclear fuel and high-level radioactive waste? How does the federal government regulate this type of transport?

For the past 30 years, high-level radioactive material has been shipped in the U.S. by rail and truck without any fatal accidents or environmental damage related to the radioactive nature of the cargo. This record of safety is largely attributable to strict regulation by the federal government. Federal regulations pertaining to shipments of spent nuclear fuel cover two broad areas: safety and safeguards.

Safety regulations are intended to protect public health and safety both during routine transportation and in accident situations. The Nuclear Regulatory Commission and the Department of Transportation share responsibility for regulating shipment safety. The Nuclear Regulatory Commission's requirements address the packaging of spent nuclear fuel, including the certification of container designs and approval of quality assurance programs during manufacturing.⁵ The Department of Transportation is responsible for regulating the operational aspects of shipments by any mode, from route selection and driver training to shipment documentation.⁶

Safeguards regulations protect shipments of spent nuclear fuel from deliberate acts of sabotage. The Nuclear Regulatory Commission is solely responsible for these regulations.⁷ The commission's requirements cover a wide range of activities, including prior approval of the routes, procedures for coping with emergencies, and the notification of state governors of impending shipments. Table 4 lists these and other safeguards requirements.

DOE has committed to following all federal, state, tribal, and local laws and regulations that apply to radioactive waste transportation. The Midwestern High-Level Radioactive Waste Committee believes, therefore, that the transport of spent

nuclear fuel and high-level radioactive waste—if conducted in compliance with all federal and state regulations, and with adequate preparation and communication—can be achieved safely.

Will DOE transport spent nuclear fuel and high-level radioactive waste by train or by truck? How will the waste be packaged?

Since the beginning of the waste-management program, DOE has stated that it will utilize all available modes of transport for shipping high-level radioactive waste and spent nuclear fuel: rail, highway, and barge. Combinations of these modes, in which different segments of the trip are made via different modes, are also an option. Most of the shipments will be transported by highway or rail.

Table 4. Nuclear Regulatory Commission Physical Protection Requirements for Shipments of Spent Nuclear Fuel

- Procedures to cope with the threat of deliberate damage to the shipment
- A communication center to monitor the progress of the shipment
- Use of a written shipment log
- Advance arrangements with local law-enforcement officials along routes to assist in emergency response activities
- Advance NRC approval of routes
- Avoiding intermediate stops to the extent possible
- Visual surveillance of shipments during stops
- Assurance that escorts have received training in the physical protection of shipments
- Calls to the communication center by escorts every two hours
- At least two armed escorts through heavily populated areas
- Additional requirements for highway shipments:
 - The ability to immobilize the cab or cargo-carrying portion of the vehicle
 - Driver familiar with and capable of implementing immobilization, communications, and security procedures

Source: 10 CFR 73.37.

Several factors influence the choice of modes. The inherent safety of each mode is one factor. Truck and rail shipments differ in the probability and severity of accidents, and in the ability to limit the exposure of the public during normal shipment operations. Capital and hauling costs are another factor. Although the per-shipment cost of a truck shipment might be less than that for rail, the greater payload of rail shipments makes them more economical in a wide variety of situations.

Plant capabilities are another factor. Some nuclear plants, for example, are not readily accessible by rail, making all-rail transport either impossible or more costly. Ultimately, the Standard Disposal Contracts give utilities the right to choose which mode to use.

Regardless of the mode selected, all spent nuclear fuel will be transported in specially designed transportation casks that meet Nuclear Regulatory Commission standards (Table 5). Constructed to meet rigorous safety standards, these casks comprise the first line of defense against an accidental release of radioactive material. Unlike transportation packages for many other hazardous materials, spent nuclear fuel casks are specifically intended to reduce the potential impact of an accident.

There are only a few transportation casks available for use today, most of which have relatively low payloads of 3–7 assemblies per truck cask and 7–18 assemblies per rail cask. DOE had planned to develop and was well on the way to completing high-capacity truck casks for the waste-management program when Congress slashed the program's funding by half. As a result, all work on a high-capacity truck cask has been turned over to the private sector without any financial support from the federal government.

For rail shipments, DOE had planned to develop multipurpose canisters—a single container that, with different “overpacks,”

Table 5. Nuclear Regulatory Commission Testing Requirements for Spent Nuclear Fuel Shipping Casks

Normal Conditions

Hot (100°F) and cold (-40°F) environments
 External pressure ranging from 3.5 PSI to 20 PSI
 Normal vibration experienced during transportation
 Simulated rainfall of two inches per hour for at least one hour
 Free fall from one to four feet depending on the package weight
 Impact of a 13-lb., 1.25-inch diameter steel cylinder with rounded ends, dropped from 40 inches onto the most vulnerable surface

Accident Conditions

Free drop from 30 feet onto an unyielding surface in a way most likely to cause damage to the cask
 Free drop from 40 inches onto the end of a 6-inch diameter vertical steel bar
 Exposure for not less than 30 minutes to temperatures of 1,475°F
 Immersion in at least three feet of water for eight hours in an orientation most likely to result in leakage
 Water pressure equivalent to immersion in 50 feet of water for at least eight hours (performed on a separate cask)
 Deep water pressure equivalent to immersion in 656 feet of water for at least one hour

Source: 10 CFR Sections 71.61, 71.71, and 71.73.

could be used to store, transport, and dispose of spent nuclear fuel. Another victim of Congressional budget-cutting, the multipurpose canister program was terminated in 1996 after DOE’s contractor, Westinghouse, had completed only the first of a three-phase contract. Several private companies have received or are seeking certification from the Nuclear Regulatory Commission for high-capacity rail casks that can also be used for storage. Although the Nuclear Regulatory Commission has certified at least one type of “dual-purpose” rail cask, no company has as yet manufactured any.

How many shipments will there be under the Civilian Radioactive Waste Management Program?

It is extremely difficult to predict the total number of shipments expected during the life of the waste-management program. The mode of transportation, the quantity of spent nuclear fuel and high-level radioactive waste requiring disposal, the position of each bundle of spent nuclear fuel in the queue, the rate of acceptance—all these factors influence the projected number of shipments.

Despite this difficulty, there are some sound estimates of the potential number of shipments. The State of Nevada, for example, has commissioned two studies to gauge the impact of shipments on states and counties throughout the nation. The first study, completed in 1995, estimated that 6,217 truck shipments and 9,421⁸ rail shipments would be required to transport all the spent nuclear fuel planned for discharge through 2030 (approximately 86,700 metric tons of uranium). These estimates assumed maximum use of the multipurpose canister, however, which may not be the case.

A more comprehensive study commissioned by the state included high-level radioactive waste shipments in the total number. Published in 1996, this study predicts that, if shipments were to begin in late 1999, a total of 79,000 highway shipments and almost 13,000 rail shipments would be required using currently available technology—that is, a standard capacity truck cask and a high-capacity rail cask.

Under scenarios emphasizing rail transport, the same study estimated between 14–17,000 rail shipments and 5–26,000 highway shipments. For each of these scenarios, the study anticipates shipments having an impact on 43 states, including 10 of the 12 Midwestern states.⁹ In fact, six Midwestern states—Nebraska, Illinois, Iowa, Kansas, Missouri, and Indiana—were listed among the eight “major corridor states” under the study’s “most likely scenario” (see the next section).

Regardless of the actual number of projected shipments, one thing is clear: Shipments of spent nuclear fuel that take place as part of the federal waste-management program will occur with far greater frequency than shipments in the past. Over the last decade and a half, there have been a total of 1,154 highway and 128 rail shipments in the U.S., for an average of 85 total shipments per year. Depending on the mix of rail and truck transport, the frequency of shipments during the operation of the waste-management program could range from several hundred to several thousand per year.

Who will actually transport the waste—DOE, the utilities, or some other party?

The Nuclear Waste Policy Act requires DOE to utilize private industry “to the fullest extent possible” in all aspects of the transportation system. Throughout much of the past decade, DOE had planned to contract with private carriers to transport the waste. Most of the actual logistics, however—including shipment planning, procurement of equipment, infrastructure improvements—were to remain DOE’s direct responsibility.

In 1996, though, this picture of the transportation system changed. On May 28, DOE published a notice in the *Federal Register* seeking expressions of interest in and comments on its plan to privatize waste acceptance, storage, and transportation services. According to the notice, DOE is considering awarding competitive fixed-price contracts, possibly by region, for periods of 5–10 years. These contractors would be responsible for accepting spent nuclear fuel from reactor sites, for supplying all necessary casks and equipment, and for transporting the spent nuclear fuel to a designated federal facility. To maintain competition, no company would receive more than two regional contracts.

States and the regional organizations that represent them are closely monitoring DOE’s privatization plans. One area of concern is the implications for the states’ role in shaping the

transportation system. Through cooperative agreements such as the one with CSG's Midwestern Office, DOE has established solid working relationships with agency officials from states likely to be affected by radioactive waste shipments. The department has also created certain expectations regarding the input these states will have once shipments are imminent. A privatized system without state input as an integral part could jeopardize these relationships, with negative consequences for the success of the entire waste-management program.

DOE claims it will require contractors to “interface” with state, local, and tribal governments “along the selected routes.” Such a requirement, however, would seem to preclude state involvement in selecting the routes, which many view as one of the most fundamental areas for state input.

What routes will the shipments follow? Who is responsible for selecting the shipping routes?

The Department of Energy will abide by the Department of Transportation's regulations governing the selection of routes for shipments of spent nuclear fuel and high-level radioactive waste. According to these regulations, carriers of spent nuclear fuel are responsible for selecting the shipping route.

