[T]WOMEY, LATHAM & SCHMITT
ATTORNEYS AT LAW
P. O. BOX 398
33 WEST SECOND STREET
RIVERHEAD, N. Y. 11901
516 727-2180

THOMAS A. TWOMEY, JR.
STEPHEN B. LATHAM
ZIG SCHMITT*
ROBERT D. PIKE
* ADMITTED IN N. Y. & FLA.

10 MAIN STREET
EAST HAMPTON, N. Y. 11937

February 8, 1980

Steven A. Varga
Chief Lightwater Reactors, Branch No. 4
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Varga:

I received a copy of the enclosed document from Richard Hand, special counsel to the County of Suffolk in the Shoreham Licensing Proceedings, Docket No. 50-322.

Our office represents a coalition of groups which have petitioned to intervene in this case, and the information requested in the enclosed document is of great interest to us. I would appreciate it if you would advise me whether answers to the enclosed questions have been provided, and if so, I would appreciate it if you would forward a copy of those answers to me at your earliest convenience.

Yours truly,

Steve Latham

Steve Latham

SL:lc

enc.

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JAN 29 1979

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JAN 23 1979

Docket No: 50-322

Long Island Lighting Company
ATTN: Mr. Andrew W. Wofford
Vice President
175 East Old Country Road
Hicksville, New York 11801

Gentlemen:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - SHOREHAM NUCLEAR POWER STATION

In order to complete our review of the Shoreham application, we require adequate responses to the enclosed requests for additional information. If you have any questions on this matter, please contact us.

Sincerely,

Steven A. Varga, Chief
Light Water Reactors Branch No. 4
Division of Project Management

Enclosure:
Request for Additional Information

cc: See next page

dupe
7902060075

JAN 2 3 1979

Long Island Lighting Company

Howard L. Blau
Blau and Cohn, P.C.
380 North Broadway
Jericho, New York 11753

Jeffrey Cohen, Esq.
Deputy Commissioner and Counsel
New York State Energy Office
Agency Building 2
Empire State Plaza
Albany, New York 12223

Energy Research Group, Inc.
400-1 Totten Pond Road
Waltham, Mass. 02154

Irving Like, Esq.
Reilly, Like and Schnieder
200 West Main Street
Babylong, New York 11702

J. P. Novarro
Project Manager
Shoreham Nuclear Power Station
P. O. Box 618
Wading River, New York 11792

W. Taylor Reveley, III, Esq.
Hunton & Williams
P. O. Box 1535
Richmond, VA 23212

Ralph Shapiro, Esq.
Cammer & Shapiro
No. 9 East 40th Street
New York, New York 10016

Edward J. Walsh, Esq.
General Attorney
Long Island Lighting Company
250 Old Country Road
Mineola, New York 11501

JAN 23 1979

SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. STN 50-322

REQUEST FOR ADDITIONAL FINANCIAL INFORMATION

1. a. Indicate the estimated annual cost by year to operate the subject facility for the first five full years of commercial operation. The types of costs included in the estimates should be indicated and include (but not necessarily be limited to) operation and maintenance expense (with fuel costs shown separately), depreciation, taxes and a reasonable return on investment. (Enclosed is a form which should be used for each year of the five year period.) Indicate the projected plant capacity of the unit for each of the above years.

   b. Indicate the unit price per kWh experienced by each applicant on system-wide sales of electric power to all customers for the most recent twelve month period.

2. Indicate the estimated costs of permanently shutting down the facility, stating what is included in such costs, the assumptions made in estimating the costs, the type of shutdown contemplated and the expected source of funds to cover these costs.

3. Provide an estimate of the annual cost to maintain the shutdown of the facility in a safe condition. Indicate what is included in the estimate, assumptions made in estimating costs and the expected source of funds to cover these costs.

4. a. Provide copies of the prospectus for the most recent security issue and copies of the most recent SEC Form 10-K. Provide copies of the preliminary prospectus for any pending security issue. Submit copies of the Annual Report to Stockholders each year as required by 10 CFR 50.71(b).

   b. Describe aspects of the applicant's regulatory environment including, but not necessarily limited to, the following: prescribed treatment of allowance for funds used during construction and construction work in progress; form of rate base (original cost, fair value, other); accounting for deferred income taxes and investment tax credits; fuel adjustment clauses in effect or proposed; historical; partially projected, or fully projected test year.

   c. Describe the nature and amount of the applicant's most recent rate relief action(s). In addition, indicate the nature and amount of any pending rate relief action(s). Use the attached form to provide this information. Provide copies of the submitted financially-related testimony and exhibits of the staff and company in the most recent rate relief action or pending action. Furnish copies of the hearing examiner's report and recommendation, and final opinion last issued with respect to each participant, including all financial exhibits referred therein.

d. Complete the enclosed form entitled, "Financial Statistics," for the most recently available period and the calendar years 1977, 1976 and 1975.

JAN 2 3 1979

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1 FOR THE CALENDAR YEAR 19__

(thousands of dollars)

Operation and maintenance expenses	
Nuclear power generation	
Nuclear fuel expense (plant factor ______%)	$______
Other operating expenses	______
Maintenance expenses	______
Total nuclear power generation	______
Transmission expenses	______
Administrative and general expenses	
Property and liability insurance	______
Other A.&G. expenses	______
Total A.&G. expenses	______
TOTAL O&M EXPENSES	______
Depreciation expense	______
Taxes other than income taxes	
Property taxes	______
Other	______
Total taxes other than income taxes	______
Income taxes - Federal	______
Income taxes - other	______
Deferred income taxes - net	______
Investment tax credit adjustments - net	______
Return (rate of return: ______%)	______
TOTAL ANNUAL COST OF OPERATION	$______

JAN 23 1979

ATTACHMENT FOR ITEM NO. 4.c.

RATE DEVELOPMENTS

	Electric	Gas	Steam
Granted			
Test year utilized			
Annual amount of revenue increase requested-test year basis (000's)			
Date petition filed			
Annual amount of revenue increase allowed-test year basis (000's)			
Percent increase in revenues allowed			
Date of final order			
Effective date			
Rate base finding (000's)			
Construction work in progress included in Rate base (000's)			
Rate of return on rate base authorized			
Rate of return on common equity authorized			
Revenue Effect (000's)			
Amount received in year granted			
Amount received in subsequent year (If not available, annualize amounts received in year granted)			
Pending Requests			
Test year utilized			
Amount (000's)			
Percent increase			
Date petition filed			
Date by which decision must be issued			
Rate of return on rate base requested			
Rate of return on common equity requested			
Amount of rate base requested			
Amount of construction work in progress requested for inclusion in rate base			

ATTACHMENT FOR ITEM NO. 4.d.
FINANCIAL STATISTICS

JAN 23 1979

	12 months' ended 1977	1976	1975
	(dollars in millions)		
Earnings available to common equity			
Average common equity			
Rate of return on average common equity			
Times total interest earned before FIT: Gross income (both including and excluding AFDC) + current and deferred FIT + total interest charges + amortization of debt discount and expense			
Times long-term interest earned before FIT: Gross income (both including and excluding AFDC) + current and deferred FIT + long-term interest charges + amortization of debt discount and expense			
Bond ratings (end of period)			
Standard and Poor's			
Moody's			
Times interest and preferred dividends earned after FIT: Gross income (both including and excluding AFDC) + total interest charges + amortization of debt discount and expense + preferred dividends.			
AFUDC			
Net income after preferred dividends			
%			
Market price of common			
Book value of common			
Market-book ratio (end of period)*			
Earnings avail. for common less AFDC + depreciation and amortization, deferred taxes, and invest. tax credit adjust.-deferred.			
Common dividends			
Ratio			
Short-term debt			
Bank loans			
Commercial paper			
Capitalization (Amount & Percent)			
Long-term debt			
Preferred stock			
Common equity			

* If subsidiary company, use parent's data.

federal register

Thursday
January 31, 1980

Part VII

Department of Transportation

Research and Special Programs Administration

Highway Routing of Radioactive Materials; Proposed Rulemaking

DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Parts 173 and 177

[Docket No. HM-164; Notice No. 80-1]

Highway Routing of Radioactive Materials

AGENCY: Materials Transportation Bureau (MTB), Research and Special Programs Administration, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This notice proposes to establish routing requirements to apply to carriers by highway of radioactive materials when placarding is required. General requirements would apply to all such carriers, and more specific requirements, concerning use of Interstate highways, written route plans, and driver training, would apply to carriers of large quantity packages (which would include commercial shipments of irradiated reactor fuel). Recent action by the Nuclear Regulatory Commission regarding physical security of irradiated reactor fuel offered for transportation by its licensees would be recognized and extended to all shippers of irradiated reactor fuel. Certain actions by State governments concerning radioactive materials routing by highway would be recognized. This proposal is intended to reduce the possibility of exposure and inadvertent releases in normal and accident situations in transportation, and to clarify the scope of permissible State and local action.

DATE: Comments must be received by May 31, 1980. Public hearings will be announced later.

ADDRESS: Comments should be addressed to: Dockets Branch, Materials ...portation Bureau, U.S. Department ...ation, Washington, D.C. ...uested that five copies be ...ckets ...y be reviewed in ... Street, S.W., W... ...ween 9 am and 5:30 p...

FOR FURTHER INFORMATION CONTACT: Marilyn E. Morris, Regulations Specialist, Standards Division, Office of Hazardous Materials Regulation, Room 8102, 400 Seventh Street, S.W., Washington, D.C. 20590, phone 202-426-2075.

