

NUREG-0561
Revision 1

Physical Protection of Shipments of Irradiated Reactor Fuel

Interim Guidance

Manuscript Completed: May 1980
Date Published: June 1980

**Division of Safeguards
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555**



Available from

GPO Sales Program
Division of Technical Information and Document Control
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

and

National Technical Information Service
Springfield, Virginia 22161

ABSTRACT

During May, 1979, the U.S. Nuclear Regulatory Commission approved for issuance in effective form new interim regulations for strengthening the protection of spent fuel shipments against sabotage and diversion. The new regulations were issued without benefit of public comment, but comments from the public were solicited after the effective date. Based upon the public comments received, the interim regulations were amended and reissued in effective form as a final interim rule in May, 1980. The present document supercedes a previously issued interim guidance document, NUREG-0561 (June, 1979) which accompanied the original rule. This report has been revised to conform to the new interim regulations on the physical protection of shipments of irradiated reactor fuel which are likely to remain in effect until the completion of an ongoing research program concerning the response of spent fuel to certain forms of sabotage, at which time the regulations may be rescinded, modified or made permanent, as appropriate. This report discusses the amended regulations and provides a basis on which licensees can develop an acceptable interim program for the protection of spent fuel shipments.

PREFACE

Concurrently with the publication of this draft revised interim guidance, the NRC will publish in effective form revised amendments to 10 CFR Part 73 to require measures for the protection of spent fuel shipments against sabotage. This interim guidance provides a basis upon which licensees can develop an acceptable program for the physical protection of spent fuel shipments. Comments on this revised interim guidance should be sent to:

Regulatory Improvements Branch
Division of Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

CONTENTS

	<u>Page</u>
PREFACE.....	iv
1. INTRODUCTION.....	1
1.1 Scope of the Rule.....	1
1.2 Organization of this Document.....	2
1.3 Definitions of Terms.....	2
2. GENERAL REQUIREMENTS.....	5
2.1 Advance Notification.....	5
2.2 Procedures for Coping with Safeguards Threats and Emergencies.....	5
2.3 Designation of Heavily Populated Areas.....	7
2.4 Instructions to Escorts.....	8
2.5 Communications Center.....	13
2.6 Shipment Log.....	15
2.7 Arrangements with Local Law Enforcement Agencies.....	17
2.8 Advance Route Approval.....	20
2.9 Avoidance of Intermediate Stops.....	26
2.10 Procedures at Stops.....	26
2.11 Escort Training Requirements.....	32
2.12 Periodic Contacts with Communications Center.....	34
3. ROAD SHIPMENTS.....	36
3.1 Protection of Road Shipments within Heavily Populated Areas.....	36
3.2 Protection of Road Shipments Not within a Heavily Populated Area.....	39
3.3 Communications for Road Shipments.....	43
3.4 Immobilization of Transport Vehicle.....	45
3.5 Driver Familiarization Program.....	48
4. RAIL SHIPMENTS.....	50
4.1 Protection of Rail Shipments within Heavily Populated Areas.....	50
4.2 Protection of Rail Shipments Not within a Heavily Populated Area.....	51
4.3 Communications for Rail Shipments.....	53

	<u>Page</u>
5. SEA SHIPMENTS.....	55
5.1 Protection of Sea Shipments within Heavily Populated Areas.....	55
5.2 Protection of Sea Shipments Not within a Heavily Populated Area.....	56
5.3 Communications for Sea Shipments.....	58
APPENDIX A - LIST OF DESIGNATED HEAVILY POPULATED AREAS.....	59

1.0 INTRODUCTION

1.1 Scope of the Rule

The guidance contained in this document pertains to the physical protection of irradiated reactor fuel subject to the requirements in the "Interim Final Rule for the Physical Protection of Irradiated Reactor Fuel in Transit". This regulation is contained in 10 CFR Part 73.37. Shipments of irradiated reactor fuel must be protected in accordance with §73.37 if they meet both of the following conditions:

- (1) The quantity of fuel in the shipment exceeds 100 grams (as described below), and
- (2) The total external radiation dose rate measured at a distance of three feet from any accessible surface, without intervening shielding, is in excess of 100 rems per hour.

For the purposes of the regulation and the accompanying guidance, the terms "irradiated reactor fuel" and "spent fuel" are considered synonymous and are used interchangeably.

The regulations apply to irradiated reactor fuel from either power or nonpower reactors that is contained in domestic shipments or the domestic portions of import or export shipments (i.e., while the shipment is within U.S. territory or U.S. territorial waters). The 100-gram threshold quantity is intended to apply to the combination of uranium and plutonium compounds and associated fission products generated during irradiation. The weight of fuel cladding and other structural or packaging material associated with the fuel should not be included in determining whether the quantity of irradiated fuel in a given shipment needs to be protected under the requirements of §73.37.

1.2 Organization of This Document

The guidance contained in this document is organized to correspond closely with the regulation. Chapter 2 corresponds to the General Requirements contained in §73.37(b) of the regulation. These requirements apply to all spent fuel shipments regardless of the mode(s) of transportation utilized in a particular shipment. Chapters 3, 4 and 5 correspond to §§73.37(c), (d) and (e), which contain additional requirements specific to each particular mode (i.e., road, rail or sea).

In addition to the specific physical protection requirements contained in §§73.37(b), (c), (d) and (e), the regulation contains performance objectives in §73.37(a). These performance objectives are not intended to be implemented as specific requirements, but rather are general statements of the Commission's intent. These objectives characterize and further define the general level of protection expected to be provided by physical protection systems designed to satisfy the requirements of the regulation. Thus, the discussions for each of the specific requirements in the regulation have been developed to be consistent with and to support the performance objectives to the extent each objective applies to a given element of the physical protection system.

1.3 Definitions of Terms

The following definitions apply to the guidance for spent fuel shipments contained in this document. These definitions apply irrespective of the mode of transport except as otherwise noted.

"Local law enforcement agency (or authority)," or LLEA, is understood for the purposes of this regulation and the accompanying guidance to

refer to any state, county or municipal agency which has law enforcement authority within the locality or jurisdiction where the shipment may be located. It usually is limited to the particular law enforcement agencies which have responsibility for responding to calls for assistance by escorts, such as county or municipal police forces, port authority police, highway patrol, etc. In some instances, involving sea shipments, for example, the U.S. Coast Guard or other Federal agency may also be considered as the LLEA, depending upon whether they are relied upon to provide a response to a request for assistance.

"Transport vehicle," or "shipment vehicle," for road shipments means an integrated unit type truck or combination tractor-trailer that bears a spent fuel shipment. For a rail shipment, the shipment vehicle, or shipment car is the rail car containing the spent fuel cask. The regulation is written in terms of a single transport vehicle or shipment car being used for a given spent fuel shipment. However, it is recognized that more than one such vehicle may be employed in a single shipment. In this case, all provisions of the regulation should be interpreted to apply to all the transport vehicles as a group, unless noted otherwise in the guidance.

"Heavily populated area" means any geographical area designated as such by the NRC. (See Section 2.3 and Appendix A for further details.)

"LLEA radio communications" means the radio communications system normally used by the LLEA to communicate with its mobile units.

"Armed escort" is a term defined in the regulation [§73.2(u)], and means "an armed person, not necessarily uniformed, whose primary duty is to

accompany shipments of special nuclear material for the protection of such shipments against theft or radiological sabotage."

"Escort," as used in this document, generally means a person with similar duties to that of an armed escort, but who may or may not be armed. If unarmed, the escort is not expected to actively prevent or impede acts of radiological sabotage when met by armed force.

2.0 GENERAL REQUIREMENTS

2.1 Advance Notification

Introduction. Section 73.37(b)(1) requires that the NRC be given advance notice of each shipment, as provided in §73.72.

Objective. Advance notification of a movement of nuclear material subject to specific NRC requirements provides NRC with timely planning information and allows assignment of NRC personnel to inspection and monitoring activities.

Timing of notification. Section 73.72 provides for notice at least seven days in advance of the shipping date. This means the written notice must be postmarked by the U.S. Postal Service at least seven days prior to the date that the shipment is to leave a fixed site. For import or export shipments, if the U.S. Postal Service is not directly available, the licensee should assure that the NRC is notified, either in writing (e.g., cable, telex, etc.) or by other means (e.g., telephone), at least seven days prior to the time the vessel bearing the shipment first reaches a point within 3 miles of U.S. land territory, to assure appropriate arrangements may be made for NRC staff to inspect the shipment.