Highway carriers must use the interstate highway system and any bypasses around population centers—what the Department of Transportation refers to as “preferred routes.” States may designate alternatives to these preferred routes, subject to approval by the Department of Transportation. To date, only two Midwestern states—Iowa and Nebraska—have designated alternate routes.

Rail routing is somewhat different than highway routing. Unlike the interstate highway system, railroad tracks are privately owned and maintained. The carrier still has the right to select the route, but there is no rail equivalent to the system of

preferred routes. Without a single network of tracks, a shipment travelling the most direct route could involve several companies. The tracks over which the shipment is carried could also vary widely in quality. Another difference is that the highest quality tracks are often located in the heart of major population centers. In order to use these high-quality tracks—analogueous to trucks using the interstate highway system—rail shipments often have to go through population centers rather than bypassing them.

For years, the Midwestern High-Level Radioactive Waste Committee has urged DOE to select the probable routes as early as possible to allow the states time to review the routes, suggest alternatives, and prepare for shipments. The department has responded to this request by stating that, under the Department of Transportation's regulations, the carrier and not the shipper is responsible for selecting the routes. In other words, as the shipper, DOE does not plan to have any role in the selection of the routes.

The department has gone beyond federal regulations, however, in routing both the shipments of spent nuclear fuel from foreign research reactors and the planned movement of transuranic waste to a DOE facility in New Mexico. In both instances, DOE consulted with the affected states as it considered prospective shipment routes. In the case of the transuranic waste shipments, probable routes were announced many years in advance. The committee believes that shipments of spent nuclear fuel and high-level radioactive waste as part of the Civilian Radioactive Waste Management System deserve at least as much advance route planning and state consultation as other DOE shipping campaigns involving radioactive materials.

Impact on the Midwestern States

How will the Midwestern states be affected by shipments of radioactive waste?

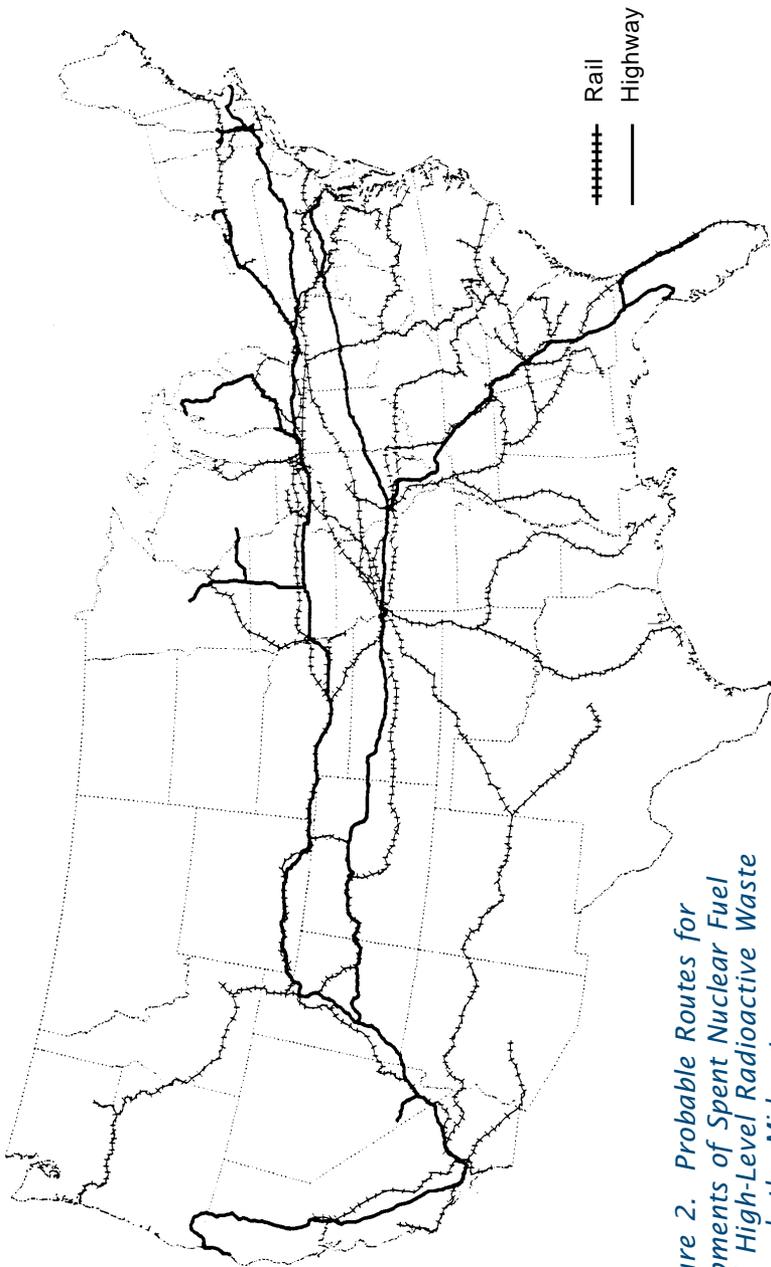
As mentioned in the Background section, the Midwestern region is home to 33 operating and shutdown commercial nuclear reactors and one private storage facility for spent nuclear fuel. The seven states in which these sites are located will obviously be crossed by shipments of spent nuclear fuel.

Yet these are not the only states that will be affected—nor are the shipments from Midwestern reactors the only ones that will pass through the region. Indiana, for example, does not have any nuclear power plants, but the state will almost certainly be crossed by spent nuclear fuel coming from reactors in Ohio and states to the south and east. In fact, if their destination is Yucca Mountain, most of the spent nuclear fuel shipments will eventually pass through two or more Midwestern states (Figure 2).¹⁰

According to routing studies conducted by the State of Nevada, five Midwestern states will see over 50 percent of the projected highway casks that will be transported (Table 6). Two of these states—Nebraska and Illinois—will see 70 percent or more of the casks projected to be shipped by rail. Only three of the affected Midwestern states—Minnesota, Michigan, and Wisconsin—will be crossed by 10 percent or less of the spent nuclear fuel and high-level radioactive waste bound for the repository.

What impact will these shipments have on Midwestern state governments?

Assessing the impact of shipments on the states is difficult for several reasons. First, the transportation system envisioned by DOE is not only unprecedented in scale, it is still taking shape. Fundamental aspects of the program—such as the



*Figure 2. Probable Routes for Shipments of Spent Nuclear Fuel and High-Level Radioactive Waste through the Midwest
Source: Planning Information Corporation 1996.*

Table 6. Projected Shipments of Spent Nuclear Fuel and High-Level Radioactive Waste Through the Midwest

State	Percentage of all shipping casks		Number of sites shipping through state	Number of sites located within state
	highway	rail		
Nebraska	62	82	60	2
Illinois	90	77	47	8
Iowa	57	46	32	1
Kansas	38	38	28	1
Missouri	38	38	27	1
Indiana	70	42	25	0
Ohio	62	29	14	2
Michigan	7	3	4	4
Minnesota	5	1	3	2
Wisconsin	<1	2	3	3

Source: Planning Information Corporation (1996); Nevada Agency for Nuclear Projects (1995).

starting date of shipments, the routes to be used, even the destination of the shipments—remain to be decided.

Yet even if the details of the transportation system were already spelled out, the impact on each state would differ depending on which parameter one uses to measure that impact. Regarding the projected number of shipments, for example, the previous section shows that this figure varies greatly from one state to another—with non-corridor states such as Michigan and Wisconsin experiencing relatively few shipments compared to corridor states such as Nebraska and Iowa.

In addition, each state is unique in terms of its transportation infrastructure, which could lead to different impacts in states that are similar in other ways. States could have the same number of highway and track miles, but there could be vast differences in the condition of that infrastructure. As a result, the costs associated with infrastructure improvements could be much greater in one state than in another.

The degree to which the impact is geographically concentrated or spread out might differ in otherwise similar states. Kansas and Missouri, for example, are expected to experience virtually the same impact with regard to the projected number of shipments. In Missouri, however, these shipments will be confined to the northern half of the state, whereas in Kansas the shipments are predicted to affect all but the southwest quadrant of the state.

States also have different regulatory systems, with different requirements for inspecting shipments and different capabilities for responding to accidents. In one state, Illinois, statutes require each shipment of spent nuclear fuel to be inspected and escorted as it passes through the state. With close to 14,000 shipments projected to cross the state over the life of the waste-management program, Illinois can expect to devote a good deal of human and financial resources to inspections and escorts. Other corridor states such as Indiana and Iowa do not currently require shipments to be inspected or escorted on a routine basis.

Some states assess fees for each container or shipment of spent nuclear fuel that crosses the state. In Illinois, the fee is \$1,000 per truck cask and \$2,000 per rail cask. The revenue generated by this fee is used to cover some of the costs of inspecting and escorting shipments. The State of Minnesota charges a fee of \$1,000 per shipment. Kansas, Missouri, and Ohio charge fees for hazardous materials shipments in general. In Kansas, carriers of hazardous waste must pay an annual fee of \$250. Missouri and Ohio base their fees on the amount of hazardous waste handled by the carrier, with maximum annual fees of \$250 in Missouri and \$15,000 in Ohio.

Emergency response capabilities also differ between states. With 14 commercial reactors and one storage facility, Illinois is already well prepared for shipments of spent nuclear fuel and might, therefore, require only modest enhancements to its emergency response capabilities when shipments begin.

States that have less experience with highly radioactive waste might need to invest a greater amount of time and money to reach a similar level of preparedness.

Is DOE doing anything to reduce this impact?