SUPPLEMENTARY INFORMATION:

I. Historical Background

In 1976, truck shipments of irradiated reactor fuel (spent fuel) from Brookhaven Nationald Laboratories' Long Island facility were interdicted by an amendment to the New York City Health Code. The Health Code amendment had the practical effect of banning most commercial shipments of radioactive materials in or through the City. Associated Universities, Inc., which operates Brookhaven National Laboratories, asked DOT whether that ordinance was preempted by Federal transportation safety requirements issued under the Hazardous Materials Transportation Act (HMTA) (49 U.S.C. 1801 *et seq.*). On April 20, 1978, DOT published an Inconsistency Ruling (43 FR 16954) in which it viewed the City's Health Code amendment as an extreme routing requirement intended to protect the very dense urban population found inside the City. DOT concluded that the HMTA could preempt local requirements such as New York City had implemented, but because highway routing authority had not yet been exercised under the HMTA, the City's health code was not preempted by HMTA requirements.

A number of other State and local governments have either passed, or proposed, legislation that severly restricts transportation of certain radioactive materials through their jurisdictions. These actions do not seem to be based on the relative significance of previous accidents involving radioactive materials transportation. The information available to DOT through the Department's Hazardous Materials Incident Reporting System, to which carriers report incidents involving any release of a hazardous material in transportation, or any suspected radioactive contamination, indicates that radioactive materials transportation has a good safety record. In 1977 the DOT estimated that 2.5 million packages of radioactive materials were being transported by all modes yearly. This estimate closely approximates the 2.19 million packages reported in the study "Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes" (December 1977) (NUREG 0170) (p. 1-18) as being shipped in 1975. From 1971, when the reporting system was established, until August 1979, a total of 463 incident reports were received involving radioactive materials (0.5% of the total reports received). In comparison, approximately 45,000 incident reports were received which involve flammable liquids (51% of the total). Of the 463 reports filed since 1971 involving radioactive materials, 323 concerned highway transportation, and of this number approximately 275 were reports of minor or suspected contamination to the container and/or transport vehicle due to improperly prepared shipments. The more severe of the reported highway incidents involved vehicle accidents which resulted in packages of radioactive materials being burned, thrown from the vehicle, or rolled on by the vehicle. These events occurred in about 15% of the reported incidents. Examples of such incidents reported last year include:

(1) The January 10 collision near Morristown, Tennessee of a truck tractor and flat-bed trailer carrying 5 cylinders, each containing 6800 pounds of radioactive material fissile, n.o.s. (Uranium Hexafluoride UF_6) into the rear end of a tank truck. The crash resulted in the total loss of the truck power unit and personal injuries to the driver. The cylinders however, remained intact and the trailer sustained very limited damage. The load was returned to Oak Ridge, Tennessee using another power unit. No loss of contents or increased radiation levels were detected.

(2) A single vehicle accident on March 22 involving a truck tractor and enclosed semi-trailer carrying 54 steel drums of 55 gallon capacity, each containing approximately 810 pounds of Radioactive Material, LSA, n.o.s. (yellowcake). In this incident the vehicle was travelling on a portion of I-235 near Wichita, Kansas. The shoulder of the road was composed of soft dirt due to a recent excavation required for the construction of an interchange. Travelling at a speed of 50-52 MPH the right rear wheels went into the soft shoulder on the right side of the road. When the driver attempted to steer the truck back onto the road, the truck began to swerve to the left, overturned, and landed across the road on its right side. As a result of the accident, 51 drums came through the roof of the trailer and scattered as far as 100 yards from the truck in the direction the truck was initially travelling. About 1800 pounds of the 43,782 pounds of yellowcake was spilled. Cleanup operations and recovery of the yellowcake required 9 days to complete. This incident resulted in personal injuries to the driver but no radiological damage occurred to personnel and essentially none to the environment.

(3) The loss of a package of radiopharmaceuticals (radioactive yellow-III label) from the rear of a local delivery truck on August 16 onto a city street in Des Moines, Iowa. The package weighing 29 pounds consisted of a lead shielded generator (Molybdenum 99/Technetium 99) and glass vials of a

sterile saline solution. Extensive damage was incurred by the package from the wheels of passing motor vehicles resulting in the scattering of its contents. While several of the glass vials were broken the generator itself was not damaged to the point of releasing its contents, nor was there an increase in radiation levels.

None of these or any of the radioactive materials incidents reported to date resulted in radiological health consequences as severe as the consequences reported sometimes to result from the behavior of flammable liquids in transportation accidents. Nonetheless, it seems likely that State and local interest in radioactive materials transportation will continue. Reasons for this interest involve qualitative differences between transportation hazards posed by radioactive materials and transportation hazards posed by other materials.

Transportation accident risk and estimates of population doses from normal accident-free transportation for radioactive materials have been made in NUREG 0170 and in the preliminary report "Transport of Radionuclides in Urban Environs: A Working Draft Assessment" (May 1978, SAND77-1927) (Urban Environs Draft) (both documents are available for review in the public docket). Those estimated risks are within the magnitudes of other socially accepted risks, such as evidenced in highway traffic fatality rates.

Public concern with radioactive materials transportation, however, is more profound than those estimates would suggest is justified. In part this concern reflects the distinction between risks which are likely to be concentrated and similar risks spread over differing times and locations. The annual death rate from passenger car accidents, for example, usually is perceived as less catastrophic than major aircraft accidents, although far more people die in automobile accidents. This distinction may reflect the perceived limits of society to deal with catastrophic occurrences.

Discomfort from a lack of public familiarity with radiation hazards also increases the likelihood of local responses to radioactive materials transportation risks. Accident risk, for example, may be expressed in such unfamiliar terms as numbers of latent cancer fatalities, early deaths or morbidities, and genetic effects. Unlike other hazardous materials, radioactive materials present an impact during accident-free, or normal, transportation. This impact, called normal dose, results from the fact that under normal circumstances, some small amounts of radiation penetrate the outer surfaces of most packages of radioactive materials. Normal dose is very small, but it is statistically significant in terms of the overall impacts that result from radioactive materials transportation.

Radiation hazards themselves are comprised of a number of phenomena. A radioactive material may be solid, liquid, or gaseous, and thus may or may not easily be dispersed in a transportation accident. A radioactive material may be ingested or absorbed selectively and retained in plant, animal, and human tissues for varying lengths of time due to the basic chemical and physical characteristics of the different radioactive materials as well as the nature of the tissues. A person also can be exposed to radiation by being near an exposed radiation source. Radiation ordinarily cannot be detected except by instrumentation, unlike the well understood flammability hazard of such materials as gasoline.

Radiation health effects are not widely understood but include genetic effects and latent cancer, conditions which may not be mainfested until many years after exposure (which may not be recognized at the time it occurs). A thorough understanding of radiation and its known health effects requires a significant degree of technical knowledge. Other materials possess similar hazards, but the combination of these characteristics in the case of radioactive materials has produced a degree of public concern which has affected actions taken or being considered by State and local governments.

II. Discussion of Public Comments

In August 1978, DOT issued an advance notice of proposed rulemaking (43 FR 36492, August 17, 1978) opening this docket and asking for public comment to assist in deciding whether rules to govern highway routing of radioactive materials should be developed and proposed, and if so, what the rules should say. The advance notice did not propose any action but asked for comment on whether any action should be taken by DOT. Over 550 comments were received, falling principally into six groups.

A. Individuals: Public Interest and Environmental Organizations

This group comprises almost 70% of all comments received and falls into two subgroups:

(1) Individuals and organizations opposed to the transportation of nuclear materials or Federal involvement in local affairs. These commenters made two major points: local laws which are stricter than Federal regulations should be allowed to stand, and radioactive materials, particularly spent fuel, are inherently dangerous and should not be transported through heavily populated areas. One commenter urged MTB to adopt a full licensing scheme to apply to shipments involving a large number of curies (a unit of radioactivity) with an expressly reserved right in State and local governments to impose stricter standards. This commenter suggested banning large curie shipments from urban areas with population densities above 10,000 persons per square mile.

(2) Individuals and organizations favoring wider Federal preemption of State and local laws. These commenters stressed the excellent transportation safety record of radioactive materials and urged that additional requirements not be imposed. Many commenters in this group asked MTB to adopt a general routing rule which would specifically preempt unnecessary local restrictions that impede commerce.

B. State Governments and Political Subdivisions

Views were expressed by approximately 19 States, 7 counties and 10 cities or towns. Several States endorsed existing DOT requirements and supported a general routing rule such as that found at 49 CFR 397.9(a). Most commenting States appear to favor a general routing rule with provision for some State input. Most States also appear to be interested in obtaining more information on the types, quantities, and forms of radioactive materials shipped, and the routes actually used. Local governments, on the other hand, generally opposed any type of Federal interference with local laws and ordinances. Commenters from both urban and rural counties, as well as from cities, generally opposed transportation of radioactive materials through their jurisdictions.

C. Motor Carrier Industry

Commenters in the motor carrier industry were concerned with inconsistent State and local laws. The American Trucking Associations, Inc., (ATA) suggested that MTB establish a general routing rule which would give carriers some degree of flexibility within certain guidelines to use their own discretion over choice of routes. To provide for State input, ATA suggested that MTB prioritize highways for routing purposes by characteristics that States could use in determining specific routes within their jurisdictions. ATA also suggested the use of a "circuity limit" to establish maximum rerouting distances that could be required by States under this scheme. Finally, ATA states that any such routing requirements should be keyed to vehicles carrying sufficient amounts of radioactive materials to require placarding. (When certain amounts of any hazardous material are carried in a motor vehicle, DOT requires that a placard, or warning sign, be affixed to the vehicle. For radioactive materials, the placard bears the word "RADIOACTIVE" and an appropriate symbol.)