2.2 Procedures for Coping with Safeguards Threats and Emergencies

Introduction. Section 73.37(l)(2) requires the development of procedures for coping with circumstances that threaten deliberate damage to a shipment and with safeguards emergencies that have developed.

Objective. The purpose of this requirement is to assure the most effective response possible for coping with safeguards emergencies which may threaten the security of a shipment. This is to be achieved by providing for the development of a plan containing specific procedures to be used by drivers, escorts, licensee personnel, and other individuals involved in the safeguarding of the shipment in case threats, attempted sabotage, or other events jeopardize the security of the shipment.

Procedures to be covered. The procedures developed should provide escorts with detailed guidance on how to react to a variety of abnormal situations which may be anticipated to possibly occur and present either an immediate or imminent threat to the continued security of the shipment (e.g., overt attempts at sabotage, traffic accidents, derailments, mechanical failures which may have been caused by an adversary, etc.). The procedures should be documented in a form which indicates the actions each escort or driver would be expected to take in response to a given situation. These actions should be consistent with the priorities established in §73.37(b)(3).

Availability of procedures documentation. The procedures developed should be collected in a document which should be readily available to each individual who is participating in implementing the protection requirements. At least one copy of the safeguards emergency procedures document should be available to the personnel in each vehicle (other than LLEA vehicles) involved in the transporting or escorting of a road shipment. Copies of this document should also be available to escorts

for rail and sea shipments and to the persons responsible for monitoring the shipment at the communications center (as discussed in Section 2.5 of this document).

2.3 Designation of Heavily Populated Areas

Introduction. The physical protection requirements in §§73.37(c), (d), and (e), for physical protection of spent fuel shipments by different transportation modes, differ depending on whether or not the shipment is within a heavily populated area. This section provides guidance on determining which areas within U.S. territory are considered to be heavily populated for purposes of this regulation.

Objective. The primary objective of designating certain areas as being heavily populated is to identify those areas in which the population is considered sufficiently large to justify the higher level of physical protection against potential sabotage of spent fuel shipments while they are passing through such areas.

Designation of heavily populated areas. Certain areas within United States territory are designated as heavily populated areas for purposes of regulation of spent fuel shipments. Heavily populated areas are characterized in terms of urbanized areas, as defined by the Bureau of the Census (United States Department of Commerce), having total populations of one hundred thousand (100,000) persons or more. Precise definitions of what constitutes an urbanized area, and maps showing their boundaries, are contained in a Census Bureau publication available

separately.* A list of the urbanized areas currently meeting the above criterion is provided in Appendix A of this document. From time to time the list may be modified to reflect new information or new criteria. Notification of any such changes will be published in the Federal Register and made available on a one-time basis to known affected licensees.

A shipment within three miles of the boundary of a designated urbanized area, or located anywhere within a designated urbanized area, is considered to be within a heavily populated area. Information specifying which roads are inside or outside of a heavily populated area so designated is not furnished by the NRC. However, such information should be obtainable through a comparison of the urbanized area maps available from the Bureau of the Census with generally available road maps.

2.4 Instructions to Escorts

Introduction. Section 73.37(b)(3) requires certain instructions be given to escorts involved in the implementation of physical protection requirements for spent fuel shipments. Generally, these instructions relate to confirmation and assessment of detections of possible threats to the safety and security of a shipment, notification of and requests

*U.S. Bureau of the Census, Supplementary Report, 1970 Census of Population, Series PC(S1)-108, "Population and Land Area of Urbanized Areas for the U.S.: 1970 and 1960." April 1979. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

for assistance from local law enforcement agencies, and implementation of the appropriate emergency procedures developed to cope with such situations.

Objective. The purpose of this requirement is to assure that shipment escorts are prepared to cope with emergency and sabotage threatening situations and are properly instructed as to the priority of the different measures that need to be taken to protect the shipment.

Actions protected against. The development of appropriate emergency procedures and corresponding instructions to be given to escorts should be done with an understanding of the nature of the possible sabotage related actions being protected against. Studies have been conducted that conclude the only credible way radioactive material could be released that might result in significant radiological effects is through the use of selected high explosives. To cause the most significant consequences with a minimal amount of explosives, the adversary would have to gain access to the shipment cask(s) for a considerable amount of time in order to allow precise placement of the explosives and modification of the cask surface. Casks are considered to be essentially impervious to small arms fire and to small amounts of explosives.

Protection while not within heavily populated areas. The development of detailed instructions for escorts for providing protection while the shipment is not within a heavily populated area will depend upon the specific circumstances of each shipment (e.g., the mode(s) of transportation, route characteristics, physical protection resources available, etc.). Therefore, the regulation specifies only the general nature of

the instructions which should be given to escorts. The actual instructions given are expected to be somewhat more detailed, and should include the procedures developed for dealing with emergencies [in accordance with §73.37(b)(2)].

One of the primary functions of the escorts will be to maintain vigilance to detect any abnormal or unusual situations involving persons or vehicles in the vicinity of the transport vehicle that could pose a threat to the shipment. In case such a situation is detected, the escorts are to be instructed to implement emergency procedures, including those developed in accordance with §73.37(b)(2), consistent with the priority of actions required by §73.37(b)(3). Since sabotage attempts are considered easier to carry out while the shipment is stationary than while it is in motion, the escorts will also be instructed to maintain the shipment under continuous surveillance while the shipment is stationary. While the shipment is in motion the escorts should situate themselves within view of the shipment vehicle so that the shipment may be observed periodically and whenever there is reason to suspect the shipment may be threatened. The escorts for road shipments should also be instructed as to the types of circumstances which would dictate implementation of procedures to immobilize the transport vehicle (see Section 3.4).

Protection within heavily populated areas. While the shipment is within a heavily populated area, the function of the escorts will be similar to that outside heavily populated areas but with several additional considerations in regard to the continuity of surveillance, the range of

options available to protect the shipment in case of attack, and the possible use of deadly force.

In normal circumstances, the escorts will endeavor to keep road or rail shipments moving while passing through a heavily populated area, making only unavoidable stops. While moving, the shipment should be kept under closer surveillance than is necessary for shipments not within heavily populated areas. Only brief interruptions in this surveillance should be tolerated, such as those which may be unavoidable as a result of traffic situations, bends in a road, etc. Escorts should be instructed also to maintain a high level of alertness for possible situations which may threaten the safety or security of the shipment. As in the case of shipments not within heavily populated areas, the shipment is required to be kept under continuous surveillance during any unavoidable stops that might be made.

In the event a safeguards emergency situation develops, the escorts should be instructed to call immediately for law enforcement assistance and to take action to impede any attempts at radiological sabotage of the shipment. These actions should be in accordance with the provisions of §73.37(b)(3), and should include implementation of the procedures developed in accordance with §73.37(b)(2). The safeguards emergency procedures should include specific procedures designed to cope with threatening situations which occur while the shipment is within a heavily populated area. The level of protection to be afforded shipments while within designated heavily populated areas will differ from

that outside of heavily populated areas because of the requirements for larger numbers of escort personnel or vehicles, and for armed escorts. The LLEA also may be directly involved in escorting the shipment. The instructions given to the escorts and the information given to LLEA members serving as escorts should reflect this greater capability and broader range of options for physical protection.

The use of armed escorts presents the possibility that the escorts may be called upon to use deadly force in the course of protecting a shipment. The use of deadly force by any private guard is presently governed by state laws, and may differ from state to state. However, certain general principles are common to laws in all states in regard to the possible use of deadly force in situations in which private guards may carry out their assigned duties to protect shipments.

These are summarized by the following three guidelines:

1. An armed escort has no duty to retreat from a show of force, or from a situation that could lead to a show of force. Thus, if the escort is instructed in certain situations to take up a position such that his own safety and retention of control of the shipment are inseparable, then his subsequent use of force to meet force in protecting the shipment would be considered justified.
2. Armed escorts may generally meet force with force. The degree of force considered justified is that which is considered commensurate with the degree of force presented by the adversary.

3. Use of deadly force is generally considered justified when there is a reasonable belief that it is necessary in self defense or in the defense of others to protect against death or grievous bodily injury.

It is believed that these three principles, taken together, constitute an adequate, practical and publicly acceptable policy for the protection of spent fuel shipments insofar as the possible use of deadly force is concerned. Therefore, these principles should form the basis of instructions given to armed escorts for protection of spent fuel shipments while the shipments are within heavily populated areas.

2.5 Communications Center

Introduction. Section 73.37(b)(4) requires licensees to establish a communications center. The operator of the center is required to monitor the shipment to assure its continued integrity while en route and to notify the appropriate agencies should a safeguards emergency arise.