In crafting the Nuclear Waste Policy Act, Congress anticipated that shipments of spent nuclear fuel and high-level radioactive waste would affect state governments. Congress directed DOE to mitigate this impact in Section 180(c) of the act:

The Secretary shall provide technical assistance and funds to States for training for public safety officials of appropriate units of local government and Indian tribes through whose jurisdiction the Secretary plans to transport spent nuclear fuel or high-level radioactive waste under [the act]. Training shall cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. The Waste Fund shall be the source of funds for work carried out under this subsection.

DOE is currently developing a policy and a set of procedures to provide this assistance. The Midwestern High-Level Radioactive Waste Committee, along with its counterparts in the other three regions, has provided DOE with extensive and substantive input on the department's plans for implementing Section 180(c) (Table 7).

In May 1996, the department published a draft of these procedures in the *Federal Register*. The Committee was disappointed that the plan described by DOE did not reflect more of the Midwestern states' specific suggestions and concerns. The proposed policy and procedures, for example, placed far too many restrictions on the allowable uses of funding, including limitations on equipment purchases and an

Table 7. Midwestern High-Level Radioactive Waste Committee Comments on DOE's Plans to Provide Funding and Technical Assistance to States under Section 180(c) of the Nuclear Waste Policy Act

DOE should place a high priority on developing its policy on Section 180(c).

Section 180(c) assistance should apply to shipments to private facilities.

Section 180(c) assistance should be administered directly to tribes.

The final procedures should minimize administrative costs.

Funding to states should be based primarily on impact, with a portion reserved to insure minimum funding levels to states that might require additional assistance.

Routes should be selected well in advance so that DOE can target assistance to corridor jurisdictions.

States should be free to choose how best to use Section 180(c) funding.

Equal emphasis should be placed on procedures for "emergency response" and those for "safe routine transportation."

Section 180(c) assistance should cover all activities related to planning and preparing for shipments, including purchasing and calibrating equipment and conducting drills and exercises.

Source: Midwestern High-Level Radioactive Waste Committee (1995 and 1996).

actual prohibition on funding state and local drills and exercises.

The committee is also concerned that, with the final policy scheduled for publication in 1997, states will not have sufficient lead time to apply for, receive, and use Section 180(c) assistance in preparation for shipments beginning as early as 1998. DOE claims to have developed a contingency plan in the event that shipments will occur with less than three years notice. The department has not, however, made that plan available to the states for review and comment.

How are the Midwestern states involved in shaping DOE's transportation system?

The Midwestern High-Level Radioactive Waste Committee has been working together since 1990 to help DOE develop a transportation system that meets the region's needs. At its biannual meetings, the committee develops regional positions on issues such as routing, emergency response, the timing of shipments, and federal assistance to the states. The committee then discusses these positions with DOE at regional meetings or at meetings of the department's Transportation External Coordination Working Group. Organized in 1991, the Transportation External Coordination Working Group brings together government, citizen, and professional organizations to discuss and provide feedback on the transportation of radioactive materials throughout the DOE complex. The committee is a charter member of this important working group.

The Midwestern High-Level Radioactive Waste Committee recently initiated its most ambitious project to date—the development of a regional routing plan that will identify the states' preferences for rail and highway routes for shipments of spent nuclear fuel and high-level radioactive waste. By providing states with an idea of the probable routes to the repository, this plan will help states in their efforts to determine the type and extent of federal assistance they will need to prepare for shipments. The Routing Subcommittee is developing this plan with input from the committee as a whole. The committee hopes to publish the plan in late 1997.

Conclusion

Shipments of spent nuclear fuel and high-level radioactive waste will undoubtedly affect the Midwestern states. In addition to shipments from the 34 storage sites in the region, thousands of shipments from Eastern and Southern reactors will cross the region if they head westward to the permanent repository. Since 1990, the Midwestern High-Level Radioactive Waste Committee has represented the region in discussions with DOE about the necessary elements of a transportation system to move this waste.

The committee has identified early shipment routing and federal assistance to the states as the highest priorities for DOE and the Midwestern states. As the 1998 deadline for starting shipments approaches, the committee will continue to urge DOE to select the probable routes and to begin providing federal assistance to the states. These first steps, if DOE chooses to take them, will start the transportation system off on the right course by demonstrating the department's commitment to involving the states in its decision making. The Midwestern High-Level Radioactive Waste Committee strongly believes that the success of the transportation system—and, by extension, the entire waste-management program—rests squarely on the strength of that commitment.

Appendix: The Midwestern States

The pages that follow present a variety of information on the 12 Midwestern states. For each state, this section lists the location and amount of spent nuclear fuel in storage, the contribution the state has made to the Nuclear Waste Fund, and whether the state participated in the lawsuit against DOE. In addition, this section contains information on statutes and requirements that apply to the transport of radioactive materials. It identifies the state agencies responsible for inspecting shipments and for responding to transportation accidents involving spent nuclear fuel and high-level radioactive waste. It also indicates whether the state has access to TRANSCOM, a satellite-based tracking system that allows state personnel to monitor the location of shipments using a personal computer.

The state maps display preferred highway routes that are recognized by the Department of Transportation. These routes include the interstate highway system, along with bypasses around major population centers. As noted earlier, the Department of Transportation requires carriers of spent nuclear fuel and high-level radioactive waste to follow these routes. States have the right to designate alternates to the system of preferred routes, subject to approval by the Department of Transportation. Iowa and Nebraska are the only two states in the region that have designated preferred routes. These alternate routes are listed in the section on each state.

Illinois

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Braidwood	Will	284	668
Byron	Ogle	367	864
Clinton	DeWitt	133	724
Dresden 1	Grundy	70	683
Dresden 2	Grundy	388	2,162
Dresden 3	Grundy	386	2,148
La Salle	La Salle	433	2,360
Morris Storage	Grundy	674	3,217
Quad Cities	Rock Island	788	4,284
Zion	Lake	<u>769</u>	<u>1,684</u>
Total		4,292	18,794

Percent of electricity from nuclear: 54

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$966,500,000

Statutes: Hazardous Materials Transportation Act (Illinois Revised Statutes, chapter 430, para. 30/1 et seq.)

Hazardous Materials Emergency Act (Illinois Revised Statutes, chapter 430, para. 50/.01 et seq.)

Nuclear Safety Preparedness Act (Illinois Revised Statutes, chapter 420, para 5/1 et seq.)

Radiation Protection Act (Illinois Ann. Statutes, chapter 420, para. 40/1 et seq.);

Commercial Transportation Law (Illinois Revised Statutes, chapter 625, para. 5/18c et seq)

Nuclear Facility Safety Act (Illinois Administrative Code, title 32, part 341)

Emergency Response Plan: Illinois Plan for Radiological Accidents (Volume X, Transportation Accident Plan)

Governor's designee for notification: Thomas Ortziger, Director, Illinois Department of Nuclear Safety

Access to TRANSCOM: Yes

Agency Responsible for Emergency Response: Illinois Department of Nuclear Safety

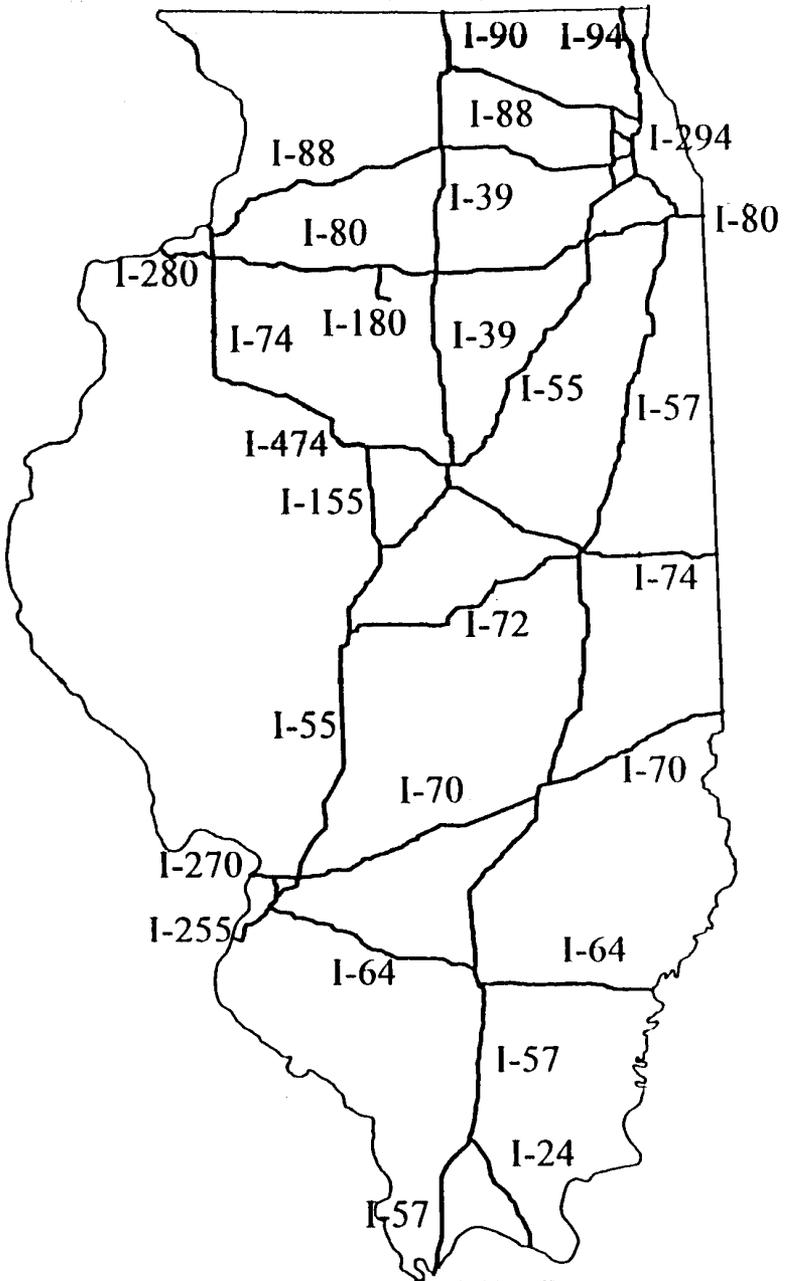
Agency with Authority to Inspect Shipments: Illinois Department of Nuclear Safety

Inspections required: Yes

Escorts required: Yes

Fee for shipments: \$1,000 per highway cask, \$2,000 per rail cask

Designated Highway Routes: None



Indiana

Spent fuel in storage (1994): None

Percent of electricity from nuclear: 0

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$149,200,000

Statutes: Indiana Motor Carrier Act (Indiana Code Ann. sections 8-2.1-18-36 et seq.)