D. Shippers of "Low-Level" Radioactive Materials and Other Hazardous Materials

This group includes commenters representing manufacturers, users, and shippers of radiopharmaceuticals, medical and industrial isotopes, and other "low hazard" radioactive materials. It also includes shippers concerned with possible future routing controls on other hazardous materials (a matter beyond the scope of this docket). These commenters generally saw little reason to impose more stringent rules, but felt that if such rules were to be imposed, low-level radioactive materials should be excepted because of their time-critical nature (many medical radioisotopes lose their radioactivity over a relatively short period of time), low transport hazard, and medical/research value. Suggestions ranged from excepting all Type A quantity (from 0.001 to 1,000 curies of material per package, depending on the material) and limited quantity packages (small amounts otherwise generally excepted from DOT specification packaging, marking and labeling requirements) to excepting all non-placarded shipments.

E. Shippers of Large Quantity or "High-Level" Radioactive Materials

This group primarily includes shippers or shipper organizations associated with the nuclear power industry. Although there were only nine commenters in this category, one commenter represented 24 electric utility companies which are operating 39 nuclear power generators and planning the construction of 61 new generators. This commenter maintained that routing controls applying only to radioactive materials cannot be justified on the basis of safety alone, but that the proliferation of local restrictions on transportation justify the imposition by MTB of a general routing requirement to preempt State and local requirements. One commenter suggested a general rule that would require avoidance of heavily populated areas when possible, would provide for "voluntary licensing" of carriers for specific routes, and would permit State and local governments to seek an order from MTB prohibiting transportation of certain radioactive materials over specific routes.

F. Bridge and Turnpike Authorities

Comments were received from bridge and turnpike authorities, and from the International Bridge, Tunnel and Turnpike Association. These commenters expressed concern that their facilities might become part of a "designated hazardous materials route" established by MTB and pointed out that such action might raise their insurance rates.

III. Regulatory Background

A. Synopsis of Proposed Rule

The proposal presented in this publication would establish a general rule which would apply to any motor vehicle carrying radioactive materials requiring placarding. The general rule would require such a vehicle to be operated on a route that presents a risk to the fewest persons unless there is not any practicable alternative highway route available or unless it is operated on a "preferred" highway as subsequently defined. Subject to this provision, the motor vehicle would have to be operated on a route which minimizes transit times, so as to minimize unnecessary exposure. The carrier would be responsible for notifying the driver of the presence of radioactive materials in the shipment and for indicating generally the route to be followed.

A second, additional and more specific rule would apply to any motor vehicle transporting a package containing a large quantity of radioactive materials, as defined by existing DOT regulations. Such a motor vehicle would be required to operate on "preferred" highways, defined as any highway approved for that purpose by an appropriate State agency, and any Interstate highway for which an equivalent substitute has not been provided by such State agency. The vehicle would operate in accordance with a written route plan prepared by the carrier before departure. State agencies could designate preferred highways, after consultation with local jurisdictions, based on the policy of an overall minimization of radiological and nonradiological impacts of both normal transportation and transportation accidents. When necessary, a motor vehicle containing a large quantity of radioactive materials could operate away from preferred highways under the provisions of the general rule. The driver of a motor vehicle containing a large quantity package would be required to receive specific training.

Each shipper of a large quantity package would be provided by the carrier with a copy of the written route plan, which the shipper would file with MTB (except for irradiated reactor fuel covered by NRC requirements). The filed route plans would be used by MTB to provide data on routes, amounts and shipment frequencies for use in State and local emergency response planning. Information on the movements of irradiated reactor fuel would be available after the MTB received this information from the NRC.

The specific large quantity rule would require use of an Interstate urban circumferential or bypass route to avoid cities if available, instead of an Interstate through route, notwithstanding a minor transit time increase. For cities with Interstate through routes without Interstate circumferential or bypass routes, a State could designate any available circumferential or bypass route if it is essentially equivalent in performance or design to an Interstate circumferential or bypass situated in some other urban location.

B. Existing DOT Requirements for Transport of Radioactive Materials

This document focuses on routing and related operational controls for highway transportation of radioactive materials. Existing provisions in the DOT Hazardous Materials Regulations address required packaging and related transportation controls, which constitute the primary safety measures in radioactive materials transportation. A brief summary of those existing rules follows.

Packaging for radioactive materials transportation is based on amount, kind, and physical form of the radioactive material to be transported. Each radionuclide is assigned to a Transport Group, of which there are seven that are ordered to reflect the various radionuclides' degree of radiotoxicity and relative hazard in transportation. For each Transport Group, two quantity limits are established which define Type A and Type B quantities, for which Type A and Type B packaging then is prescribed. If the radionuclide is in "special form" rather than "normal form", quantity limits for Type A and B quantities are larger, because materials in special form are difficult to disperse, either because of the inherent properties of the materials (such as a solid metal) or because the materials are specially prepared (as through encapsulation).

In most cases, a warning label must be applied to each package of radioactive material. The kind of label required depends on the radiation dose rate at or near the surface of the package. The dose rate, in turn, is determined by the type of packaging and shielding used within the package, and by the type and quantity of radionuclides present in the package. There are three labels which may appear on a package of radioactive materials: White I, Yellow II, and Yellow III. The amount of surface radiation allowed for each type of label is identified subsequently in the discussion of radioactive materials covered by this rulemaking. It is sufficient to state here that any vehicle which carries a package labeled Yellow III must show the radioactive material placard on all four sides of the transport vehicle. In addition, all vehicles which carry Fissile Class 3 (certain fissile radioactive materials which require special transportation arrangements for that reason) and large quantity packages must be placarded regardless of the dose rate of the package.

Three other terms that affect packaging are "limited quantity", "low specific activity" (LSA), and "large quantity". Limited quantities of radioactive materials are small amounts, such as may be found in certain manufactured articles (instruments, electronic tubes). Limited quantities of the various radionuclides also are defined generally by an activity limit in millicuries or curies associated with each Transport Group. Such amounts are excepted from many transportation controls, such as requirements for specification packaging, marking of the shipping name on the package, and labeling the package for a radiation hazard.

LSA materials are materials that contain very little radioactivity per unit weight. Uranium ore, for example, may be shipped as LSA. These materials frequently are shipped in large volume shipments and are transported in Type A packaging unless moved in an exclusive use vehicle (*i.e.*, where a single shipper alone uses the vehicle and all loading and unloading occurs under the direction of the shipper or the consignee, a practice through which larger shipments are permitted).

"Large quantity" amounts of radioactive materials are defined by Transport Group and vary from a minimum of 20 or more curies (for materials such as plutonium, Transport Group I) to 5,000 or more curies (certain radioactive gases, Transport Groups VI and VII). Large quantity amounts must be shipped in Type B packaging, most of which require approval for that purpose, prior to use, by the Nuclear Regulatory Commission.

The distinction between Type A packaging and Type B packaging is significant. In addition to having adequate radiation shielding, Type A packaging is designed to withstand normal transportation conditions as simulated by tests described in the Hazardous Materials Regulations: exposure to the equivalent of extreme climatic conditions; and drop, penetration, compression and vibration tests representing other conditions encountered in normal transportation. Type B packaging, on the other hand, often must be heavily shielded and is designed to withstand extreme accident conditions as simulated by a 30-foot drop onto an unyielding surface; a 40-inch drop onto the end of a pointed steel bar; exposure to a temperature or fire of 1,475° F. for 30 minutes; and submersion in three feet of water for eight hours.

In the vast majority of possible accidents experimental work has indicated that in the event of an accident a release of 0.1 percent of the contents would be a reasonable assumption for Type A packages. On the basis of general handling experience it is further assumed that the actual intake of radioactive material into the body by a person coming into contact with air or surfaces contaminated by such a release is unlikely to exceed 0.1 percent of the amount released from the package. Thus, it is unlikely that any one person would ingest more than one-millionth of the maximum allowable package contents in the event of an accidental release. Stated differently the Type A package quantity limitations are such that an intake of one-millionth of the maximum allowable package contents would not result in a radiation dose to any organ in the body exceeding internationally accepted limits; nor a radiation level of 1 rem per hour at 10 feet from the unshielded contents.

Type B packaging, in a severe transportation accident, would be expected to survive without any significant release of its contents. Spent fuel assemblies, for example, are shipped by highway as large quantity shipments in massive packagings (casks) that may be five in diameter, fifteen feet long and weigh up to 35 tons. Casks are practically impervious to small-arms fire and small explosive charges.

In a highway accident near Oak Ridge, Tennessee, on December 8, 1970, a spent fuel cask was thrown more than 100 feet when a truck driver while negotiating a wide turn lost control after swerving to avoid another vehicle. Although the driver was killed in the impact, there was no release of spent fuel or increase in radiation. Spent fuel casks of an earlier design also have been subjected to destructive testing simulating severe, high speed highway and rail accidents. The casks survived with only minor damage that would have posed little or no risk to the public if the events had been real rather than simulated.

Associated with irradiated fuel and present during its transportation by highway are certain decay gases and volatile fission products along with the essentially solid materials. Given a set of circumstances in which the cask is subjected to extreme crushing forces of 200,000 pounds and a subsequent fire of 1875° F. for 2 hours duration, estimates have been made of the resulting radiological consequences. In Section 5-6 of NUREG 0170 some of these "worst-case" shipment scenarios were considered. One such hypothetical case involves a shipment of spent fuel being transported through a high-density urban area (15,444 people per square kilometer). It was hypothesized that if such an incident were to occur, 100% of the gaseous and volatile materials would be released as an aerosol and then dispersed into the atmosphere where wind currents and other weather conditions would influence both the area and degree of radioactive contamination. Under these particular circumstances it is estimated that the contaminated area would require evacuation for 10 days and the cost of clean-up, lost incomes and temporary living expenses would amount to $200 million (1975). Radiological health consequences are estimated to be minimal with no early or latent cancer fatalities. While an event such as this is likely to occur only once in 3 billion years, the data is significant when weighing its risk against other risk levels which are determined to be acceptable. Extreme incidents which involve the release of as little as 1% of the solids as an aerosol would have extremely serious consequences. Such an incident, however, is likely only once in 25 billion years and is thought by MTB not to warrant undue concern. A more typical high speed collision and fire in a highway accident is not likely to result in extensive radiological injuries or damage from the presence of either Type A, Type B or large quantity packages of radioactive materials.