Objective. The requirement to monitor the shipment by periodic status reports to a remote location is designed to assure early detection of a possible attempt at sabotage, even when specific information relating to such an attempt is not received from the shipment escorts within a reasonable time. It is also the objective of this monitoring requirement to aid in the recovery of a missing shipment by assuring the availability of accurate bounding information regarding the missing shipment's last known location.

Equipment. The communications center should be equipped with two dedicated telephone lines and any other equipment necessary to receive communications from the particular transport being used. Ordinarily, one of the telephone lines is to be reserved for receiving status reports from the shipment, while the other line is to be reserved for emergency communications with the LLEA. The communications center need not be equipped with citizens band (CB) radio equipment, however, since such equipment will not usually allow direct communications between the shipment escorts and the center over a long enough range to be useful in monitoring the shipment.

Procedures. The center should be staffed continuously with at least one person who has the authority to take the appropriate actions in case of a safeguards emergency whenever a shipment is en route. The operator should maintain a record of the status reports that he receives for inclusion in the shipment log (see Section 2.6 below). The operator should also maintain a record of any deviation from the planned shipment itinerary, any significant incidents which occur, and of reports made to the NRC and others. The operator should have a copy of the route data for the shipment readily available and should request assistance from the LLFA in whose jurisdiction the shipment is believed to be located if the transport does not report in on schedule and cannot be contacted, or if a request for assistance is received from the shipment escorts. (Escort procedures should require escorts to request LLEA assistance directly in cases where it is operationally feasible to do so.) A procedure or device should be employed to assure the operator becomes immediately aware of when a report from the shipment escorts becomes

overdue. The operator can carry out other work while a shipment is en route, provided that the other work does not interfere with prompt response to incoming messages from the transport or with other safeguards duties.

2.6 Shipment Log

Introduction. Section 73.37(b)(5) requires that escorts and communications center personnel maintain, for each spent fuel shipment, a written log including information describing the shipment and significant events occurring during the shipment. The log is to be kept available for review by authorized NRC personnel for a period of at least one year following completion of the shipment.

Objective. The purpose of the requirement for keeping a shipment log is to provide assurance that protection requirements have been properly carried out, to allow the NRC to identify areas where improvement in protection is needed, and to assure the availability of an accurate record of the shipment to assist in resolving any questions of public concern regarding the shipment which could arise after completion of the shipment.

Content. The shipment log should include the following types of information:

- a. Names of shipping and receiving organizations, carriers, escorts and,
 - (1) for road shipments, the names of the drivers;

- (2) for rail shipments, the names of the chief engineers, and
 - (3) for sea shipments, the names of the vessels and their masters.
- b. Origin, destination and approved route (copy of route overview).
 - c. General description of cargo and shipping container(s).
 - d. Dates and times of departure and arrival (planned and actual).
 - e. Dates, times and locations of stopovers and custody transfers.
 - f. Identification of the communications center and its staff.
 - g. Dates, times and locations of status reports made by shipment escorts to the communications center, and schedule of expected status reports.
 - h. Deviations from the planned route.
 - i. Other abnormal occurrences with regard to routes, equipment, vehicles, personnel, weather, traffic or threats.

Procedures. The written log may be recorded in its entirety at the communications center, based upon information received from the shipment escorts during the trip, or it may be comprised of separate entries made by the shipment escorts and the communications center staff, which are subsequently collected into a single document.

2.7 Arrangements with Local Law Enforcement Agencies

Introduction. Section 73.3(h)(6) requires that arrangements have been made with local law enforcement agencies along the routes of road and rail shipments, and at U.S. ports where vessels carrying spent fuel shipments are docked, for their response to an emergency or a call for assistance.

Objective. This requirement is designed to provide for rapid LLEA assistance in the event of an emergency or a call for assistance. It also is intended to assure that the selected LLEAs along the route are familiar with the types of situations to expect when responding to such calls.

NRC participation. The Commission will conduct surveys of proposed routes including the response capabilities of LLEAs along the routes, for the purpose of fulfilling its own responsibilities for establishing safeguards contingency plans. Certain elements of the information developed in these route surveys will be made available to the licensees for planning and operational use.

Specifically, the following information will be provided to licensees on a one-time basis. The information applies to all modes of transportation:

a. Route Overview (See Figure 2-1)

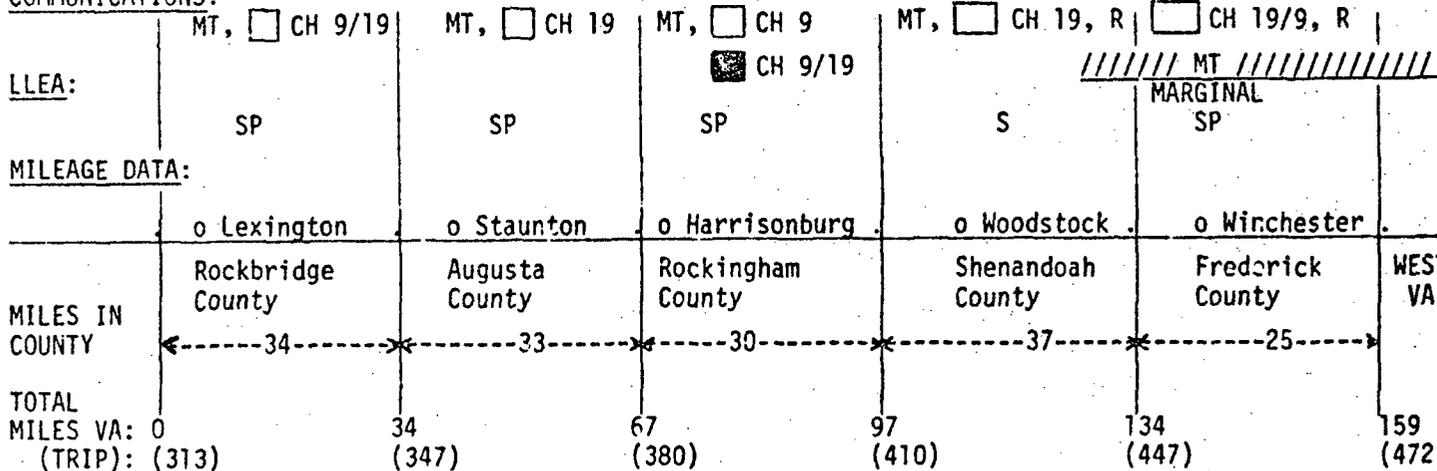
- (1) Route identification.
- (2) Mileage data.
- (3) LLEA identification, jurisdictions and response centers.

VIRGINIA

EMERGENCY PHONE NUMBERS: (Area Code 703)

<u>Lexington</u>	<u>Staunton</u>	<u>Harrisonburg</u>	<u>Woodstock</u>	<u>Winchester</u>
SP 291-2548	SP 885-2142	SP 434-8593	S 459-4071	SP 869-2000
(800) 542-5959	(800) 552-0962	(800) 552-0962	911	(800) 572-2260
(After 5 P.M.)		(After 5 P.M.)		(After 5 P.M.)

COMMUNICATIONS:



KEY:

- | | |
|------------------------|--|
| o LLEA Response Center | <input type="checkbox"/> CB Monitored (Base) |
| HP Highway Patrol | <input checked="" type="checkbox"/> CB Monitored (Car) |
| SP State Police | CH/No. Channel Monitored |
| S Sheriff | R REACT Group Monitored |
| CP City Police | MT Mobile telephone Useable |

Figure 2-1. Typical Route Overview

- (4) LLEA telephone numbers.
 - (5) Citizens band (CB) radio channels monitored by LLEA or REACT groups.
 - (6) Observed effectiveness of radiotelephone along the route.
- b. Available food and fuel stop locations along the route.
 - c. Possible safe haven locations along the route for temporary refuge or emergency assistance.

Licensee actions. The licensee should provide the above route information to the carrier personnel and escorts making the shipment and ensure that they are instructed in its proper use. The data should be updated periodically to maintain its validity. If a large number of shipments are planned over the same route, spot checking LLEA telephone numbers and contacts during each trip would be sufficient for updating purposes. However, if shipments along the route are infrequent, i.e., more than six months lapse between shipments, more systematic verification procedures may be called for. Route information verifications should be recorded in the shipment log.

If unplanned detours from the approved route make it necessary for the shipment to enter jurisdictions where previous LLEA contacts are not known to have been made, the shipment escorts or communications center staff should immediately seek to determine new LLEA telephone numbers and contacts for those jurisdictions.