Indiana Radiation Control Act (Indiana Code Ann. sections 16-41-35-1 et seq.)

Emergency Response Plan: Radiological Protection Systems Management Plan, Radiological Emergency Plan Annex C Memorandum of Agreement Between the Indiana State Board of Health and the State Emergency Management Agency

Governor's designee for notification: Melvin J. Carraway, Superintendent, Indiana State Police

Access to TRANSCOM: Yes

Agency Responsible for Emergency Response: State Emergency Management Agency and State Board of Health

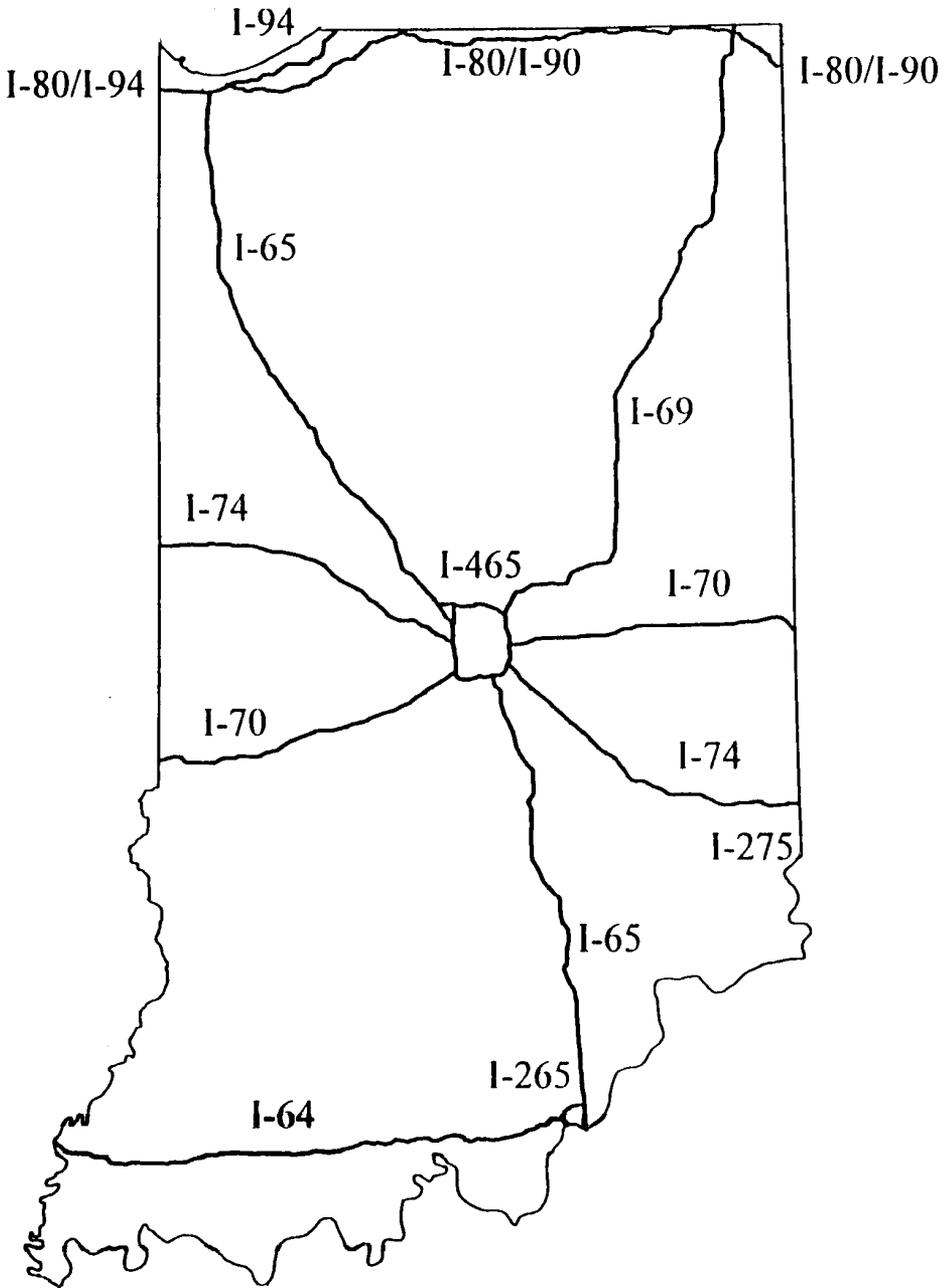
Agency with Authority to Inspect Shipments: State Police and Board of Health

Inspections required: No

Escorts required: No

Fee for shipments: No

Designated Highway Routes: None



Iowa

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Duane Arnold	Lynn	236	1,280

Percent of electricity from nuclear: 11

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$165,800,000

Statutes: Motor Carrier Safety Law (Iowa Code 321.449-321.450)

Radioactive Waste Management Law (Iowa Code 455B.331-455B.340)

Transportation Law (Iowa Code 321.266)

Department of Transportation Law (Iowa Code 307.26-307.27)

Nuclear Transportation Regulations (Iowa Environmental Protection Commission)

Nuclear Materials Transportation Rules, Category 567

Railroad Safety Regulations (Iowa Administrative Code chapters 800-830)

Emergency Response Plan: Iowa Emergency Response Plan Part IV:
The Iowa Radiological Emergency Response Plan (Section A:
Non-Power Reactor Incidents)

Governor's designee for notification: Ellen M. Gordon, Administrator,
Emergency Management Division

Access to TRANSCOM: No

Agency Responsible for Emergency Response: Department of Public
Health

Agency with Authority to Inspect Shipments: None

Inspections required: No

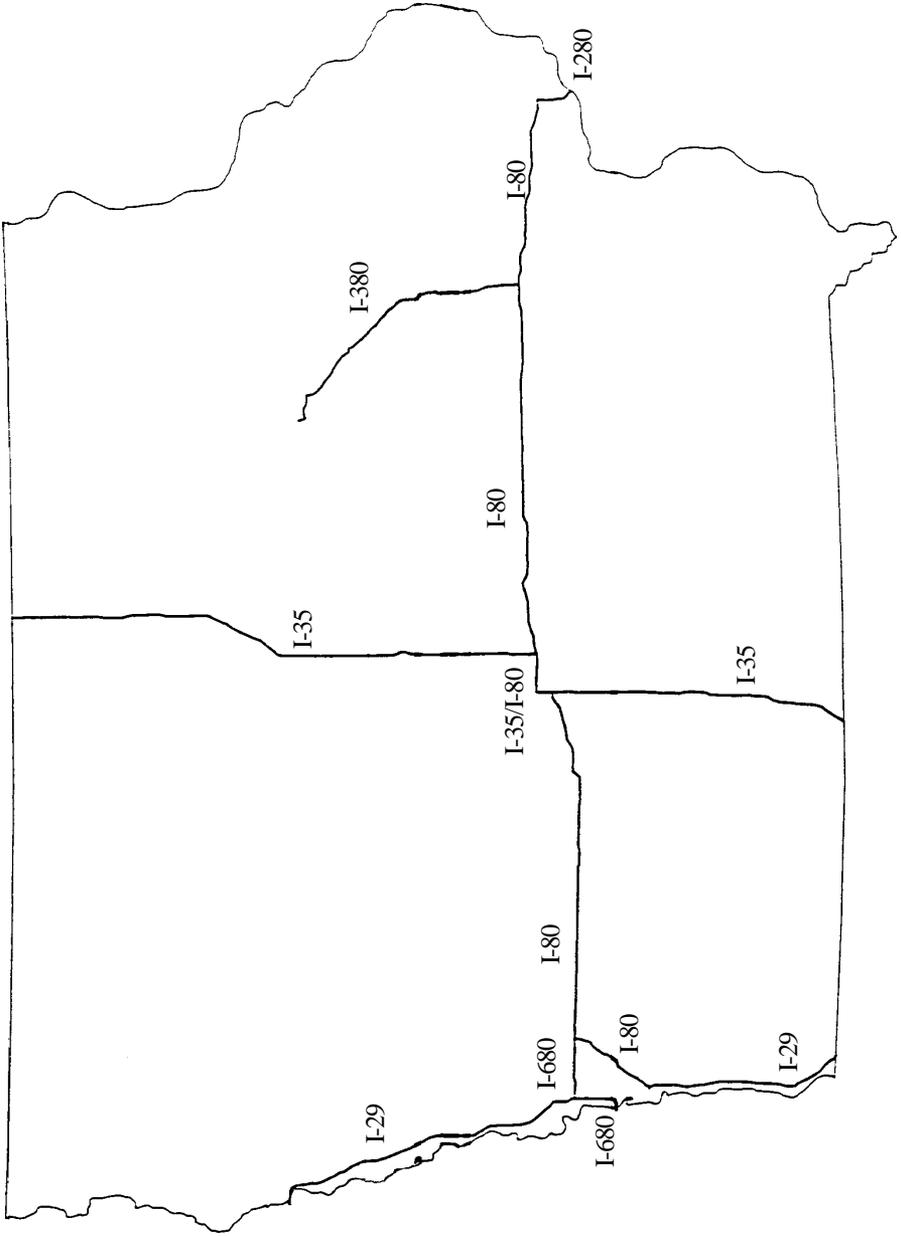
Escorts required: No

Fee for shipments: No

Designated Highway Routes: I-80 and I-680 in lieu of I-29 in all
directions through the Council Bluffs area

I-280 in lieu of I-80 through the Quad Cities area

I-80 and I-35 in lieu of I-235 through the Des Moines area



Kansas

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Wolf Creek	Burlington	226	488

Percent of electricity from nuclear: 26

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$68,400,000

Statutes: Transportation Law (Kansas Statutes Ann. section 8-1746)

Transportation of Radioactive Materials (Kansas Administrative Rules Section 28-35-189a et seq.)