C. Normal and Accident Exposure Resulting From Transport of Radioactive Materials

This proposal was developed after consideration of impacts from both transportation accidents and accident-free (normal) transportation. Accident risk includes both radiological risks and nonradiological risks (such as impact damage in a motor vehicle collision). Normal transportation is considered principally from the radiological standpoint of normal population dose. Nonradiological impacts of normal transportation are considered secondarily and largely consist of the costs associated with motor vehicle operation (such as fuel use).

Normal dose is the amount of radiation exposure received generally by persons who come near packages of radioactive materials during accident-free transportation, such as package handlers, truck crews, pedestrians and other passers-by. Normal dose usually is expressed in terms of rems (Roentgen Equivalent in Man, a measure of biological damage from radiation) or units thereof. The term "person-rem" is used to express total (integrated) population dose. The normal dose from a package of radioactive materials is dependent upon the amount of radiation emitted through the package surfaces, which is described by the Transport Index (usually a measure of radiation at three feet from the package surface). Essentially all packages of radioactive materials, from small Type A packages to spent fuel casks, emit at least small amounts of radiation even when in compliance with all Federal packaging requirements. The amount of radiation exposure received by the population as normal dose is proportional to the time during which exposure occurs. It declines at least geometrically with distance from the package. A longer trip means a longer period of exposure which results in greater normal doses to truck crews (drivers) and also may mean greater doses to the surrounding population. In highway transportation, the dose received by the truck crew is the largest single component of normal dose that can be changed by modifying transportation practices. The health effects discussed in this publication are those predicted by a health effects model used in NUREG 0170. Commenters wishing to address the validity and degree of certainty associated with that health effects model will find a brief discussion in NUREG 0170 on p. 3–11.

In NUREG 0170, the impact of normal dose from radioactive materials transportation is summed up in the following way for all modes of transportation.

> The estimated total annual population dose [from radioactive materials transportation] is 9,790 person-rem in 1975 and 28,400 person-rem in 1985. This dose has the same general characteristics as other chronic exposures to radiation such as natural background. The predicted result of public exposure to this radiation is approximately 1.19 latent cancer fatalities and 1.7 genetic effects in 1975 and 3.08 latent cancer fatalities and 4.4 genetic [effects] in 1985. When the value of 9,790 person-rem may seem large, it is small when compared with the [forty million] person-rem received by the total U.S. population in the form of natural background radiation . . . [T]he average annual individual dose [from radioactive materials transportation] is approximately 0.5 [millirem], which is a factor of 300 below the average individual dose from background radiation. [p. 4–49]

Total accident risk is an estimate that combines both the chance that an accident will occur and the probable consequences if it does. Total risk sums both radiological consequences and nonradiological consequences. Accident risk from radiological hazards depends on a variety of factors, but principally on the severity and rates of accidents on the roads traveled (other factors contribute to the accident probability, such as driver training and vehicle condition) and on the density and proximity of the population along the route. All else being equal, unsafe highways, long trips and dense populations near the highways result in higher accident risks. Accident risk also includes the nonradiological hazards, such as the injuries and damage that may be realized in any motor vehicle accident. Nonradiological accident risks generally appear to be much greater than radiological accident risks, but the prediction of radiological accident risks involves more variables than nonradiological accident risks and therefore is less confident.

Regarding radiological risk from potential transportation accidents in all modes of transportation, NUREG 0170 estimates that:

> The accident risk for the 1975 level of shipping activity . . . is very small: roughly 0.005 additional [latent cancer fatalities] per year, or one additional [latent cancer fatality] every 200 years, plus an equal number of genetic effects. This number of [latent cancer fatalities] is only 0.3% of those resulting from normal transport population exposures.
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> * * * * *
>
> The projected accident risk in 1985 is . . . about 3.5 times the 1975 risk, but is still very small in comparison to the [latent cancer fatalities] resulting from normal transport.
>
> * * * * *
>
> The principal nonradiological impacts are those injuries and fatalities resulting from accidents involving vehicles used exclusively for the transport of radioactive materials. The number of expected annual nonradiological fatalities [in 1975] is almost 50 times greater than the expected number of additional [latent cancer fatalities] resulting from radiological causes [in transportation accidents] but is less than one fatality every five years. [pp. 5–52, 53]

D. Related Factors Affecting Route Selection Under Proposal

In view of statistics showing lower accident rates and reduced travel times in travel on interstate highways, this proposal favors use of the Interstate System. MTB believes that in most cases this policy will produce the most significant transportation safety impact reduction and it offers a clear standard for compliance and enforcement purposes. However, the policy is modified by two other considerations which should be kept in mind by persons reviewing this proposal.

First, for reasons of cargo security discussed later in this document, the Nuclear Regulatory Commission (NRC) recently established interim physical security rules (44 FR 34466, June 15, 1979) for transportation of irradiated reactor fuel (spent fuel). Those rules include the following requirements for NRC licensees who ship spent fuel:

(a) Advance notice to and approval from the NRC for each shipment of spent fuel.

(b) Advance arrangements with law enforcement agencies along the route for emergency assistance.

(c) Use of routes that avoid heavily populated areas where practicable, and additional protective measures approved by the NRC where that is not possible.

(d) A trained escort accompanying each shipment.

(e) Motor vehicles that are equipped with radiotelephone and CB radio communications equipment and that are capable of being immobilized.

(f) Procedures for coping with threats and physical security emergencies.

The security of spent fuel in transit was a major concern to commenters in the 1978 hearing on the advance notice of proposed rulemaking in this docket and in the hearing in 1977 regarding the inconsistency ruling on the New York City Health Code amendment. Development of the current DOT proposal reflects existing arrangements between DOT and NRC wherein NRC exercises responsibility for any necessary physical security requirements during transportation. The DOT proposal is therefore directed at reducing impacts associated with normal and accident situations arising in transportation, while NRC is concerned with preventing malicious or deliberate release of radioactive materials. The DOT proposal, however, would extend the NRC physical security requirements to nonlicensee shippers, such as the Department of Energy.

Second, the proposal acknowledges that some local conditions may justify special routes for shipments of large quantity packages. One such condition is expressly recognized in the proposal and concerns cities which have an Interstate direct route and an Interstate (or equivalent) circumferential or bypass route. The proposal also provides for State action to establish or modify routes for carriers of large quantity packages.

The benefit of routing that avoids cities, or heavily populated areas generally, is difficult to predict, but involves a trade-off between the increased impacts due to longer shipment distances and the decreased impacts due to avoiding dense populations. Avoidance of heavily populated areas is a requirement that currently applies to all shipments of hazardous materials by motor vehicle if the amounts are sufficient to require placarding:

Unless there is no practicable alternative, a motor vehicle which contains hazardous materials must be operated over routes which do not go through or near heavily populated areas, places were crowds are assembled, tunnels, narrow streets, or alleys. Operating convenience is not a basis for determining whether it is practicable to operate a motor vehicle in accordance with this paragraph. [49 CFR 397.9(a)].

Requiring motor vehicles to avoid heavily populated areas usually will increase trip distance and travel time. For the transportation of radioactive materials, under some circumstances those increases can result in an increased normal dose. If use of less safe highways or increased travel times are necessary to avoid heavily populated areas, accident risk also may be increased. The extent of the safety benefit that might result from motor vehicles avoiding heavily populated areas (such as a possible decrease in normal dose or in accident consequences) is influenced by factors such as differences in population densities, effectiveness of local emergency planning, physical features and weather conditions along the various routes that might be used and the times and days they are used. These factors are site-specific and hard to generalize on a national scale except on a statistical basis.

Some generalizations, however, can be made. Because of their lower accident rates and greater efficiency, use of Interstate highways usually will result in fewer accidents and in reduced travel times. Given equivalent roadways, routing radioactive materials carriers on longer Interstate circumferential roads, with adjoining populations that are less dense than those adjoining a shorter Interstate through route, usually will increase normal truck crew dose and the probability of an accident but usually will decrease total normal dose and accident consequences. The possible reduction in radiological accident consequences in such a situation depends on variable factors including population distribution in the area and meteorological conditions which can affect the movement of airborne debris.

Differences exist between Interstate routes through and around a city. A circumferential Interstate route may have a higher average speed and lower accident rate than an Interstate through route, but the accidents may be more severe. Because of the cost and availability of land, and greater access requirements, the design standards of some urban freeways may be less than optimal and possibly less than those of a suburban circumferential Interstate highway. Data from NUREG 0170 and recent traffic accident statistics indicate that routing to avoid cities may offer a slight reduction in overall radiological risk, but at the probable expense of a greater number of fatalities and injuries resulting from an increase in traffic accidents associated with increased distances. However, even though the resultant increase in nonradiological fatalities appears to be larger than the decrease in radiological fatalities anticipated, the difference is small in terms of absolute numbers (a difference of possibly one fatality every 100 years at 1985 levels of shipping activity). There also is necessarily more uncertainty in the prediction of radiological consequences from transportation than in the prediction of traffic fatalities, due to the number of variables involved, so a conservative approach also suggests circumferential routing.

There also are sound administrative reasons to require that Interstate circumferential and bypass routes be used. Circumferential routing around cities is more consistent than direct routing with requirements that apply to other hazardous materials transported by highway (49 CFR 397.9(a)).