It should be noted that §73.37(b)(6) does not require that notification be given by the licensee to each LLEA along the route for specific

shipments either immediately prior to the shipment or during the shipment; it requires only that arrangements have been made some time prior to the first shipment along the approved route.

2.8 Advance Route Approval

Introduction. Section 73.37(b)(7) provides that the licensee must obtain NRC approval of the routes over which spent fuel is to be shipped prior to any shipment of the fuel over such routes. Any U.S. ports where a vessel carrying a spent fuel shipment is scheduled to dock must also be approved in advance of the first use of such a port. Certain types of information are to be submitted to the NRC staff describing the proposed route.

Objective. Advance information on routes for spent fuel shipments is used by the NRC in judging whether or not the public health and safety would be protected along the proposed route given that the appropriate physical protection requirements would be implemented for spent fuel shipments along such route. This decision will be based upon the requirements contained in the regulation and the route selection criteria. The advance route information is also used to identify the proposed route for purposes of the NRC's contingency planning relative to the shipment.

Obtaining approval of a route. Ordinarily, a proposed route for a spent fuel shipment (including the use of any U.S. ports) must be approved by the NRC in writing prior to its initial use. The submission of alternative routes at the time of submission of the licensee's preferred

route is encouraged. Information upon which route approvals may be based should include the following:

a. Cargo Description

- (1) Quantity and type of irradiated fuel (e.g., number of elements, reactor type).
- (2) Cask identification (e.g., type of cask, cask capacity).
Specific cask identification parameters such as cask serial numbers may be submitted later in the shipment planning process if unknown at the time the route approval request is first submitted to the NRC.
- (3) Loaded weight of road transport vehicle or shipment rail car; for sea shipments, weight of loaded cask(s) or cargo containers.

b. Anticipated Schedule

- (1) Number of shipments proposed in a series of shipments.
- (2) Approximate duration of each shipment from point of origin to destination.
- (3) Date(s) of shipment(s) anticipated.

c. Route Information

- (1) Origin and destination (i.e., specific locations, addresses).
- (2) Proposed route and alternative route descriptions. Indicate which of alternatives is preferred route. Include route numbers in case of road shipments.
- (3) Road, rail or nautical miles comprising each route segment.
- (4) Estimated travel time for each segment (i.e., estimated time needed to travel segment under good conditions).

- (5) Location of planned or available stopover points for each route segment (e.g., for food, fuel, loading or unloading).
- (6) Designated heavily populated areas which would be traversed on planned route or on each alternative route.

d. Physical Protection Arrangements Planned for Heavily Populated Areas on Route

- (1) Escort arrangements made for travel through each designated heavily populated area on the route. (Describe for proposed route and each alternative route.)
- (2) Firearms to be carried by escorts while traversing heavily populated areas (if private guards are employed).
- (3) Location and arrangements for staffing of communications center.
- (4) Plans for providing required communications capabilities.

This information should be supplied by the licensee as early as possible in anticipation of the first movement of spent fuel along the proposed route. The specific information identified above should be submitted in writing along with a request for route approval to:

Director, Division of Safeguards
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subsequent shipments in a series of shipments may be made on approved routes without additional requests for route approval if the route has

been approved specifically for the given series of shipments, unless the licensee is notified by the NRC staff that the approval has been withdrawn.

Route selection criteria. The following are descriptions of criteria frequently used by the NRC staff to determine the preferability and acceptability of spent fuel shipment planned routes and alternative routes. These criteria apply generally to road, rail and sea modes. In the case of road shipments, in particular, interstate highways typically best satisfy these criteria.

- o Likelihood of swift LLEA response. Routes that permit more timely responses by the LLEA when assistance is requested, are preferred.
- o Avoidance of tactically disadvantageous positions. Routes are preferred which avoid passage through areas including features or terrain which would place the shipment or shipment escorts in significantly tactically disadvantageous positions (e.g., passage through long tunnels or over bridges spanning heavily populated areas).
- o Availability of appropriate rest and refueling stops. Road shipment routes should feature sufficient locations for rest and refueling stops to allow flexibility in adjusting schedules to accommodate unexpected situations.
- o Availability of good transportation safety design features. Road and rail routes featuring advanced safety design features

(e.g., divided highways, guard rails, limited access highways for road shipments; high grade track for rail shipments) are preferred over those including portions that are in disrepair or obsolescent.

Unplanned detours. During the course of an actual shipment, circumstances may arise that preclude the use of some portion of an approved route for an extended period of time. In this case, detours may be taken provided that certain procedures are followed in lieu of having specific advance NRC approval of the revised portion of the route. These procedures are as follows:

- (1) The licensee establishes that the subject portion of the approved planned route is impassable or that conditions along such route will result in unplanned stops in the shipment schedule of one hour or more.
- (2) The licensee establishes that it is impractical to utilize an alternative route previously approved by the Commission.
- (3) The licensee establishes that the detour selected will most likely allow for uninterrupted travel until the shipment is able to resume travel along the planned approved route or along a previously approved alternative route, or result in fewer stops or delays as compared to the planned approved route.
- (4) The licensee assures that contacts with the LLEA along the proposed detour route have previously been made, or that they are made at the time a determination is made to

use the detour route (e.g., radiotelephone calls to telephone information operators, adjacent LLEA jurisdictions, or state police may be used to obtain the desired information).

- (5) The communications center is notified by the shipment's escort(s) of the change in shipment itinerary, any delays experienced along the planned or alternate route, and the estimated duration of the detour.
- (6) Arrangements are made to provide any additional resources for physical protection needed to comply with the specific requirements of §73.37(c)(1), (d)(1) or (e)(1) in case it becomes necessary to travel within a heavily populated area previously not included as part of the planned approved route.

Escorts should anticipate as much as possible the need for making unplanned detours so that the shipment may keep moving without interruption. The shipment should not be stopped solely for the purpose of making new LLEA contacts or communicating with the communications center. In some situations, however, stops may be unavoidable. This may occur, for example, if the only alternative for the detour involves transit through a designated heavily populated area for which the additionally required escort resources are not immediately available. In this case, the shipment should proceed to the nearest available safe haven before making the stop.

2.9 Avoidance of Intermediate Stops

Introduction. Section 73.37(b)(8) provides that shipments be planned to avoid scheduling of intermediate stops to the extent practicable.

Objective. This provision is in recognition that the shipment is generally more vulnerable when stationary than while in motion. By minimizing the number of scheduled stops during any particular shipment, the opportunities for attempts at radiological sabotage are correspondingly reduced.

Shipment planning. When planning scheduled stops for spent fuel shipments, each planned stop should be justified by a security or operational need for making the stop. Whenever possible, stops should be planned to serve multiple purposes, and should not be planned to occur within heavily populated areas. The licensee should arrange with the carrier for the greatest degree of cooperation possible to assure that the number of stops is minimized. Stops should be planned to avoid set patterns in the times and places they occur.

2.10 Procedures at Stops

Introduction. Shipments are required under §73.37(b)(9) to be maintained under surveillance during periods when the shipment vehicle is stopped, or when the shipment vessel is docked.

Objective. The shipment is considered to be most vulnerable to sabotage attack while stationary. Maintaining the shipment under surveillance during periods when the shipment is at rest is intended to assure that any sabotage attack would be detected as early as possible so that the

adversary would have only a minimal amount of time to attempt the sabotage before response forces arrived.

Road shipments stopped outside of heavily populated areas. At least one escort is required to maintain visual surveillance of the shipment during periods when the transport vehicle is stopped. This requirement is intended to apply to stops made for purposes other than compliance with traffic regulations or due to the exigencies of normal traffic conditions, which would be expected to result in stops of very limited duration. The surveillance is required to be performed by a person trained as an escort. However, the driver may relieve the escort for short periods provided that he is familiarized with the surveillance procedures.

Normally, surveillance should be maintained from inside the transport vehicle. However, it may also be practicable to maintain surveillance from outside of the transport vehicle, such as from an escort vehicle or another transport vehicle, or from a phone booth. The position chosen from which surveillance will be maintained should meet each of the following conditions:

- (1) The means for immobilizing the transport vehicle should be readily available to the person responsible for maintaining surveillance.
- (2) The person performing the surveillance should have readily available to him the radiotelephone or other equivalent means of two-way voice communications.

- (3) The person performing surveillance should have readily available to him the route overview information containing LLEA contacts (see Section 2.7).