Motor Carrier Regulations (Kansas Corporation Commission, Kansas Statutes Ann. 66-1129)

Nuclear Energy Development and Radiation Control Act (Kansas Statutes Ann. 48-1601 et seq.)

Radioactive Waste Transportation Prenotification Law

Emergency Response Plan: Kansas Emergency Operations Plan

Governor's designee for notification: Frank Moussa, M.S.A.,
Technological Hazards Administrator, Department of the
Adjutant General

Access to TRANSCOM: Yes

Agency Responsible for Emergency Response: Department of the
Adjutant General

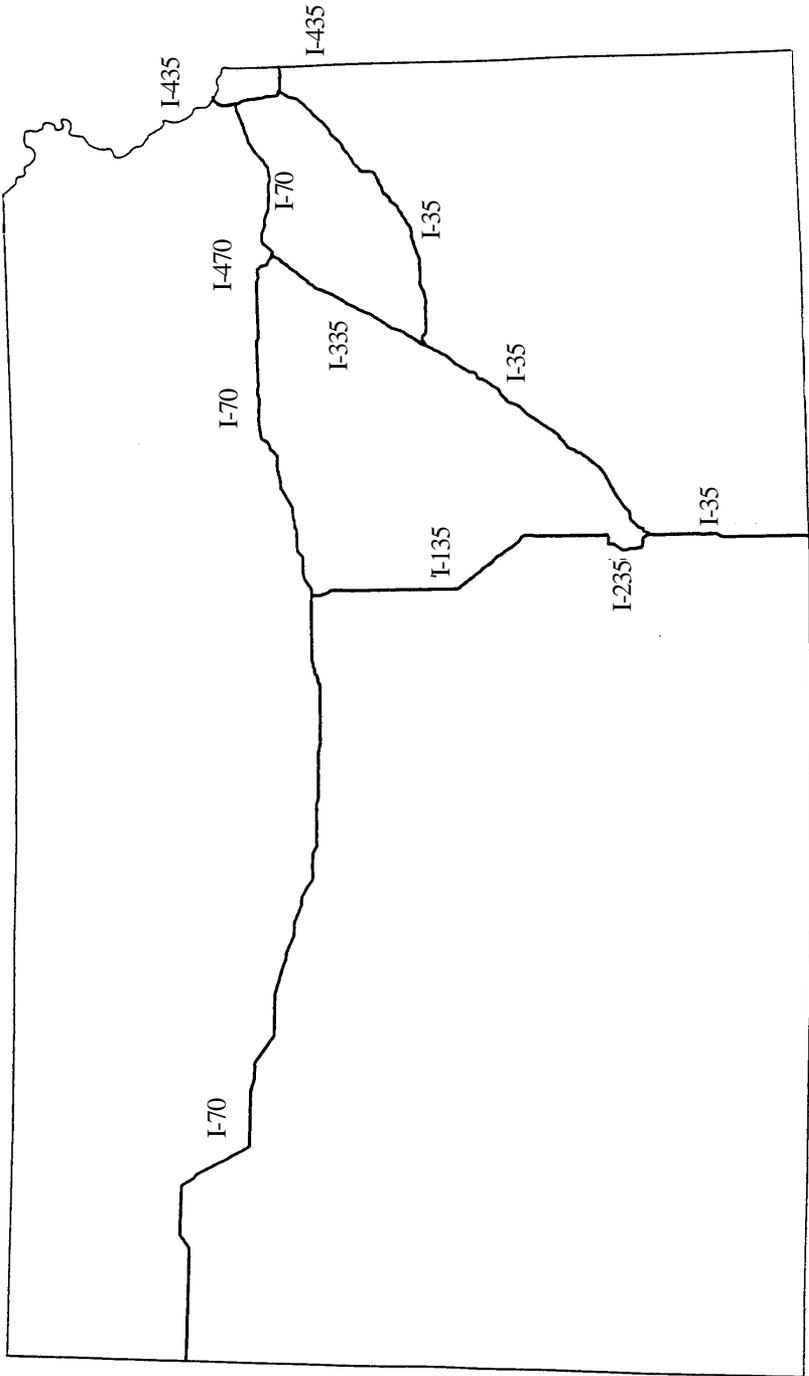
Agency with Authority to Inspect Shipments: None

Inspections required: No

Escorts required: No

Fee for shipments: Maximum \$250 for hazardous materials shipments

Designated Highway Routes: None



Michigan

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Big Rock Point	Charlevoix	44	336
Cook	Berrien	738	1,679
Enrico Fermi	Monroe	162	900
Palisades	Van Buren	<u>317</u>	<u>793</u>
Total		1,261	3,708

Percent of electricity from nuclear: 26

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$140,300,000

Statutes: Radiation Control Act (Michigan Comp. Laws Ann. sections 333.13501 et seq.)

Radioactive Materials Transportation Regulations (unofficial title)
(Michigan Division of Radiological Health Regulations
R325.5801 et seq.)

Michigan Fire Safety Board Regulations (R29.551 et seq.)
Department of Public Health Radiation Protection Regulations
(R325.5001 et seq.)

Emergency Response Plan: Michigan Emergency Management Plan

Governor's designee for notification: Captain Stephen Madden,
Commanding Officer, Special Operations Division, Michigan
Department of State Police

Access to TRANSCOM: Yes

Agency Responsible for Emergency Response: Michigan Department
of State Police

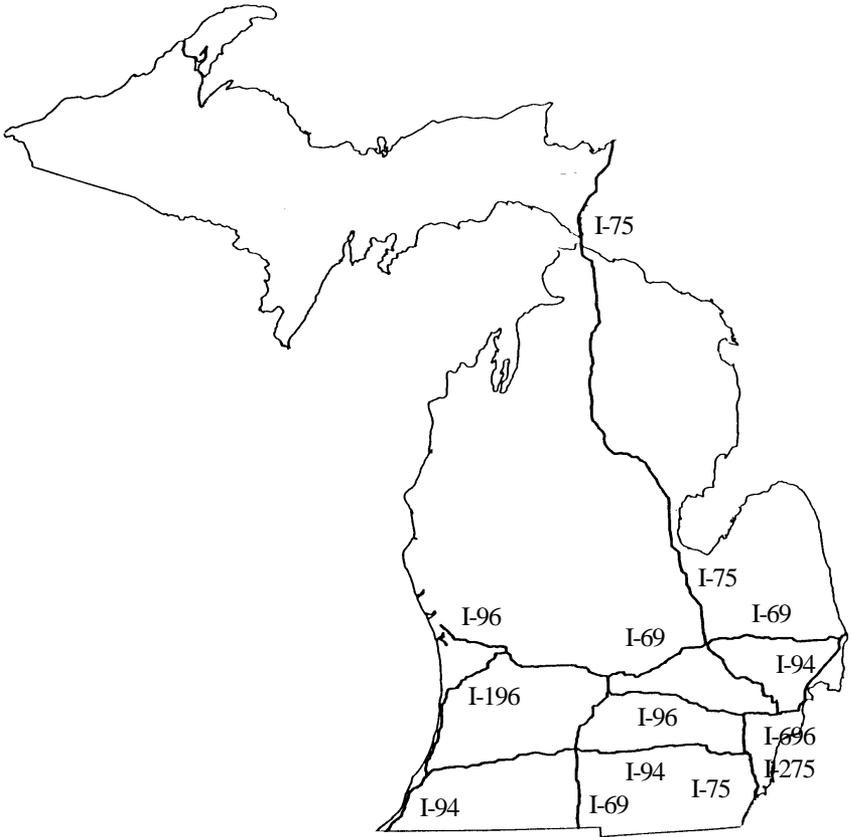
Agency with Authority to Inspect Shipments: None

Inspections required: No

Escorts required: No

Fee for shipments: No

Designated Highway Routes: None



Minnesota

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Monticello	Wright	147	822
Prairie Island	Goodhue	<u>501</u>	<u>1,329</u>
Total		648	2,151

Percent of electricity from nuclear: 31

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$249,100,000

Statutes: Motor Carrier Law (Minnesota Statutes Ann. sections 221.033-221.035)

Radioactive Waste Management Law (Minnesota Statutes Ann. 116C.73)

State Board of Health Law (Minnesota Statutes Ann. section 144.12(15))

Emergency Response Plan: Minnesota Emergency Operations Plan

Governor's designee for notification: John R. Kerr, Assistant Director, Planning Branch, Department of Public Safety, Division of Emergency Management

Access to TRANSCOM: No

Agency Responsible for Emergency Response: Department of Public Safety, Division of Emergency Management