The proposed required use of circumferential routes by large quantity carriers, however, is predicated on the safety and efficiency of transportation on Interstate highways. Where other highways are designated to establish an urban circumferential route, they should offer the same advantages as comparable Interstate circumferentials. For the designation of preferred highways other than urban circumferentials, the proposal would assume an evaluation of all factors pertinent to reducing the impacts of highway transportation of radioactive materials, rather than the abbreviated method of relying on the similarity of the perferred routes to Interstate highways. State action is more fully discussed later in this document.

From a regulatory standpoint, consideration must be given to the need for requirements which are efficient and comprehensible, which encourage compliance and which can be enforced. The term "heavily populated areas", not used in the proposal, is disfavored for this reason. Instead, an attempt has been made to state the routing factors which would be used for placarded vehicles, and to state that the carrier would be responsible for acting to ensure those factors are observed in the operation of its motor vehicles. MTB also must consider the extent to which State and local site-specific participation can be useful in establishing or modifying routes used by highway carriers of radioactive materials.

IV. Analysis of Proposed Rule

A. Radioactive Materials Subject to Routing Requirements

The proposal in this notice is based on the type of radioactive material shipped and the quantity (activity) per shipment. Essentially there are three transportation situations that would require different treatment under this proposal (see table "Examples of Radioactive Materials Under Proposal"):

(1) Packages for which the carrier is not required to placard his vehicle would be excepted from any routing restrictions. These packages comprise the majority of all radioactive materials shipped and include packages excepted from labeling or bearing the White I or Yellow II radioactive material label as a result of a relatively low radiation dose rate at or near the package surface (see CFR 172.403). A package is excepted from labeling under certain conditions if it contains limited quantities of radionuclides (identified in 49 CFR 173.391(a)), manufactured articles (clocks, smoke detectors, or electronic tubes) which contain limited quantities of radioactive materials, or certain other manufactured articles (identified in 49 CFR 173.391(c)). Also excluded from labeling are some low specific activity (LSA) radioactive materials when shipped in an exclusive use motor vehicle (see 49 CFR 173.392).

A radioactive White I label is required on all other packages which have a dose rate measuring up to 0.5 millirem per hour at any point on the external surface of the package (excluding Fissile Class II.

or III or large quantity radioactive materials). A radioactive Yellow II label is required on any package measuring more than 0.5 millirems but not more than 50 millirems per hour at any point on the external surface of the package, and not exceeding one millirem per hour at three feet from any point on the external surface of the package, (*i.e.*, the Transport Index may never exceed 1.0 for these packages). A wide range of radioactive materials thus would be excepted from any routing requirement since they are either excepted from labeling or carry the White I or Yellow II label and thus are excepted from placarding.

(2) Packages for which placarding is required would be subject to a general routing requirement. This category of packages includes those requiring a Yellow III label or containing Fissile Class III materials or a large quantity of radioactive material. Also, any package which measures more than 50 millirem per hour at any point on the package surface or which exceeds one millirem per hour at three feet from any point on the external surface of the package (*i.e.*, the Transport Index is greater than 1.0; see 49 CFR 173.389(i)) requires placarding. The proposal would require all such packages, if not transported on an Interstate or specially designated highway, to be transported so as primarily to risk exposure to the least number of people and secondarily to minimize travel times.

Many commercial shipments of radioactive materials fall within this category. For example, many medical-use shipments, both Type A and B quantities, require a Yellow III label and must be placarded. Medical isotopes used for scanning procedures in hospitals such as Tc-99M, Au-198 or I-131 are occasionally packaged such that the Transport Index exceeds 1.0. Isotopes used for teletherapy and medical research such as Co-60 and Cs-137 usually require a Yellow III label. Many industrial-use shipments would also fall into this category. Isotopes such as americium, berylium, Cs-137, and Kr-85 are used by the well-logging industry to determine properties of rock formations. Ir-192 and Co-60 are used in radiography to measure structural integrity of welded joints. Isotopes which are used in industrial gauging devices include Ra-226, Sr-90, Am-241 and others. Many of these industrial isotopes would require a Yellow III label when packaged according to accepted practice.

In short, radioactive materials subject to the general routing requirement in proposed § 177.825(a) include any packaged radionuclide, regardless of quantity, which has a Transport Index of 1.0 or greater.

(3) Shipments of packages containing a large quantity of radioactive materials (defined at 49 CFR 173.389(b)), including spent fuel, would be subject to additional Federally imposed restrictions as well as the possibility of Federally recognized State restrictions. This category includes the most toxic radionuclides, which are found in Transport Groups I and II, when shipped in quantities over 20 curies per package as well as larger quantities in the other Transport Groups. Included in Transport Groups I and II are many shipments of nuclear fuel cycle material, plutonium, polonium, mixed fission products, some isotopes of uranium, and certain commonly shipped isotopes such as Am-241, Ra-226, and Sr-90. A large number of shipments of materials in the first two Transport Groups are already subject to stringent physical security requirements during transportation established by the NRC. Special nuclear materials, potential theft targets which include many shipments of plutonium and the uranium isotopes U-233 and U-235, as well as spend fuel, a possible terrorist target, when shipped by NRC licensees are subject to the physical security requirements in 10 CFR Part 73.

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EXAMPLES OF RADIOACTIVE MATERIALS UNDER PROPOSAL

Radioactive Materials Not Subject to Proposal	Radioactive Materials Subject to General Rule	Radioactive Materials Subject to Additional Restrictions
Shipments for which carrier not required to placard vehicle	Shipments which require carrier to placard vehicle-any Type A or Type B package with radiation levels such that Yellow III label required	Shipments which include any Large quantity package
1. Packages excepted from labelling	1. Medical and research use isotopes	1. Over 20 curies of most toxic radionuclides - Transport Groups I and II
-Smoke detectors -Clocks -Manufactured articles -Very small quantities of radionuclides	-Mo-99, Au-198, and I-131 used for scanning procedures -Small source Co-60 and Cs-137 for research activities	-Americium -Plutonium 1/ -Polonium -Spent reactor fuel 1/
2. Packages with either White I or Yellow II label	2. Industrial use isotopes	2. Any other radionuclide depending on the number of curies in package
-Most radiopharmaceuticals used in hospitals	-Ir-192 and Co-60 used for radiography -Cs-137 and Kr-85 used in well-logging industry -Ra-226, Sr-90 and Am-241 used for industrial gauging devices	No. of Curies -Transport Group III - over 200 -Transport Group IV - over 200 -Transport Group V - over 5,000 -Transport Group VI-VII - over 50,000 -Special Form - over 5,000 -Example - Large source (10,000 curies) Co-60 used for teletherapy or large source Cs-137 (100,000 curies) used for medical research
3. Low Specific Activity (LSA) in Exclusive Use Vehicles	3. Low level radioactive wastes	
-Limited to uranium ores and thorium ores unconcentrated	-Packaged LSA in exclusive use vehicles	

1/ Subject also to NRC physical security requirements in 10 CFR Part 73

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B. General Routing Requirement

The general routing scheme contained in proposed § 177.825(a) would require placarded vehicles carrying radioactive materials first to avoid areas posing hazards to large numbers of people and as a subordinate consideration to operate over routes selected to reduce time in transit. Consideration of "time in transit" includes a prudent evaluation of delays that may result from potential occurrences such as anticipated bad weather. Either of two exceptions permit variance from the condition that selected routes avoid population exposure: (1) when a practicable alternative highway route is not available, or (2) when the motor vehicle is operated on preferred highways under conditions set out in proposed § 177.825(b)(1). The criteria for determining when a "practicable alternative" highway route is not available are the same as those considered to apply under the existing hazardous materials routing rule in 49 CFR 397.9(a): operating necessity and safety. Operating necessity includes such factors as access to origin and destination points, and necessary fuel and repair stops. Safety includes considerations such as adverse weather and roadway conditions, but does not include travel time which is subordinate to the requirement to avoid population exposure. In no case is the operating convenience of the carrier a valid consideration. The second exception from the requirement relies on motor vehicle operation over routes that are intended for large quantity shipments under proposed § 177.825(b).

The requirement that transit time be minimized poses particular problems in multiple stop operations. This is because the number of possible routes between any two points and the number of possible sequential combinations of various stops theoretically can be a very large number. Consequently, for purposes of compliance with the proposed rule, it would be sufficient that a motor vehicle operator choose only the probable quickest route to his next stop, although any more efficient method of selecting routes to reduce transit time may be used.

The proposed general rule would apply only to motor vehicles which are required to be placarded. There are three reasons for this choice. First, hazardous materials placards are highly visible and easily observed by Federal, State and local enforcement authorities. Second, placarding itself is not required for most radiopharmaceuticals, industrial isotopes and other low-hazard radioactive materials. These materials are shipped in large numbers of packages and may be manufactured as well as used in the same urban area. They would be extremely difficult to control by routing requirements. Third, the existing routing rule in 49 CFR 397.9(a) applies to placarded motor vehicles. Carriers as well as enforcement authorities are familiar with the existing connection between placarding and routing control, a fact that should improve initial compliance with any final rules issued in this docket.

Commenters have suggested that cities with a population density of 10,000 to 12,000 persons or more per square mile should be avoided by radioactive materials carriers. The MTB has not used the term "heavily populated area". It does not appear practical to define it as a function of population densities or absolute population figures. The term is vague and its purpose difficult to enforce. In its interim rule on physical security of spent fuel, NRC uses census figures which are publicly available. That program, however, involves specific route approval from NRC for security reasons, which MTB does not consider justified in dealing with normal exposure and the possibility of accidents. A route restriction for placarded highway carriers based on a specific population figure would require an easily accessible, authoritative and highly detailed source of population information. Census figures usually are based on political boundaries, total populations, and total land areas. These figures do not distinguish uneven population distributions within a particular jurisdiction. Use of total jurisdictional figures (or population density figures averaged over a given jurisdiction) may result in unnecessary avoidance of entire jurisdictions or permitted transit through localized areas of high population density within a jurisdiction.