Normally, when the transport vehicle is stopped and is being maintained under surveillance, whether occupied or not, the doors and windows of the transport vehicle should be closed and locked to impede unauthorized access to the vehicle. Just prior to making the stop, the escort should assure that the radiotelephone or equivalent communications equipment is operating properly, and that the appropriate LLEA contacts and telephone numbers are immediately available. The person performing the surveillance should remain continually alert to any external activities which may indicate a possible threat to the safety or security of the shipment. When there is more than one vehicle being utilized for the shipment (an escort vehicle or additional transport vehicles), surveillance responsibilities may be divided among different personnel if adequate communications are provided to allow the appropriate level of coordination. These communications may be provided through the use of CB radio or walkie-talkie, etc.

Persons and vehicles involved with the shipment should be situated, to the extent practicable, in such a manner that they cannot be simultaneously prevented from communicating with the LLEA in case of attack.

Road shipments stopped within heavily populated areas. Stops should especially be avoided within heavily populated areas, in accordance with

§73.37(b)(8). However, unscheduled stops within such areas may sometimes become necessary. If such stops occur, at least one of the persons performing the surveillance at a given time should be one of the armed escorts required under §73.37(c)(1).

The basic procedures outlined above for road shipments stopped outside of heavily populated areas are applicable also for stops within heavily populated areas. However, because a potential adversary would be presented with fewer obstacles to a successful sabotage of a spent fuel shipment already within a heavily populated area, additional precautions should be taken to protect the shipment during unanticipated stops within such areas, as outlined below:

- (1) The full complement of armed escorts available at the time of the shipment's stopping should participate in the surveillance, as well as any drivers or other unarmed escorts not engaged in essential activities associated with the purpose for which the stop was made. This will result in a degree of redundancy.
- (2) The armed escorts, where more than one is available, should be separated so as to prevent, to the extent practicable, their being simultaneously incapacitated by a single adversary act.
- (3) Escorts or drivers participating in the surveillance should be prepared to attempt to communicate with the LLEA either directly (e.g., landline telephone) or indirectly (e.g., CB radio), in case the radiotelephone or other equivalent two-way voice communications becomes inoperable.

- (4) Where unusual circumstances arise, if the LLEA is not already directly involved in escorting the shipment [in accordance with §73.37(c)(1)(i)], the LLEA should be contacted to advise them of the presence of the shipment within their jurisdiction, the purpose and projected duration of the stop, and to request that they be alert for possible calls for assistance within the stated period.

These and other procedures should be included among the safeguards emergency procedures required under §73.37(b)(2).

Rail shipments. Procedures for maintaining visual surveillance of the shipment car while a rail shipment is stopped reflect the same concerns which form the basis of surveillance procedures for road shipments. During all anticipated or unanticipated stops, the shipment car should be placed under surveillance by at least one escort who will normally be positioned on the train within view of the shipment car (e.g., in the caboose). If the escort does not remain on the train, the escort should take up a protected position from which he has an unobstructed view of the shipment car, and possible approaches to it. The escort should be located in such a manner that he has immediate access to (1) the radio-telephone or other equivalent NRC approved communications equipment by which he may communicate with the LLEA and the communications center, and (2) the route overview information containing LLEA contacts (see Section 2.7). The escort should remain alert to any external activities which may indicate a possible threat to the safety or security of the shipment.

Rail shipments should be planned to the extent practicable to especially avoid intermediate stops within heavily populated areas. However, should such stops become necessary, the persons maintaining surveillance should be the armed escorts required by §73.37(d)(1), supplemented by as many other persons (e.g., unarmed escorts, train crew) as may be available during the period the shipment is stopped, to assure a degree of redundancy in protection of the shipment. Where more than one person is maintaining surveillance, they should be separately located so as to ensure to the extent practicable that a single adversary attack cannot simultaneously prevent communications with the LLEA by any of them.

Sea shipments. Procedures for maintaining surveillance of sea shipments of spent fuel apply to shipments located temporarily on a dock, and to shipments located aboard a docked vessel. For outgoing shipments, the surveillance must be provided continuously from the time the shipment arrives at the terminal aboard a road or rail transport vehicle to the time the loaded shipment vessel leaves the dock. Incoming shipments must be placed under continuous surveillance from the time the shipment vessel docks to the time the shipment is loaded onto a road or rail transport vehicle and begins to be moved from the terminal by road or rail. These procedures also apply to intermediate stops at U.S. ports by shipment vessels, during which time the shipments remain on the shipment vessel.

Visual surveillance of the shipment while on board the shipment vessel may be accomplished by direct observation of the shipment, or by observing the points of access to the shipment if it is located in an enclosed

cargo compartment. Shipments of spent fuel should be loaded and unloaded with a minimum of delay to limit the time spent at the transfer point.

Surveillance procedures will be similar to that provided for rail and road shipments. Escorts performing the surveillance should have immediate access to (1) a radiotelephone or other NRC-approved equivalent means of communications by which they could call the LLEA and communications center, and (2) the route overview information containing LLEA contacts (see Section 2.7). Especially in heavily populated areas, the escorts should be located in protected positions while maintaining surveillance. Escorts should always be on the alert to any external activities which could threaten the safety or security of the shipment. Within heavily populated areas, the escorts conducting the surveillance should be armed.

2.11 Escort Training Requirements

Introduction. Section 73.37(b)(10) requires each individual serving as an escort to have successfully completed a training program in accordance with Appendix D of 10 CFR Part 73. Ship's officers serving as unarmed escorts and members of local law enforcement agencies are exempted from this requirement.

Objective. The purpose of this requirement is to assure that the escorts understand the requirements for the protection of spent fuel shipments and that they understand and are trained in the procedures necessary to carry out such requirements.

Discussion. Escorts for road, rail, or sea shipments of spent fuel should undergo a training course in accordance with Appendix D of 10 CFR Part 73. This Appendix D contains a list of the subjects to be covered in such a course. The detailed material taught under each subject heading should be adapted to the particular mode(s) of transportation utilized for the shipment the escort is to be assigned to protect. The licensee can adjust the length of the course depending upon the background and experience of the individuals selected to be escorts. The licensee should be prepared to demonstrate the efficacy of the training program to comply with NRC's inspection and enforcement program. This can be done, for example, by keeping records of evaluations conducted by the licensee of the trainees' progress in the instruction program (e.g., written or oral tests, field tests, observation of performance in the field).

While drivers (for road shipments) are not required by the regulation to complete a training program in accordance with Appendix D, a certain amount of instruction is required [§73.37(c)(5)] to familiarize them with procedures for transport vehicle immobilization, communications, and other security procedures they are expected to help implement, such as those associated with routing requirements and rest stops. Ship's officers should similarly be familiarized with procedures they are expected to implement if they are hired to serve as escorts for sea shipments.

Appendix D includes additional training requirements for armed escorts beyond those for unarmed escorts. In general, it is intended that an

armed escort be trained to perform all the duties expected of an unarmed escort, and in addition, that he be trained in the use of firearms and tactics for the active protection of spent fuel shipments.

Members of a law enforcement agency serving as escorts are considered to be adequately trained to carry out the escort duties they are expected to perform, and are not required to undergo the training specifically required for private escorts. A member of the LLEA should, however, be briefed on the shipment procedures as necessary for the performance of the escort functions.

2.12 Periodic Contacts with Communications Center

Introduction. Section 73.37(b)(11) provides that escorts for road and rail shipments make calls to the communications center [required to be established by §73.37(b)(4)] at least every two hours to advise of the status of the shipment for road and rail shipments. Such calls are also required from escorts for sea shipments during periods when the shipment vessel is docked at a U.S. port.

Objective. The purpose of this requirement is to assure early detection of any sabotage attempt that might result in a loss of communications between the shipment escorts and the communications center, with a coincident failure of the escorts to successfully contact the LLEA to request assistance. By maintaining frequent contacts with the shipment escorts, the communications center staff can also describe, with reasonable accuracy, the general location of a missing shipment based upon information obtained in the latest communications. This would aid in the early relocation and recovery of the shipment.

Procedures for periodic calls. Calls should normally be made to the communications center using the radiotelephone or equivalent means of communication required to be provided by §73.37(c)(3)(ii), (d)(3), or (e)(3). The escorts should make frequent routine contacts with the communications center to keep the staff at the center advised of the shipment's general location and status. Such contacts should not be more than two hours apart. Supplementary contacts should be made whenever the shipment undergoes a significant change in status (i.e., when making a stop requiring surveillance, resuming travel, or taking detours) or when delays are encountered which will result in changes in the shipment's schedule or itinerary. Calls should also be more frequent when the shipment is within or in close proximity to heavily populated areas. In particular, the communications center should be informed when entry to or exit from a designated heavily populated area is accomplished, at which time the status of the escorts that have been arranged for should also be reported.