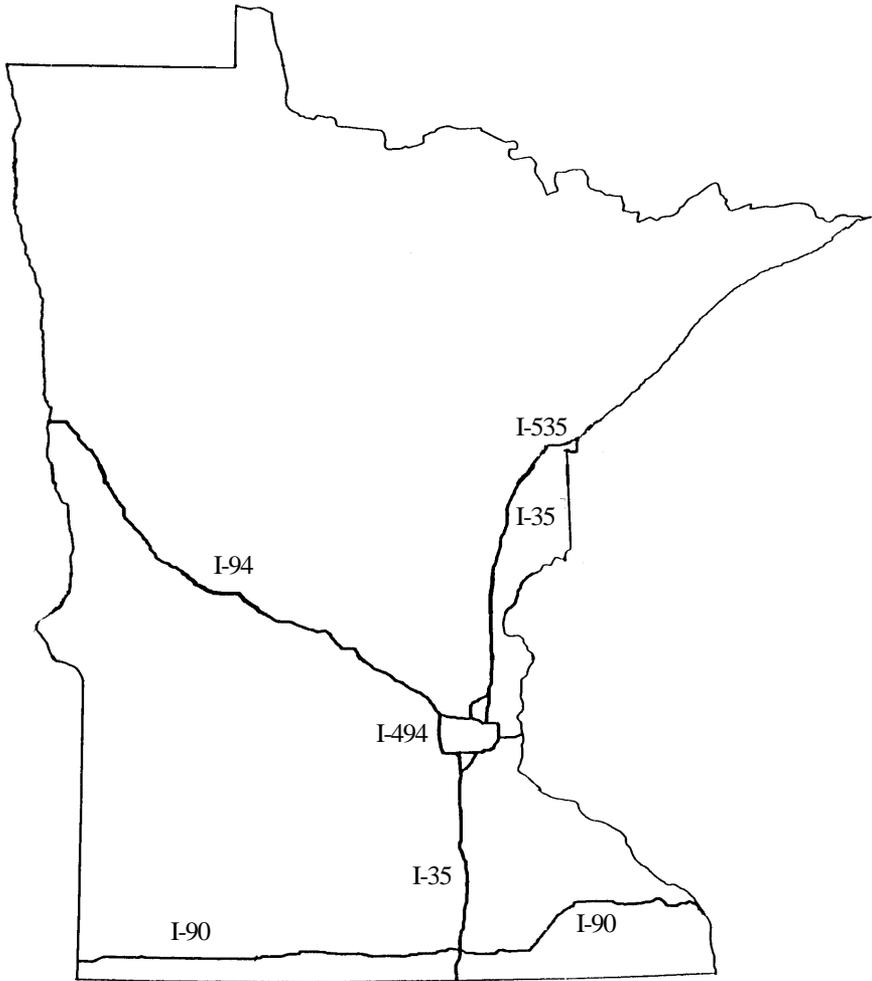
Agency with Authority to Inspect Shipments: None

Inspections required: No

Escorts required: No

Fee for shipments: \$1,000 per each vehicle carrying radioactive waste

Designated Highway Routes: None



Missouri

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Callaway	Callaway	240	548

Percent of electricity from nuclear: 13

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$139,600,000

Statutes: Radiation Control Law (Missouri Revised Statutes sections 192.400 et seq.)

Hazardous Materials Transportation Regulations (Missouri Administrative Code section 301.177)

Emergency Response Plan: Missouri Nuclear Emergency Accident Plan

Governor's designee for notification: Jerry Uhlmann, Director, Office of the Adjutant General

Access to TRANSCOM: Yes

Agency Responsible for Emergency Response : Office of the Adjutant General

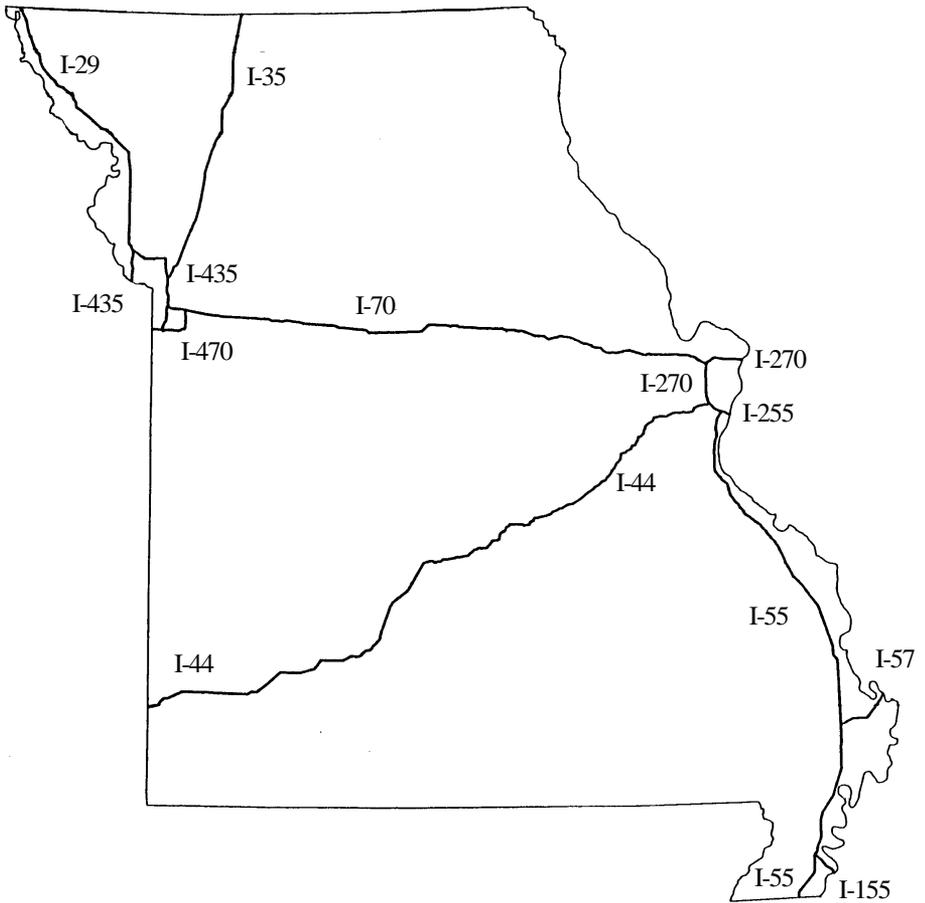
Agency with Authority to Inspect Shipments: None

Inspections required: No

Escorts required: No

Fee for shipments: None

Designated Highway Routes: None



Nebraska

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Cooper Station	Nemaha	148	804
Fort Calhoun	Washington	<u>205</u>	<u>570</u>
Total		353	1,374

Percent of electricity from nuclear: 30

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$136,800,000

Statutes: Motor Carrier Act (Nebraska Revised Statutes sections 75-363 et seq.)

Radiation Control Act (Nebraska Revised Statutes sections 71-3501 et seq.)

Emergency Response Plan: Nebraska Radiological Emergency Response Plan for Non-Power Reactor Incidents

Governor's designee for notification: Colonel Ron Tussing, Superintendent, Nebraska State Patrol

Access to TRANSCOM: No

Agency Responsible for Emergency Response: Department of Health

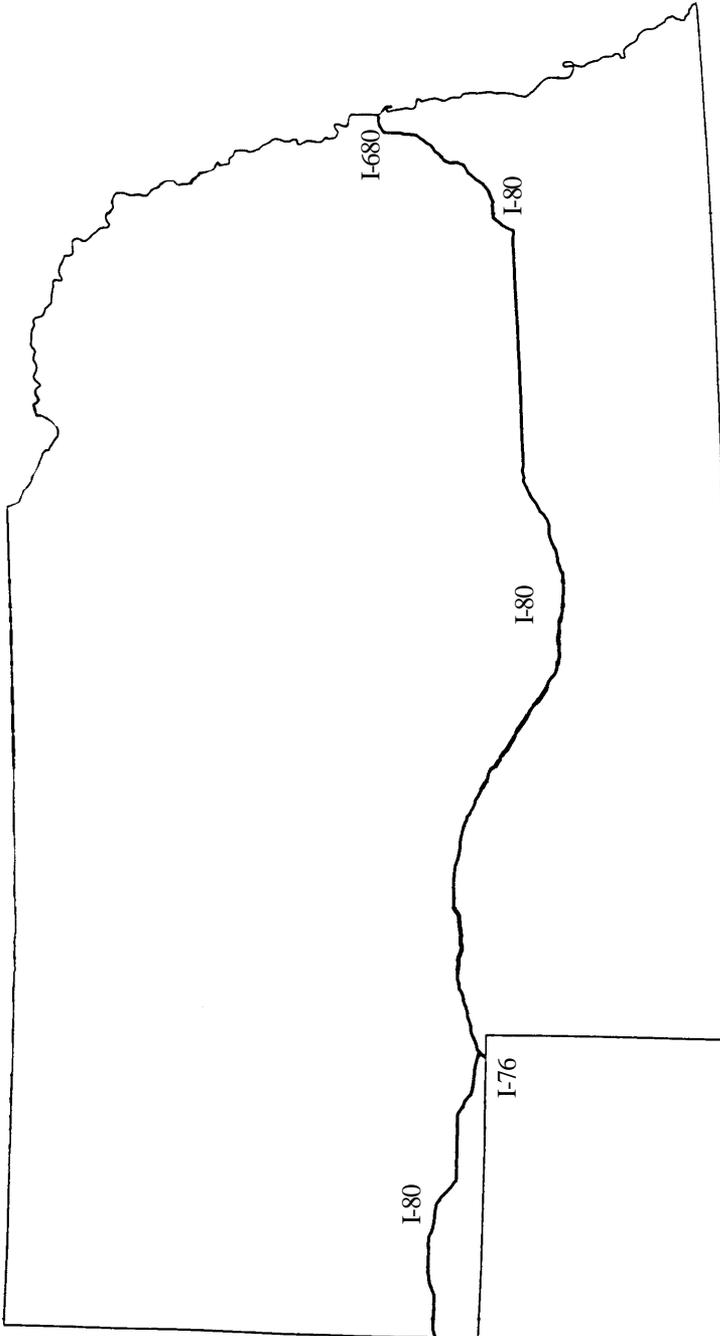
Agency with Authority to Inspect Shipments: None

Inspections required: No

Escorts required: No

Fee for shipments: None

Designated Highway Routes: I-680 in lieu of I-80 in the Omaha area



North Dakota

Spent fuel in storage (1994): None

Percent of electricity from nuclear: 0

Participation in lawsuit: No

Payments into the Nuclear Waste Fund: \$11,400,000

Statutes: Materials Licensing Law (North Dakota Cent. Code sections 23-20.1-01 et seq.)