The proposal would require the carrier to affirmatively ensure that routes are selected to minimize the number of persons that may be exposed to a radiological risk. This is the basic goal to which any prohibition of travel in heavily populated areas would aim. Further comment on this is welcome.

C. Special Restrictions on Shipments of Large Quantities, Such as Spent Fuel Shipments

The large quantity package has been selected as the cutoff point for additional requirements presented in this proposal concerning required use of preferred highways, route plans and driver training. MTB recognizes that a substantial argument can be made for choosing some other cutoff point or for not using any such distinction at all, particularly in light of the NUREG 0170 estimates that for all modes of transportation, large quantity packages account for only about 2% of the normal population dose and 37% of the latent cancer fatalities expected to result from transportation accidents (1985 projection, NUREG 0170, pp. 4–44, 5–34). However, large quantity packages generally travel 30% to 50% farther per shipment than Type B and Type A packages (NUREG 0170, p. A–13). Large quantity packages are estimated to have comprised about 378 out of a total of 1.3 million packages of radioactive materials shipped by truck in 1975. NUREG 0170 projects that 1,911 large quantity packages will be shipped in 1985 out of a total of 3.5 million radioacitve materials packages shipped by truck (pp. A–11, A–21, 22), although an estimate of 600 large quantity packages would reflect reduced spent fuel shipments and absence of recycled plutonium shipments in the NUREG 0170 model for 1985. However, it is quite possible that the estimates for large quantity shipments for both years may be several times the stated estimates, due to the manner in which the information was gathered.

Of all the radioactive materials packages shipped, only large quantity packages pose even a remote risk of extraordinary or catastrophic accident consequences. Requiring specified routes for large quantity packages would add to the public certainty as to the location and nature of these unusual risks and permit more rational emergency response planning for remote events that nonetheless may require substantial planning efforts.

MTB thinks that the hazards associated with other than large quantity packages do not warrant requiring them to be routed on preferred highways (Interstate and State-designated highways) and that the enforcement, compliance and possibly economic costs of such a requirement could be substantial. By not requiring all placarded motor vehicles to operate on preferred highways, the proposed general rule acknowledges the pronounced differences between large quantity shipments and other placarded shipments, the fact that the annual volume of all placarded shipments is large, and that a substantial part of those shipments may involve local multiple-stop delivery operations. Although the proposal would not require all placarded motor vehicles to operate on preferred highways, that result is encouraged, subject to the carrier's judgement, since some circuitous travel and questions about population exposure may be avoided by an election to travel on a preferred highway. Required use of preferred highways, however, would be limited to motor vehicles that transport a large quantity package.

(1) *Type of roadway.* The type of roadway on which radioactive materials would be transported was thought by commenters from all groups to be a prime consideration in any routing requirement. MTB is proposing that large quantity shipments of radioactive materials be restricted to carriage only on a preferred highway. A preferred highway would be defined as any specific highway designated as a preferred highway by an appropriate State-wide agency, and any Interstate highway for which substitute is not provided by such an agency.

Interstate routes. An Interstate highway is an expressway usually with fully controlled access which is part of the 42,500-mile Interstate highway system as designated by Congress. However, the term as used in this proposal includes roadways which also are designated "temporary" Interstates.

The Interstate System is part of the Federal-aid primary system connecting principal cities of the United States. Interstate highways would be defined in the text of this proposal as preferred highways because the Interstate System is built to exacting and generally uniform specifications and offers the safest and often most direct routes available. Statistics published by the Department's Federal Highway Administration for 1976 indicate that the possibility of an accident involving a fatality or injury on an Interstate highway is as little as 25% of what it is on a non-Interstate highway ("Fatal and Injury Accident Rates on Federal-Aid and Other Highway Systems/1976", September 1978). Since 1967 when such statistics first became available, the fatal accident rate (fatal accidents per 100 million vehicle miles) for Interstate highways consistently has been very much lower than the rate for non-Interstate highways. These figures suggest that travel on Interstate highways significantly reduces the probability of an accident. Consequently, in the absence of State action, MTB believes any vehicle carrying a large quantity shipment generally should be routed via Interstate highways. Restricting large quantity radioactive materials carriers to the Interstate System also is one of the few alternatives determined in NUREG 0170 to be cost-effective, because it substantially reduces overall normal population dose (p. 6–12).

State-designated routes. MTB believes that States may be able to offer useful refinements, particularly in view of the fact that State and local agencies also bear the basic emergency response duties and costs. The proposal would recognize action by appropriate State agencies to designate non-interstate public roads as preferred highways, and to remove the preferred status of an Interstate highway if an equivalent route is provided. Permissible State action is further discussed later in this document under the heading "Guidelines for State regulation."

A motor carrier who is required to transport a large quantity package on a preferred highway, or a motor carrier of other radioactive materials packages who voluntarily uses a preferred highway would be required to use the most direct preferred highway and would not be required to evaluate population densities. However, in the absence of State action to the contrary, a carrier would be required to use an Interstate or other preferred circumferential or bypass route in favor of an Interstate route through a city. This position represents a compromise between considerations of normal population dose including that of motor carrier personnel, possible accident exposure and the need for uniform and efficient compliance and enforcement.

Exceptions. The motor vehicle would be authorized to leave or travel off preferred highways when necessity or safety considerations dictate and when necessary to travel from shipment origin to the nearest preferred highway and from a preferred highway to the shipment destination. Necessary food, rest, fuel, service and repair stops would be permitted. Any travel on nonpreferred highways would still be subject to the general rule stated in paragraph (a) of proposed § 177.825 including required routing to limit the number of persons potentially exposed to risks.

In the proposed rule, MTB has not attempted to answer the question of how far out of the way a carrier must go to access and use a preferred highway. It would be preferable that the question be answered by State agencies by means of designating additional preferred highways to account for situations wherein an unreasonable amount of circuitous travel may result from carriers accessing the Interstate highways of the State. However, MTB is considering several possible methods of establishing a limit on the circuity that a carrier must accept to access a preferred highway. Two possible rules, which differ in their effect, have been examined. One rule would generally state that a carrier need not increase travel distance more than 25% to access a preferred highway, measuring from points selected by the carrier. This approach has some effects which are much less than optimal. A second rule, which is more precise, would permit the use of a formula to select routes that include non-preferred highways: for each possible route, total mileage on non-preferred highways would be increased by 25% and added to mileage on preferred highways. The route with the smallest mileage sum, computed in that fashion, would be used. Both rules might be offered in the alternative, at the option of the carrier. For enforcement purposes, a violation could be shown only by a demonstration that neither rule was followed.

The proposal, as drafted, would rely on the mutual interests of carriers and State agencies to produce local accommodations on questions concerning access to preferred highways. Comment is solicited on this point.

Placards. MTB is giving serious consideration to proposing the required use of a distinctive mark or logo on radioactive hazard warning placards to permit the ready recognition of motor vehicles carrying large quantity packages. Under existing rules, large quantity packages could be identified only by examining the shipping paper or the package markings.

One method under discussion would involve the use of the placard background presently required for certain railcars (49 CFR 172.510, 172.527). MTB believes use of some such device to distinguish motor vehicles carrying large quantity packages may be necessary and solicits comment on this issue.

(2) *Route plans.* A motor carrier transporting a large quantity of radioactive materials would have to prepare a route plan complying with the provisions of paragraph (b) in proposed § 177.825. A similar requirement now applies to carriers of Class A explosives (see 49 CFR 397.9(b)). The route plan would be supplied to both the shipper and the driver of the vehicle, in most cases before departure. The shipper's copy, for nonexclusive use shipments, could be provided later by mail. The plan would contain specific information concerning the route selected, and emergency telephone numbers for each State traversed. DOT believes that it would be preferable to rely on a single telephone number to access all emergency response and is considering possible methods of achieving this

result. For the purposes of this proposal, however, the text used indicates the basic intent: that the carrier be prepared in advance to contact State emergency response personnel immediately in the event of an accident. The State police in many cases may be the appropriate agency for summoning emergency response assistance.

The shipper would file a copy of each route plan submitted by the carrier with the MTB within 90 days of the date a large quantity shipment of radioactive materials is accepted for transportation. NRC licensees who already are required to provide this information to NRC under physical security requirements would be excepted from filing, since that information will be available to DOT. The MTB intends to make shipment information in accumulated route plans accessible to State agencies for emergency response planning and is considering several possible methods of providing this service. For shipments made under physical security requirements, however, some restrictions on release of information may have to be observed to avoid compromising that security.

(3) *Driver training requirements.* This proposal would apply a driver training requirement to motor carriers transporting large quantity packages of radioactive materials. The training would include instruction to the driver every two years on the Hazardous Materials Regulations pertaining to radioactive materials, the Federal Motor Carrier Safety Regulations (49 CFR Parts 390–397) applicable to operation of the motor vehicle, the hazards and characteristics of large quantities of radioactive materials, emergency features or other special characteristics of the vehicles to be used to transport those materials, and any emergency procedures to be followed in the event of an accident. The training would be evidenced by a certificate in the driver's qualification file and on his person during transportation. The driver training proposal was derived from a proposal now under development concerning drivers of tank trucks. A similar proposal also appears in Docket HM–115 (44 FR 12826, 12842, March 8, 1979) regarding drivers of certain tank trucks carrying flammable cryogenic liquids. For planning purposes, MTB is assuming that training would not exceed 20 hours a year for new drivers and would involve written training materials and written examination. The actual extent of training would be subject to the carrier's judgement and the driver's previous training.