3.0 ROAD SHIPMENTS

This chapter addresses requirements affecting the road portions of a spent fuel shipment by rail or sea, as well as shipments made entirely by road.

3.1 Protection of Road Shipments within Heavily Populated Areas

Introduction. Section 73.37(c)(1) requires that a road shipment within a heavily populated area be escorted by either of two means. Under the first alternative [73.37(c)(1)(i)], the transport vehicle would be escorted by a member of the LLEA in a LLEA mobile unit. Under the second alternative, the transport vehicle would be accompanied by two separate, private escort vehicles occupied by armed escorts.

Objective. The purpose of this requirement is to assure that, until LLEA response forces arrive, there is a capability for immediate, active protection of a shipment against sabotage while the shipment is within a heavily populated area.

Physical protection system options. Two options are permitted the licensee in arranging for escorts for the protection of a road shipment of spent fuel in transit within a heavily populated area. The first of these options depends upon the active cooperation and participation of the local law enforcement agency in the jurisdiction(s) comprising the heavily populated area. In the second option, the escorts are private guards hired by the licensee. The fact that the licensee is given the option of utilizing members of a local law enforcement agency as escorts does not mean that the LLEA of any given jurisdiction has an obligation to make the option available to the licensee by providing LLEA personnel

to serve as escorts. In some jurisdictions LLEA escorts may be locally required regardless of the presence of private escorts. Appropriate arrangements would have to be made between the licensee and the pertinent LLEA for each of the designated heavily populated areas. The escort operation, whether done by LLEA or by private escorts, is to be continuous while the transport vehicle is within the bounds of a designated heavily populated area.

Escort provided by LLEA. As one of the permissible options available under the regulation, licensees may arrange for a road shipment traveling within a heavily populated area to be escorted by a member of the LLEA for the given jurisdiction(s). Under this option, the transport vehicle is required to be occupied by at least two individuals. One of these would be the driver, while the second would be a trained escort, though one not necessarily armed. If additional transport vehicles are used in a convoy for a single shipment, each additional transport vehicle may be occupied solely by the driver if all convoy vehicles remain within sight of one another at all times, and maintain intra-convoy communications via citizens band (CB) radio or walkie-talkie. If any convoy vehicle must stop, then all convoy vehicles should stop to assure the continuity of escort protection for all the convoy vehicles. The unarmed escort(s) located in the transport vehicle(s) should remain especially alert to recognize possible threats to the safety or security of the shipment and should be responsible for operating the communications equipment when necessary and coordinating movements of the transport vehicle(s) with the escort vehicle.

The transport vehicle(s) must be escorted by at least one member of the LLEA who is armed and who occupies a mobile unit of the LLEA. It is intended that this mobile unit be an enclosed motor vehicle, rather than a motor cycle, motor scooter, or other open conveyance that would leave the LLEA member especially vulnerable to attack. The LLEA member may be the driver and sole occupant of the mobile unit being used, and should remain within sight of the transport vehicle(s) while traveling through the heavily populated area. He should be familiarized with the planned route and the procedures to be followed in a safeguards emergency.

Escort by private guards. A spent fuel shipment traveling within a heavily populated area may also be escorted by private guards. In this case, the transport vehicle(s) may be occupied solely by the driver(s) of the vehicle(s). However, the shipment must be escorted by at least two trained armed escorts, each occupying one of two separate vehicles other than the transport vehicle(s). Generally, one escort vehicle should lead the transport vehicle(s) while the second trails it (them). The escort vehicles are expected to be enclosed motor vehicles, and the escorts should be trained in accordance with Appendix D of Part 73. Normally, only two armed escorts are required regardless of the number of transport vehicles used in a single shipment. However, if two or more transport vehicles are to be escorted by the same set of two armed escorts in two separate vehicles, the same convoy procedures should be followed as described above for LLEA escorted shipments. It is noted that drivers of escort vehicles are expected to comply with all requirements of the Federal Motor Carrier Safety Rules applicable to commercial

drivers for interstate shipments, which include mandatory rest periods for drivers after certain numbers of hours of driving. This may be an especially significant consideration in case the same escorts are intended to be used over the entire length of the shipment.

The armed escorts should remain especially alert during transit through the heavily populated area to recognize possible threats to the safety or security of the shipment. The driver of the transport vehicle, or one of the armed escorts in the escort vehicles, depending upon where the radiotelephone equipment required to be provided for the shipment is located, should be prepared to communicate with the LLEA in case of emergency. The escort vehicles should be driven in such a way that each transport vehicle is under direct observation by one of the armed escorts at all times while traveling through the heavily populated area.

3.2 Protection of Road Shipments Not within a Heavily Populated Area

Introduction. Section 73.37(c)(2) requires that a transport vehicle not within any heavily populated area be (i) occupied by at least one driver and one other individual who serves as escort; or (ii) occupied by a driver and escorted by a separate vehicle occupied by two individuals who serve as escorts; or (iii) escorted as set forth in §73.37(c)(1). These requirements reflect a reduced level of protection in areas that are not heavily populated, but also allow the licensee to employ the same escort configuration he may have employed satisfy the protection requirements within heavily populated areas.

Objective. Currently available information indicates that the maximum estimated potential consequences of successful sabotage of a spent fuel shipment not within a heavily populated area are much less severe than that which might occur within a heavily populated area. Thus, the required level of protection for spent fuel shipments outside the designated heavily populated areas is less than that required within such areas. The objective of the physical protection requirements for spent fuel shipments outside of heavily populated areas is to assure early detection of possible threats to the shipment and communicate requests for assistance to the LLEA immediately upon detection of such threats, so that a potential adversary cannot gain control of the shipment and move it into a heavily populated area for the purpose of attempting radiological sabotage there.

Escort configuration options not within any heavily populated area. The licensee may choose from among two specific escort configuration options described below to satisfy the physical protection requirements for spent fuel shipments not within a heavily populated area. Alternatively, the licensee may also employ one of the escort configuration options described in Section 3.1 for protection of a road shipment within a heavily populated area. This last option is permitted to accommodate licensees who may find it desirable to utilize the same group of escorts, drivers and vehicles (exclusive of any LLEA participation) over most or all of a route. These requirements apply to all portions of the routes of shipments which are within U.S. territory except those

which are included within the designated heavily populated areas. The escorts are not required to be armed when escorting shipments not within heavily populated areas.

Single vehicle option. In this option, the transport vehicle must be occupied by at least two individuals, one of whom is the driver, while the other is a trained escort. No additional escort vehicles are required. If both occupants of the transport vehicle are trained and qualified as drivers, and are to alternate driver and escort duties, each of them must also be trained as escorts in accordance with Appendix D of Part 73.

The escort normally performs most of the physical protection functions required (e.g., communications, surveillance at stops, instruction of the driver regarding routes and locations of stops, and possible immobilization). If the driver performs certain of the safeguards oriented tasks, he should be familiarized with them in advance. The escort should be thoroughly familiar with route overviews, LLEA contacts, local prohibitions and all safeguards requirements. He should remain especially vigilant to recognize possible threats to the safety or security of the shipment, and should be prepared at all times to immediately communicate with the LLEA to summon assistance, if necessary. Neither the driver nor the escort is required to be armed to protect shipments outside of heavily populated areas.

In this option, additional transport vehicles in a single shipment may be occupied solely by their drivers provided that the convoy procedures described in Section 3.1 are followed.

Separate escort vehicle option. Under this option, the transport vehicle may be occupied solely by the driver, but is accompanied by a separate vehicle occupied by at least two trained escorts. This option may be particularly suited to those situations where the carrier does not authorize non-drivers to occupy the cab of the transport vehicle, or where more escorts are to be employed than can legally be accommodated in a single transport vehicle. All persons who serve as escorts during the shipment are required to be trained in accordance with Appendix D of Part 73. The escorts' responsibilities are the same as for the single vehicle shipment except that the escorts have the added responsibility of coordinating the movements of the transport vehicle with the escort vehicle. If more than one transport vehicle is employed for a single shipment, no more than the two minimally required escorts travelling in a separate escort vehicle are required provided that the convoy procedures described in Section 3.1 are followed.