Disclosure of Information Concerning Toxic or Hazardous Substances (North Dakota Cent. Code 18-01-34)

Motor Vehicle Act (North Dakota Cent. Code Ann. section 39-21-44)

Transportation of Radioactive Materials Regulations (North Dakota Administrative Code article 33-10-13)

Emergency Response Plan: North Dakota State Emergency Operations Plan

State of North Dakota Procedures for Coordination of Emergency Response and Recovery in Hazardous Material Incidents

Governor's designee for notification: Dana K. Mount, Director, Division of Environmental Engineering, North Dakota Department of Health

Access to TRANSCOM: No

Agency Responsible for Emergency Response: Department of Health

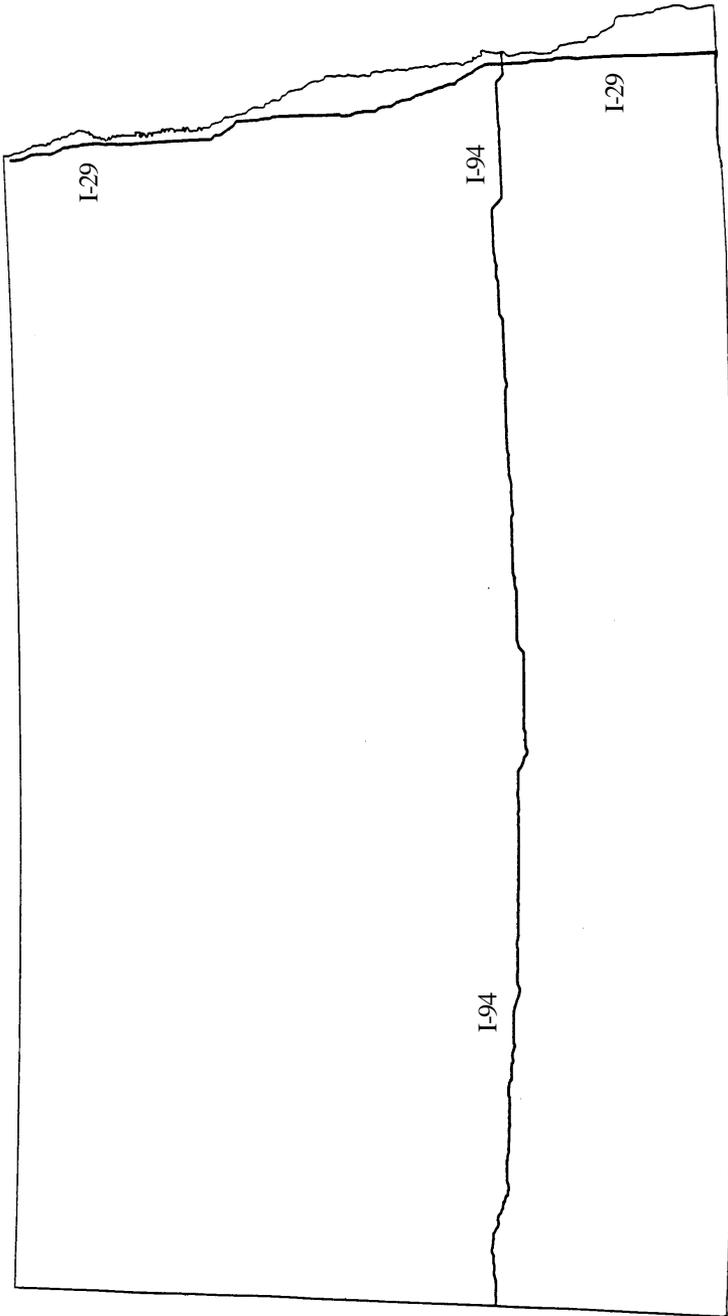
Agency with Authority to Inspect Shipments: None

Inspections required: No

Escorts required: No

Fee for shipments: None

Designated Highway Routes: None



Ohio

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Davis-Besse	Ottawa	244	520
Perry	Lake	178	972
Total		422	1,492

Percent of electricity from nuclear: 12

Participation in lawsuit: No

Payments into the Nuclear Waste Fund: \$239,600,000

Statutes: Radiation Protection Law (Ohio Revised Code Ann. sec. 3701.91)

Atomic Energy Law (unofficial title) (Ohio Revised Code Ann. sections 4163.01 et seq.)

Hazardous Materials Transportation Act (Ohio Revised Code Ann. sections 4905 et seq.)

Radiation Protection Regulations (Ohio Administrative Code sections 3701-38-01 to 3701-38-39)

Emergency Response Plan(s): State of Ohio's Memorandum of Understanding for Response to Hazardous Materials Incidents
Ohio Emergency Management Agency's Technological Hazards Branch Duty Officer's Handbook
Ohio Emergency Radiation Response Plan for Transportation Accidents

Governor's designee for notification: James R. Williams, Chief of Staff, Ohio Emergency Management Agency

Access to TRANSCOM: Yes

Agency Responsible for Emergency Response: Ohio Emergency Management Agency

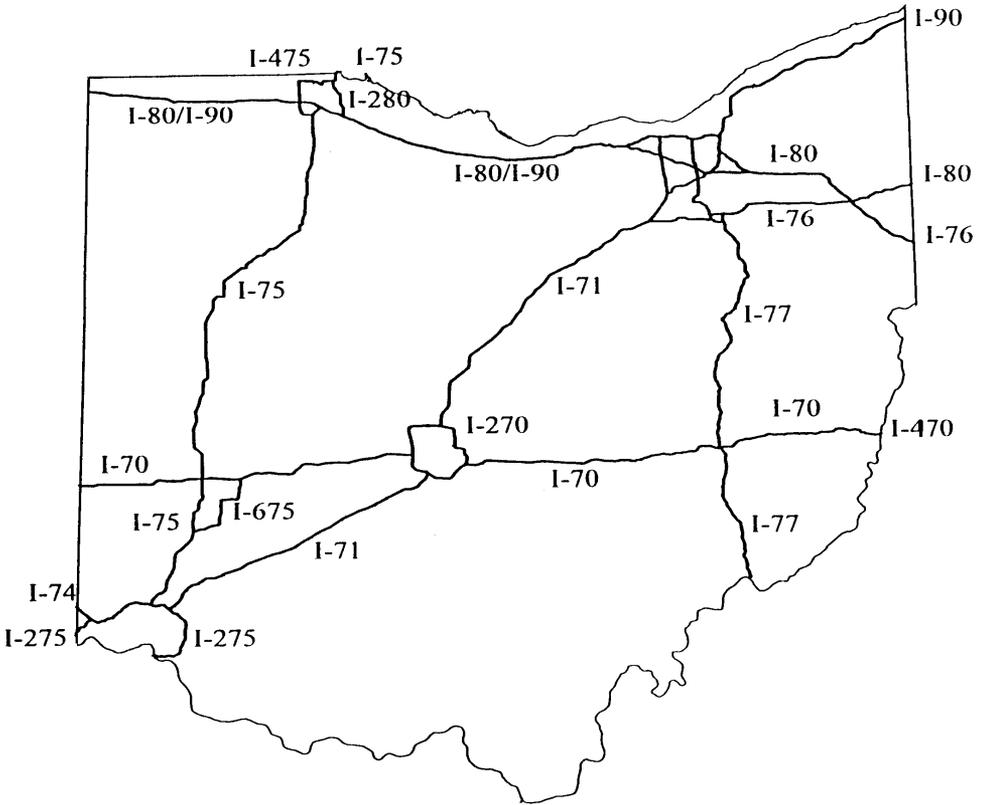
Agency with Authority to Inspect Shipments: Ohio Public Utilities Commission

Inspections required: No

Escorts required: No

Fee for shipments: Maximum of \$15,000 for shipments of hazardous materials

Designated Highway Routes: None



South Dakota

Spent fuel in storage (1994): None

Percent of electricity from nuclear: 0

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$800,000

Statutes: Radiation Resources and Uranium Resources Exposure Control Act (South Dakota Codif. Laws Ann. sections 34-21-1 et seq.)

Hazardous Materials Transportation Safety Act (South Dakota Codif. Laws Ann. sections 49-28A-1 et seq.)