D. Cargo Security

Spent fuel is the most widely recognized large quantity of radioactive materials routinely shipped. For that reason, spent fuel casks could become the target of terrorist activity, although the likelihood of a successful act of sabotage that breaches a spent fuel cask and disperses its contents may be quite small. The NRC recently established new interim physical security procedures in 10 CFR 73.37 for the shipment by its licensees of spent fuel. Those procedures are intended to remain until current studies of the ability of spent fuel casks to withstand acts of sabotage are completed. The MTB has reviewed the interim procedures and believes they will provide adequate physical protection for spent fuel shipments.

Because physical requirements under the NRC's rules may conflict with the DOT highway routing proposal made herein, paragraph (b)(4) of proposed § 177.825 would permit variation from the proposed rule's requirements if necessitated by security requirements under the NRC's rules. This provision also would permit variation for security reasons under previously established NRC rules applicable to special strategic nuclear materials.

Since the NRC interim safegurads rules only apply to NRC licensees, such as operators of commercial nuclear generating stations, MTB is proposing to require shipments of spent fuel by nonlicensees to be made in accordance with general requirements approved by MTB as being essentially equivalent to the NRC requirements. Some shipments made by contractors of the Department of Energy, such as Brookhaven National Laboratories, and possible contractors of the Department of Defense, may be subject to this provision.

In accordance with the DOT–NRC memorandum of understanding, the NRC has primary responsibility for physical security requirements. The MTB believes it is doubtful that terrorist acts would be directed against small source nonfissile isotopes, because of the small radiological consequences involved, and does not see a need for physical security requirements for such shipments. The NRC now is examining the possible need for physical protection of large source nonfissile isotopes and smaller quantities of special nuclear material during transportation. The MTB will await NRC judgment in this matter before considering any further action regarding physical security.

E. Guidelines for State Regulation

The result of stringent local regulation of highway carriers of radioactive materials has been described by some commenters to this docket as a "burden" on commerce. It is the MTB's view that the existence of a burden on commerce imposed by a State or local requirement is relevant to rulemaking responsibilities under the HMTA so far as it may affect transportation safety. The HMTA does not necessarily exclude State and local regulation of highway carriers of hazardous materials, nor is that result desirable. However, the HMTA does provide adequate preemptive authority to ensure that the Act and regulations issued under its authority are effective as intended.

The MTB believes it is important that State and local views be considered in routing decisions. There is, however, an obvious difficulty in permitting local governments to exercise what amounts to a veto power over interstate commerce. A small jurisdiction which does not directly benefit from shipping activities within its borders will often find attractive the option of diverting traffic into neighboring jurisdictions, with concomitant safety impacts in those jurisdictions. Local safety rules that are excessively stringent may produce counterproductive safety impacts and possible violation of Federal requirements in the transportation of improperly identified shipments. A balance is needed in routing decisions between local knowledge of local conditions and the wider demands of safety in interstate commerce. The proposed rule, for this reason, encourages routing participation by State and local governments through an agency with State-wide jurisdiction that would be accessible to all those persons that may be affected by routing decisions. The proposal reflects the current MTB view that a greater degree of uniformity in rules affecting radioactive materials transportation by highway is needed and that unless necessary to ensure the physical security of the cargo, as previously discussed (or otherwise justified by exemption or waiver of preemption), any State or local requirement that amounts to a transportation ban on highway carriage of radioactive materials is not reasonable.

The term "State agency with State-wide enforcement authority" is used in the proposal to describe those State agencies that may designate non-Interstate highways as preferred highways and disapprove (and thus terminate) the defined preferred status of a segment of an interstate highway for which the State agency has provided an alternate and equivalent preferred highway. The term "agency" is intended to describe an entity (including a common agency of more than one State, such as one established by interstate compact) which is authorized to use State legal process to impose and enforce routing requirements on carriers of radioactive materials without regard to intrastate jurisdictional boundaries. This description would exclude, for example, a bridge authority unless that authority also is empowered to impose and enforce such rules concerning radioactive materials transporation on State highways generally. This description would not exclude the possibility of more than one agency in a single State sharing responsibility for designating preferred highways.

Reliance on routing designation by agencies with State-wide authority may pose particular problems for cities and for agencies which operate under interstate compacts and which have responsibility for areas with defined jurisdictional boundaries. For this reason, State action establishing a preferred highway must be preceded by consultation with affected local jurisdictions. A route modification to bypass a major city, for example, would require consultation with that city and with any impacted adjacent jurisdictions. A route modification that impacts jurisdictions in another State would require consultation with those jurisdictions. Also, bridge, tunnel and turnpike authorities would require action by a State-wide agency in order to restrict passage of radioactive materials carriers on an Interstate or other preferred highway. Note that the provision in 49 CFR 177.810, which saves for such agencies the right to restrict hazardous materials transporation generally, would be modified to reflect this part of the proposal. Commenters may wish to propose other methods of dealing with the problem of providing a forum for State routing decisions which permits all interests affected by such decisions to participate in the decision process.

Under the proposal, an appropriate State-wide agency would be able to take the following actions.

Designation or modification of preferred highways other than Interstate highways. The goal in designating a preferred highway would be an overall reduction in both radiological and nonradiological impacts from transporation of large quantity packages. Basic criteria for this goal would include:

(1) Normal radiological impacts—including radiation exposure to drivers, cargo handlers, persons in other vehicles and pedestrians, occurring during normal, accident-free transportation.

(2) Normal nonradiological impact—including costs to carriers and shippers, and other impacts of motor vehicle operation such as vehicle emissions and traffic congestion.

(3) Radiological accident impact—including injuries, deaths, property damage, cleanup costs, and costs of emergency response preparedness.

(4) Nonradiological accident impact—including deaths, injuries, and property damage.

This State agency action would be predicated on the results of a technical safety review of available routing choices. It would be prudent for the State agency to document the process.

Modification of the preferred status of Interstate highways. The preferred status of an Interstate highway could be removed as part of an action based on the above-stated criteria only if the continuity of the Interstate System would be maintained by designation of a preferred highway which is essentially equivalent.

Urban circumferentials and bypasses. The proposal would require an Interstate circumferential or bypass route to be used in favor of an urban Interstate through route. Where an urban Interstate through route exists without an Interstate circumferential or bypass route, an abbreviated designation process could be used by a State agency to establish a non-Interstate circumferential or bypass as the preferred route. In this situation, an urban Interstate through route could be replaced by any circumferential or bypass route which is equivalent to other urban Interstate circumferentials or bypass routes elsewhere in either design standards or performance (*i.e.*, actual traffic flows and accident rates).

Continuity must be maintained for Interstate highways, but for non-Interstate preferred highways, continuity would be a safety factor which might not be as important as other safety considerations. However, where a preferred highway would direct traffic to a State's boundary, jurisdictions in the next State which would be impacted by the traffic must be consulted and the impacts considered as part of the designation process. A State boundary, in other words, may define the limits of a State agency's authority, but it does not define the limits of the impacts which must be considered in exercising that authority.

Cargo security and the possibility of sabotage or deliberate release of radioactive materials from a large quantity package are not directly considered in the designation of preferred highways. As previously mentioned, under the current division of responsibilities between DOT and NRC, an accounting for these factors is an NRC responsibility which is discharged through NRC physical security requirements in 10 CFR Part 73 (or the equivalent under this proposal for non-NRC licensees) for which an allowance is made in this proposal. Those requirements, which now apply to shipments of spent fuel as well as special nuclear material, involve the NRC in approving routes and other countermeasures selected to reduce threats to the physical security of the cargo.

V. Alternatives Not Proposed

A. Intrastate Carriers

The HMTA provides authority to regulate intrastate commerce that affects interstate commerce (49 U.S.C. 1802(1)(B)). The existing Hazardous Materials Regulations do not apply to purely intrastate carriers, that is, carriers whose business does not involve them at any time in the transportation of materials in interstate commerce. Intrastate carriers operate only within a State and do not carry materials in transportation whose origin or destination points are not within the State. As a practical matter, such carriers would be most likely to be used in local pickup and delivery services, warehouse distribution and so forth. Intrastate carriers of radioactive materials are regulated by State law and further controlled by requirements expressed through conditions imposed by the NRC on its licensees. Those conditions include provisions which are identical to rquirements imposed on interstate carriers by DOT. Regulation of the routes used by intrastate carriers of large quantity radioactive materials shipments was considered but not proposed because of the primarily local character of such transportation, and the very limited number of such shipments likely to move by intrastate carrier. States are free, at the present time, to establish routing controls for intrastate carriers. Future action by MTB will be considered if new information warrants.

B. Other Modes and Other Hazardous Materials

Interest has been expressed in routing considerations applicable to rail carriers, in view of the amounts of spent fuel the railroads eventually may be called upon to carry. Rail operations, however, differ significantly from highway operations and rail routing raises a separate set of issues. Also, the routing choices available in rail operations with regard to populated or congested areas are considerably more limited than in highway transportation.

The MTB does not rule out the development of highway routing rules or guidelines for hazardous materials other than radioactive materials, especially for hazardous materials shipped in bulk by highway. It is not practical, however, to attempt to deal with this subject in this docket. A study currently is being conducted for the Federal Highway Administration which eventually may provide a basis for developing general hazardous materials highway routing criteria.

C. Full Licensing of Carriers

Both registration and licensing of highway carriers of large quantities of radioactive materials were considered. With the route plan requirements proposed, however, ready identification of carriers would be possible without registration. Moreover, carriers already are subject to safety and reporting requirements under the Federal Motor Carrier Safety Regulations, and this proposal would require specialized driver training. MTB sees little additional advantage in requiring registration or licensing and has not proposed to require either.