During the course of the shipment, the escort vehicle should be situated relative to the transport vehicle(s) so as to allow the escorts continuous direct observation of the transport vehicle, except for brief lapses that might be caused by passage through sections of road featuring hills, curves, other traffic, etc. The escort and transport vehicles should maintain communications using the citizens band (CB) radio. The escort vehicle can lead or trail the transport vehicle, as necessary to effectively perform the escort functions without establishing predictable patterns. If additional transport vehicles are used in a single shipment without additional escort vehicles, the convoy procedures described in Section 3.1 should be followed.

3.3 Communications for Road Shipments

Introduction. Escorts are required in accordance with §73.37(c)(3) to be provided with the capabilities for communicating with the communications center, local law enforcement agencies and one another. These communications are normally implemented through the use of radiotelephones and citizens band (CB) radio equipment, but other equivalent means of two-way voice communications are permitted provided they are approved by the NRC. Any LLEA mobile units employed as escort vehicles are also required to be equipped with citizens band (CB) radio and the normal LLEA radio communications equipment for the given jurisdiction.

Objective. The purposes of these communications requirements for spent fuel shipments by road are to (i) provide a capability for the escorts to call for assistance when necessary, either directly to the LLEA, or indirectly through the communications center, (ii) permit personnel at the communications center to monitor the progress of the shipment, (iii) provide the escorts with a means of quickly obtaining route and LLEA contact information when unexpected detours become necessary, and (iv) provide a means of coordinating the movement of transport and escort vehicles when more than one vehicle is used in a shipment.

Communications equipment. Radiotelephone or equivalent two-way voice communications are required to be provided in at least one of the shipment vehicles. If the radiotelephone or other equivalent equipment is provided in an escort vehicle, it must be a vehicle which is committed to use along an entire road portion of the shipment. It is recognized that in some areas radiotelephone service may not be provided or may be

only marginally effective or ineffective. The route overview will normally indicate portions of the route where this is the case and indicate what alternative communications may be used. Usually, in such areas, periodic contacts with the communications center may be made by regular landline telephones. The shipment itinerary should be planned to the extent practicable so that additional stops are not required solely for the purpose of making such calls. Alternative communications systems (rather than radiotelephone) used by the licensee must be approved prior to the date of shipment. Such alternative equipment must be demonstrated by the licensee to have effectiveness at least comparable to radiotelephone along the proposed route.

Citizens band (CB) radio equipment is required to be provided in all transport and escort vehicles used in the shipment. This equipment is provided primarily to allow escorts to coordinate the movements of the different vehicles used in the shipment. It may also be used as an alternative means of contacting the LLEA when the radiotelephone or other equivalent long range communications equipment is not effective. All communications equipment to be used during the shipment's progress should be properly maintained and thoroughly checked out before the shipment starts.

Communications procedures. Communications between all escort and transport vehicles involved in the shipment should be maintained while enroute to assure that drivers and escorts not having access to the radiotelephone (or equivalent) communications are kept apprised of current developments (e.g., changes in road conditions or itinerary) as

the shipment progresses. All escorts and drivers should be knowledgeable of the specific citizens band (CB) channels normally monitored by the LLEA or REACT groups as they pass through different jurisdictions on the shipment route, so that in case of emergency the occupants of each transport or escort vehicle are capable of independently contacting the LLEA by CB radio (where such contact is possible).

It should be recognized that the preferred arrangement for combining the radiotelephone (or equivalent) communications capability with a particular escort configuration option is one in which an escort having responsibility for using such communications equipment is not also the driver of a vehicle, so that the escort is unencumbered in carrying out his communications and other duties while the shipment is moving. Location of the radiotelephone equipment in the cab of a transport vehicle occupied only by the driver would, for example, be one of the less desirable arrangements. If such an arrangement is utilized, the driver is required to be familiarized with the use and operation of the communications equipment.

3.4 Immobilization of Transport Vehicle

Introduction. Section 73.37(c)(4) requires that the transport vehicle be equipped with NRC-approved features that permit immobilization of the cab or cargo-carrying portion of the vehicle. This requirement also applies equally to any additional transport vehicles used in a single shipment. In this requirement, immobilization means rendering the loaded transport vehicle incapable of movement under its own power.

Objective. The purpose of this requirement is to deny an adversary who may succeed in gaining control of a transport vehicle a readily available means of moving the shipment to a location of his choice. If the shipment is located outside of a heavily populated area, this will prevent or delay the adversary from moving the shipment into a heavily populated area. If the adversary succeeds in gaining control of the transport vehicle within a heavily populated area, immobilization of the transport vehicle may be advisable in certain situations to prevent or delay the shipment from being moved from a less densely populated portion of such an area to one which is more densely populated, or from moving the shipment to a hiding place.

Operation. The immobilization technique should be implemented only when it is apparent that an attempt is being made to gain unauthorized control over the shipment, and there is no likelihood of avoiding capture through flight, or early interdiction by local law enforcement agency response forces. Immobilization should not be initiated in a way that would endanger the driver, escorts, or members of the public. Immobilization procedures should be developed and included in the emergency procedures document developed in accordance with §73.37(b)(2). These procedures should include consideration of situations which may occur within heavily populated areas as well as outside of such areas. Operation of the immobilization technique and the procedures governing its use should be covered in both the training course for escorts and the familiarization program for drivers (see Sections 2.11 and 3.5).

Techniques of immobilization. The immobilization techniques should meet each of the following criteria:

- a. A means must be provided so that the immobilization device and procedure can be operated and performed from inside the cab of the transport vehicle by one person.
- b. Immobilization should be accomplished in a short period of time (several seconds) after the immobilization procedure is initiated.
- c. After the immobilization is accomplished, skilled technical personnel should require at least one half hour to return the transport vehicle to normal operating condition. It should not be possible, by coercion of the drivers or escorts for an adversary to bypass the effects of the immobilization or to significantly shorten the time needed to make the transport operational again.
- d. The device should not pose no significant safety hazard before, during or after the immobilization.

Devices employed to effect immobilization may be mechanical or electrical. They should be relatively simple and reliable to operate so that they can be activated quickly under stressful conditions. Some techniques that may form the basis for acceptable immobilization procedures are:

- o Severing the main wire harness under the dashboard.

- o Disabling a critical portion of the ignition system by overloading or dismantling a key component of the ignition system or starting system.
- o Disabling the gear shifting mechanism.
- o Use of an electronic ignition control system with procedurally irreversible time delay feature.

The specific device and procedures to be utilized are required to be approved in advance by the NRC.

3.5 Driver Familiarization Program

Introduction. Transport vehicle drivers are required under §73.37(c)(5) to be familiarized with, and capable of implementing, transport vehicle immobilization, communications and other security procedures.

Objective. The purpose of this requirement is to assure that drivers involved in spent fuel shipments by road are able to function as an integral part of the spent fuel shipment physical protection system to the extent intended by the licensee, or as minimally required by the regulation.

Driver physical protection responsibilities. Drivers may become involved in the physical protection of the shipment to a greater or lesser extent depending upon the arrangements made between the carrier and the shipper or receiver (licensee). The greatest degree of driver involvement would occur when the driver is also a fully trained escort and alternately assumes driving and physical protection responsibilities with other escorts. However, in other circumstances the driver may be

only minimally involved, in which case he must at least be familiarized with the basic security functions of transport vehicle immobilization, radiotelephone and CB radio communications, and any other security procedures which would affect the driver's operation of the transport vehicle.

The driver familiarization program need not include formal classroom instruction, and no minimum number of hours of instruction is required. It is sufficient for the licensee to provide a limited amount of informal instruction and demonstrations to assure that the driver can perform the safeguards functions expected of him. The greater the driver's intended involvement in the physical protection system, the greater will be the scope of the required familiarization program.

4.0 RAIL SHIPMENTS

This chapter addresses requirements affecting the rail portion of a spent fuel shipment.

4.1 Protection of Rail Shipments within Heavily Populated Areas

Introduction. Section 73.37(d)(1) requires that a rail shipment car within a heavily populated area be accompanied by at least two armed escorts, who may be members of a local law enforcement agency, at least one of whom is stationed at a location on the train that will permit observation of the shipment car.

Objective. The objective of this requirement is the same as for the corresponding requirement for road shipments (see Section 3.1).