Emergency Response Plan: State of South Dakota Emergency Operations Plan

Governor's designee for notification: Gary N. Whitney, Director, South Dakota Division of Emergency Management

Access to TRANSCOM: No

Agency Responsible for Emergency Response: South Dakota Division of Emergency Management

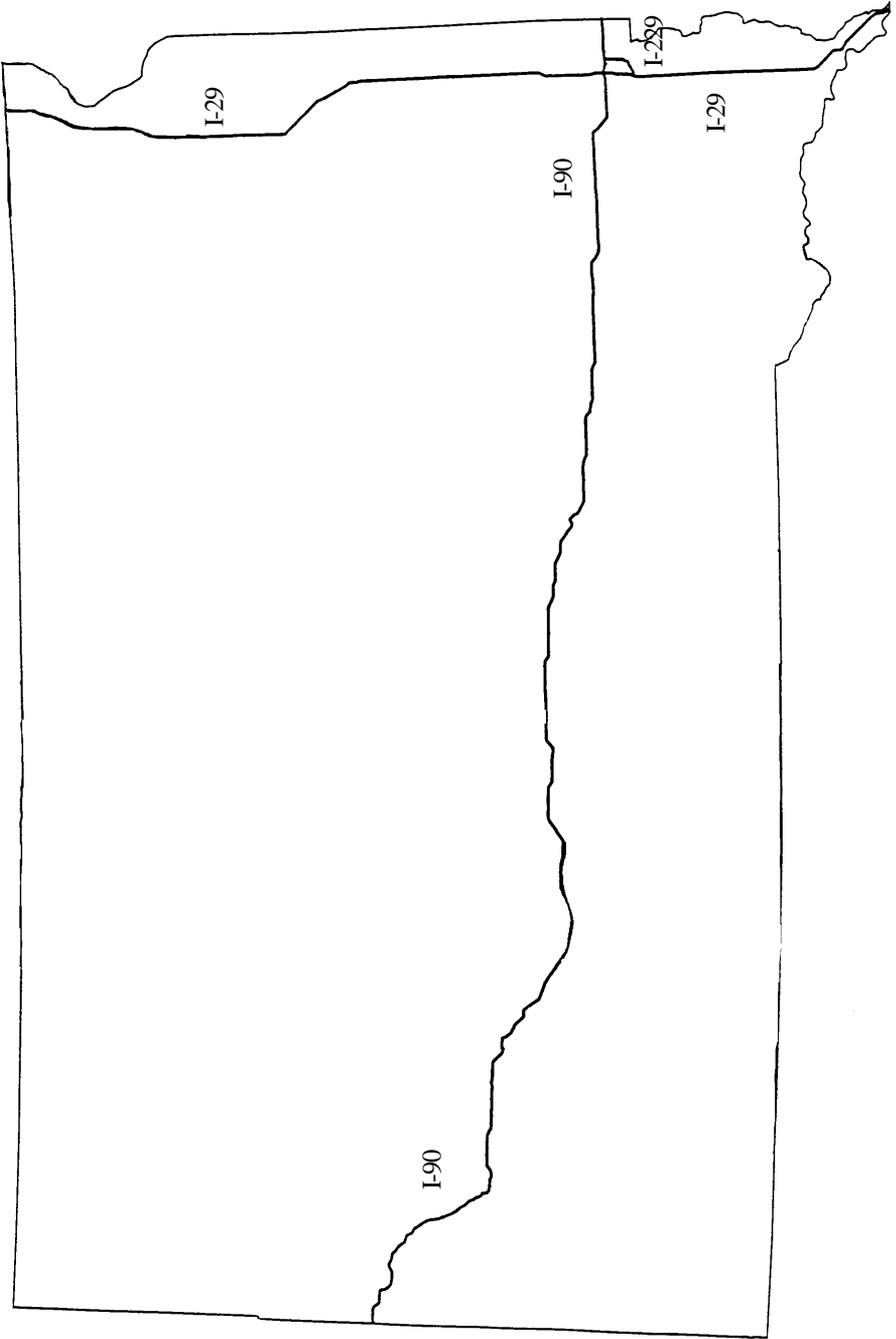
Agency with Authority to Inspect Shipments: None

Inspections required: No

Escorts required: No

Fee for shipments: None

Designated Highway Routes: None



Wisconsin

Spent fuel in storage (1994):

<u>Plant</u>	<u>County</u>	<u>MTU</u>	<u>Assemblies</u>
Kewaunee	Kewaunee	265	688
LaCrosse	LaCrosse	38	333
Point Beach	Manitowoc	<u>506</u>	<u>1,306</u>
Total		809	2,327

Percent of electricity from nuclear: 22

Participation in lawsuit: Yes

Payments into the Nuclear Waste Fund: \$339,200,000

Statutes: Radiation Protection Act (Wisconsin Statutes Ann. sections 140.50 et seq.)

Emergency Planning Law (Wisconsin Statutes Ann. sections 166.01 et seq.)

Motor Vehicle Code (Wisconsin Statutes Ann. section 346.45)

Hazardous Materials Transportation Registration Fees (Wisconsin Statutes Ann. section 85.50)

Emergency Response Plan: Wisconsin Radiological Incident Response Plan (Volume I: State Response)

Governor's designee for notification: Steve Sell, Administrator Wisconsin Emergency Management

Access to TRANSCOM: No

Agency Responsible for Emergency Response: Wisconsin Emergency Management

Agency with Authority to Inspect Shipments: None

Inspections required: No

Escorts required: No

Fee for shipments: None

Designated Highway Routes: None



For More Information

The following publications and websites can provide additional information on the transport of radioactive materials and related subjects. For specific requests for information, please contact the Council of State Governments' Midwestern Office at (630) 810-0210 or send an e-mail to lsattler@csg.org.

Documents:

Council of State Governments, Midwestern Office. 1995. *Midwestern States Routing Report*. DOE/RW/00286-7.

———. 1994. *Midwestern High-Level Radioactive Waste Transportation Primer*. DOE/RW/00286-2.

Planning Information Corporation (for the Nevada Nuclear Waste Project Office). 1996. *The Transportation of Spent Nuclear Fuel and High-Level Waste: A Systematic Basis for Planning and Management at National, Regional, and Community Levels*.

U.S. Department of Energy, Office of Civilian Radioactive Waste Management. 1994. *Civilian Radioactive Waste Management Program Plan (Volume I: Program Overview; Volume II: The Yucca Mountain Site Characterization Project; Volume III: Waste Acceptance, Storage and Transportation)*.

U.S. Department of Energy, Energy Information Administration. 1996. *Spent Nuclear Fuel Discharges from U.S. Reactors 1994*. SR/CNEAF/96-01.

U.S. Nuclear Regulatory Commission. 1996. *Public Information Circular for Shipments of Irradiated Reactor Fuel*. NUREG-0725, Rev.12.

Federal Regulations:

U.S. Department of Transportation
49 CFR Parts 106-107, 171-174, 176-177,
397 (Subpart D)

U.S. Department of Energy
Standard Disposal Contract (10 CFR Part 961)

U.S. Nuclear Regulatory Commission
10 CFR Parts 70-73

Web sites:

http://www.csg.org/midwest/radioactive_project.html: Information on the Midwestern High-Level Radioactive Waste Transportation Project is available through the Council of State Governments' homepage.

<http://www.rw.doe.gov>: The Office of Civilian Radioactive Waste Management's homepage has documents, speeches, reports, and other resources.

<http://www.nrc.gov>: The Nuclear Regulatory Commission's homepage has information on nuclear reactors, nuclear materials, radioactive waste, rulemakings, and public involvement.

<http://www.state.il.us.idns>: The Illinois Department of Nuclear Safety's website has information on projects and programs, access to statutes and licensing guidance, and more.

<http://www.nei.org>: The website of the Nuclear Energy Institute, the nuclear industry's policy organization, includes access to information about nuclear energy and radioactive waste management.

<http://www.state.nv.us/nucwaste>: Access to reports and newsletters as well as information on nuclear waste transportation is available from the Nevada Agency for Nuclear Projects.

Notes

¹ The source of funding notwithstanding, CSG retains editorial control over all publications produced under the cooperative agreement, including this *Guide*. Unless otherwise noted, any opinions expressed in the *Guide* are those of the author.

² Earlier, the Mescalero Apache had been on the short list of voluntary candidates for hosting a federal storage facility.

³ The foreign research reactor spent nuclear fuel was manufactured in the U.S. and contains highly enriched uranium, which—once recovered—can be used to make nuclear weapons. To further the nation's goal of nuclear nonproliferation, DOE, in consultation with the U.S. Department of State, has agreed to bring this spent nuclear fuel to the U.S. for storage and ultimately disposal.

⁴ The Standard Disposal Contract spells out procedures for resolving disputes between the parties to the contract, including those stemming from delays.

⁵ See Chapter 10 of the Code of Federal Regulations, Part 71.

⁶ See Chapter 49 of the Code of Federal Regulations, Parts 171–178 and Part 397, Subpart D.

⁷ See Chapter 10 of the Code of Federal Regulations, Part 73.

⁸ The study actually tracked the number of rail *casks* that would be required to ship spent nuclear fuel. Assuming most shipments would involve more than one cask, the actual number of rail shipments would be less than 9,421.

⁹ North Dakota and South Dakota are not expected to experience any shipments of spent nuclear fuel or high-level radioactive waste.

¹⁰ All discussions of routing in this *Guide* are based on two studies conducted by the State of Nevada: *High-Level Nuclear Waste Shipping Route Maps to Yucca Mountain and Shipment Number Estimates: Multi-Purpose Canister Base Case* (1995) and *The Transportation of Spent Nuclear Fuel and High-Level Waste: A Systematic Basis for Planning and Management at National, Regional, and Community Levels* (1996). Both reports assume Yucca Mountain, Nevada, as the destination. It should be noted, however, that Yucca Mountain *has not been selected* as the site of the permanent repository.