D. Transport Group Limitation

Instead of referencing packages containing a large quantity of radioactive materials as the key to required use of preferred highways, MTB considered referencing large quantities in Transport Groups I and II only. Those transport groups include the most toxic radionuclides which are defined as large quantity when shipped in packages containing more than 20 curies. However, in view of the substantial amounts of other transport groups that can be carried in individual packages, it was felt that use of the large quantity cutoff for this purpose was justified without reference to transport groups. MTB would be interested in suggestions as to other feasible cutoff points. Note that reference to transport groups and to large quantity is proposed to be eliminated in a scheduled revision of the DOT and NRC rules concerning radioactive materials (HM-169, 44 FR 1852, January 8, 1979; 44 FR 23266, April 19, 1979; 44 FR 47966, August 16, 1979; 44 FR 60771, October 22, 1979). Consequently, if the large quantity cutoff is retained, it may be expressed in terms of the A_2 values proposed in that rulemaking rather than transport groups. MTB also solicits views on whether special form materials should be treated separately. In this proposal, large quantity, in addition to specified amounts in each of the transport groups, means 5,000 or more curies of any material in special form. Under the HM-169 proposal, A_1 values also could be used for special form materials.

VI. Expected Environmental and Economic Impacts

The primary operational effect of this proposal would be to encourage use of the Interstate System by carriers of radioactive materials. Although carriers transporting packages containing a large quantity of radioactive materials are generally required to use either the Interstate System or State-designated preferred highways, carriers transporting packages containing lesser quantities are likely also to tend to use the Interstate and preferred highways especially in areas of heavy population, if this proposal is implemented. Overall radiological effects of this proposal would include a very slight reduction in total latent cancer fatalities attributable to normal dose in 1985 and a lesser reduction in the annual latent cancer fatality accident risk (based on NUREG 0170 projections). Some additional reduction in radiological consequences may result from State designation of preferred highways. A slight increase in nonradiological consequences may result from routing on preferred urban bypass or circumferentials. Overall, environmental impacts should be negligible.

Economic costs are expected not to exceed $330,000 annually under 1985 levels of shipping activity and mostly would consist of carrier costs for driver training and route plan preparation and filing. This estimate, however, does not include possible additional insurance costs to State and local bridge and tunnel authorities on the Interstate System or on highways that may be designated by future State action as preferred highways. At present, MTB lacks any quantitative data on this subject. Commenters are encouraged to provide any available estimates.

Because of the level of costs anticipated and the limited potential for environmental impact, the MTB does not consider the preparation of an environmental impact statement or a regulatory analysis necessary for this proposal. A more detailed examination of costs and environmental impacts is available in the draft regulatory evaluation and environmental assessment which may be obtained from the Dockets Branch at the address indicated at the beginning of this notice. Because this proposal varies from the highway routing requirement at 49 CFR 397.9(a), at the time a final rule is published, some further adjustment to § 397.9(a) is contemplated to avoid any conflict.

In consideration of the foregoing, Parts 173 and 177 of Title 49, Code of Federal Regulations, would be amended as follows:

1. In § 173.22, paragraph (b) would be revised and paragraph (c) would be added to read as follows:

§ 173.22 Shipper's responsibility.

* * * * *

(b) Prior to each shipment of fissile radioactive materials, and Type B or large quantity of radioactive material, the shipper shall notify the consignee of the dates of shipment and expected arrival. The shipper shall also notify each consignee of any special loading/unloading instructions prior to his first shipment. For any shipment of irradiated reactor fuel, the shipper shall provide physical protection in compliance with a plan established under—

(1) Requirements prescribed by the U.S. Nuclear Regulatory Commission, or

(2) Equivalent requirements approved by the Associate Director for Operations and Enforcement, MTB.

(c) For any package containing large quantity radioactive material (see § 173.389(b) of this subchapter) accepted for transportation by public highway, the shipper shall file the following information within 90 days with the Associate Director for Operations and Enforcement, MTB (this paragraph does not apply to packages shipped in compliance with physical security requirements of the U. S. Nuclear Regulatory Commission in 10 CFR part 73):

(1) The route plan required under § 177.825(b) of this subchapter;

(2) A statement identifying the name and address of the shipper, carrier and consignee; and

(3) A copy of the shipping paper (or the description of the radioactive material required by § 172.202 of this subchapter).

2. § 177.810 would be revised as follows:

§ 177.810 Vehicular tunnels.

Except as regards radioactive materials, nothing contained in Parts 170–189 of this subchapter shall be so construed as to nullify or supersede regulations established and published under authority of State statute or municipal ordinance regarding the kind, character, or quantity of any hazardous material permitted by such regulations to be transported through any urban vehicular tunnel used for mass transportation. For radioactive materials, see § 177.825 of this subchapter.

3. § 177.825 would be added preceding subpart B, to read as follows:

§ 177.825 Routing and training requirements for radioactive materials.

(a) The carrier shall act to ensure that any motor vehicle which contains a radioactive material for which placarding is required is operated as follows:

(1) The motor vehicle is operated on routes that risk radiological exposure to the fewest persons, considering time of day and day of week during which the transportation will occur, population density and activities, effectiveness of local emergency planning, terrain and physical features, and weather conditions. In performance of this requirement the carrier shall tell the driver that the motor vehicle contains radioactive materials and shall indicate the general route to be taken in pursuance of this requirement. This requirement does not apply when—

(i) There is only one practicable highway route available, considering operating necessity and safety, or

(ii) The motor vehicle is operated on a preferred highway under conditions described in paragraph (b)(1) of this section.

(2) Subject to paragraph (a)(1) of this section, the motor vehicle is operated on routes selected to reduce time in transit.

(b) A carrier and any person who operates a motor vehicle carrying a package which contains large quantity of radioactive materials as defined in § 173.389(b) of this subchapter shall ensure compliance with the following requirements:

(1) Except as otherwise provided in this section, the motor vehicle shall be operated over preferred highways selected by the person operating the motor vehicle to reduce time in transit. A preferred highway is any highway so designated, and any Interstate highway not disapproved, by a State agency with State-wide enforcement authority. Where a preferred circumferential or bypass route around a city and Interstate highway through that city are both available, the circumferential or bypass route shall be used. The motor vehicle—

(i) May deviate from preferred highways for emergencies and necessary stops; and

(ii) Shall be operated to comply with paragraph (a) of this section when operated off a preferred highway.

(2) The carrier (or his agent) shall prepare a written route plan and supply a copy before departure to the motor vehicle driver and a copy to the shipper (before departure for exclusive use shipments, or otherwise within fifteen working days following departure). The route plan contains—

(i) A statement of the origin and destination points, a route selected in compliance with this section, all planned stops, and estimated departure and arrival times; and

(ii) Telephone numbers which will access emergency assistance in each State that may be entered.

(3) The driver shall have in his immediate possession a certificate of training as evidence of training required by this section and shall operate the motor vehicle in compliance with the route plan.

(4) A person may transport irradiated reactor fuel only in compliance with a plan if required under § 173.22(b) of this subchapter that will ensure the physical security of the material. Variation for security purposes from the requirements of this section is permitted so far as necessary to meet requirements imposed under such a plan, or otherwise imposed by the U.S. Nuclear Regulatory Commission in 10 CFR Part 73.

(c) No person may transport large quantity radioactive material, as defined in § 173.389(b) of this subchapter, on a public highway unless—

(1) That person has provided, and the driver has received within the two preceding years, written training on:

(i) Requirements in Parts 172, 173 and 177 of this subchapter pertaining to the radioactive materials transported;

(ii) Requirements in the Federal Motor Carrier Safety Regulations (Parts 390–397 of this title) applicable to operation of the motor vehicle;

(iii) The properties and hazards of the radioactive materials transported;

(iv) Operating and handling characteristics of the vehicle the driver will be operating and any emergency features and load limitations; and

(v) Procedures to be followed in case of accident or other emergency.

(2) The driver is provided a certificate, and a copy is placed in his qualification file, showing—

(i) The driver's name and operator's license number;

(ii) The date the driver was provided the training;

(iii) The name and address of the person providing the training; and

(iv) That the driver has been trained in the hazards and characteristics of large quantity radioactive material.

(d) Actions to designate or disapprove a preferred highway are taken to minimize the total impact of highway transportation of radioactive materials. However, designation of a preferred circumferential or bypass route around a city as substitute for an Interstate highway may be based on design or performance criteria that approximate those of existing Interstate circumferential or bypass routes elsewhere. Designation and disapproval action is preceded by consultation with affected jurisdictions to ensure consideration of all impacts and continuity of preferred highways. Except as otherwise permitted under paragraph (b)(4) of this section, State and local requirements which apply to any person because that person transports radioactive materials are inconsistent with this subchapter if they have any of the following effects.

(1) Completely prohibiting travel between any two points serviced by highway;

(2) Prohibiting the use of an Interstate highway, including prohibition of travel based on time of day, without designation of an equivalent preferred highway as a substitute in accordance with the provisions of this section;

(3) Requiring use of a preferred highway except in accordance with the provisions of this section;

(4) Requiring prenotification or escort requirements, except as established under paragraph (b)(4) of this section; or

(5) Requiring special personnel or equipment.

(49 USC 1804, 49 CFR 1.53, App. A to Part 1, and paragraph (a)(4) of App. A to Part 106.)

Note.—The Materials Transportation Bureau has determined that this notice will not result in a major economic impact under the terms of Executive Order 12044 and DOT implementing procedures (44 FR 11034), or in a major Federal action significantly affecting the environment. A draft regulatory evaluation and environmental assessment is available in the public docket.

Issued in Washington, D.C. on January 25, 1980.

Alan I. Roberts,

Associate Director for Hazardous Materials Regulation, Materials Transportation Bureau.

[FR Doc. 80-2803 Filed 1-30-80; 8:45 am]

BILLING CODE 4910-60-M