Physical protection system options. The transport vehicle, in the case of a rail shipment, is the shipment car carrying one or more spent fuel casks. A single spent fuel rail shipment may involve more than one shipment car. In this case, the requirements for rail shipments should be understood to apply to the shipment cars as a group, unless noted otherwise. A spent fuel shipment by rail must be protected continuously by at least two armed escorts while traveling within a heavily populated area. At least one of these escorts is required to be situated on the train in a manner that will permit observation of the shipment car(s). However, continuous surveillance of the shipment car, while it is in motion, is not required. Usually the escorts will travel in the train's caboose with the shipment car(s) either directly ahead or separated by a single buffer car. The armed escorts may be private guards (e.g., railroad police) or members of the LLEA. The escorts should be trained

in accordance with Appendix D of 10 CFR Part 73, and should be thoroughly familiar with all safeguards requirements. A copy of the route overview data (see Section 2.7) should be readily available to them at all times.

During transit through a heavily populated area, the rail shipment escorts should be especially alert to recognize any situations which might constitute a threat to the safety or security of the shipment. The escorts should also maintain close cooperation with the train's crew to assure adherence as close as practicable to the shipment schedule and assure they remain aware of all safeguards requirements as the shipment progresses. The emergency procedures developed in accordance with §73.37(b)(2) should be collected in a document which is readily available to the escorts. These procedures should specifically address possible safeguards emergency situations which might arise within heavily populated areas.

4.2 Protection of Rail Shipments Not within a Heavily Populated Area

Introduction. Section 73.37(d)(2) requires that a rail shipment car not within any heavily populated area be accompanied by at least one escort stationed at a location on the train that will permit observation of the shipment car.

Objective. Similarly to the case of road shipments, the required level of protection for spent fuel rail shipments not within a heavily populated area is permitted to be lower than that within heavily populated areas. The objective of the physical protection requirements for

shipments outside of heavily populated areas is similar to that for road shipments outside of such areas.

Escort requirement. Only one trained escort is required to accompany a spent fuel shipment while it remains outside of any heavily populated areas. The escort may be a privately hired security guard, a licensee employee, or a member of the railroad police organization who regularly provides security for railroad property and shipments. In any of these cases, the escort should be trained in accordance with Appendix D of Part 73.

While the shipment is moving, the escort should be positioned in such a manner that he may frequently observe the shipment car but need not maintain continuous surveillance of it. When the shipment is stopped, however, the escort should maintain continuous surveillance of the shipment car as discussed previously (Section 2.10).

The escort for a spent fuel rail shipment traveling outside of heavily populated areas should remain in close contact with the train's crew to assure (1) that he learns immediately of any unanticipated route changes or delays in the shipment, (2) that the train's crew is adhering to the planned schedule and procedures, (3) that the crew is aware of the requirements for additional protection should the train have to enter a heavily populated area not on the shipment's original itinerary, and (4) that the escort is apprised of any information which develops concerning the nature of any detours or delays experienced so that he may relay this information to the communications center. Also, the escort should

arrange to be made aware of upcoming stops so that appropriate preparations can be made to implement established surveillance and related procedures as soon as the train stops.

4.3 Communications for Rail Shipments.

Introduction. The escorts for a rail shipment of spent fuel are required to have the capability of communicating with the communications center and with the LLEA through the use of radiotelephone equipment or other equivalent means of two-way voice communications approved by the NRC. Such communications must be available on the train.

Objective. The purposes of the communications requirements for spent fuel shipments by rail are to (i) provide a capability for the escorts to call for assistance when necessary, (ii) permit personnel at the communications center to monitor the progress of the shipment, and (iii) provide the escorts with a means of quickly developing new LLEA contacts and obtaining new route information when unexpected detours become necessary.

Communications equipment. Radiotelephone or other equivalent two-way voice communications are required to be provided for the escorts' use on board the train. An acceptable equivalent would be the communications system regularly used by the train's crew. Such communications equipment must be made available for the escorts' use on board the train. Reliance on the use of telephones in call boxes located along the tracks is not generally acceptable because the telephones might not be available in case the train was forced to make an emergency stop. However,

call boxes could be relied upon for short intervals where radiotelephone service is not available. If the train's communications system is used, complementary communications capabilities such as walkie-talkie or CB radio equipment should be provided to assure the escorts will have immediate access to the communications equipment when necessary, if it is located apart from where the escort is situated. The shipment route overview will generally indicate where radiotelephone or other equivalent communications equipment provided may not be effective. For such areas, alternative means of communication should be planned.

All equipment used to satisfy the communications requirements of §73.37 (d)(3) should be properly maintained and checked out before the shipment starts, to assure it is in good operating condition just prior to its intended use.

Communications procedures. When more than one escort is employed for a given rail shipment, the communications equipment may be made available to just one of the escorts provided that the remaining escorts are kept apprised of all radiotelephone (or equivalent) communications on a frequent basis during the progress of the shipment.

5.0 SEA SHIPMENTS

This chapter addresses requirements affecting the portions of spent fuel shipments that are by sea.

5.1 Protection of Sea Shipments within Heavily Populated Areas

Introduction. Section 73.37(e)(1) requires that a vessel bearing spent fuel and docked within a heavily populated area is protected by (i) two armed escorts stationed on the vessel or on the dock at a location that will permit observation of the vessel; or (ii) an armed member of a local law enforcement agency who is equipped with normal LLEA radio communications, and who is stationed on the vessel or on the dock at a location that will permit observation of the vessel.

Objective. The purpose of this requirement is to assure that there is a capability for immediate, active protection of a shipment against radiological sabotage while the shipment vessel is docked within a heavily populated area. This objective is to be achieved by ensuring that there are people on duty on or near the shipment vessel who are capable of early detection of a sabotage attempt and who have the capability to delay or prevent sabotage until LLEA response forces arrive.

Escort requirement. This requirement applies only while a vessel bearing spent fuel is docked within a heavily populated area. Thus, the primary duty of the escort(s) will be to maintain surveillance of the shipment as required by §73.37(b)(9). A vessel is considered to be docked when it is made fast to the dock and passage ways from the vessel

and facilities have been put in place for loading or unloading passengers or cargo. Vessels underway or being towed, or vessels at anchor but not fastened to the dock, are not considered to be docked.

Two escort options are permitted to be used to satisfy the requirements of §73.37(e)(1). The first option requires that the shipment is protected by two armed escorts, while the second option provides that the shipment may be protected by a single member of a local law enforcement agency, provided that he is equipped with the normal LLEA radio communications.

Escort duties for the protection of a shipment on board a vessel are similar to those for road and rail shipments. The escorts should always remain vigilant to detect possible threats to the safety and security of the shipment. It is recognized that it may not be possible for the entire shipment vessel to be kept under continuous surveillance. In such cases, the escort or escorts should focus on the possible approaches a potential adversary may have to gain access to the shipment. Some patrolling may be done by the escort(s) to assure that the approaches to the shipment are covered.

5.2 Protection of Sea Shipments Not within a Heavily Populated Area
Introduction. Section 73.37(e)(2) requires that a shipment vessel be protected by an escort while in U.S. territorial waters, or while docked at a U.S. port, but not within a heavily populated area. A single escort is required, whose main function will be to assure that the shipment is not off-loaded except as provided by the licensee.

Objective. The purpose of this requirement is to assure that the shipment is under surveillance against possible sabotage attempts while in U.S. waters, so that the LLEA may be alerted to respond to any attempt to sabotage the shipment.

Escort requirement. For the purpose of this requirement U.S. waters are considered to extend three miles from U.S. land territory other than small offshore islets. U.S. land territory includes the forty-eight contiguous states, Alaska, the eight largest islands of Hawaii, the three major islands of the U.S. Virgin Islands, Puerto Rico, Guam, and Tutulia of American Samoa.

The escort may be provided in a number of ways. The escort may come aboard the vessel at the time of loading (or stopover) in a foreign port; he may come aboard as the ship nears U.S. territory as do ship's pilots; or he may be a ship's officer who assumes the role of escort as the shipment enters U.S. waters. The regulation does not require that an escort be provided while the vessel is beyond the territorial bounds specified.

The escort should be familiar with the shipment vessel's itinerary. Prior to entering a port within a heavily populated area, the escort should ascertain that the shipment is intact and has not been tampered with. During unloading of any cargo in U.S. territory, the escort should assure that the shipment is unloaded only at the port authorized by the shipper (licensee). Should any deviation from authorized handling of the shipment occur, the escort should bring the matter to the immediate attention of the ship's most senior officer present at the

time. The escort should also notify the licensee immediately by radiotelephone, or other equivalent communications means provided, if it appears that the shipment is likely to be unloaded at a port other than the planned destination.

5.3 Communications for Sea Shipments

Introduction. Section 73.37(e)(3) requires that radiotelephone (or other equivalent means of NRC-approved two-way voice communications) be provided for the use of escorts during the portion of the shipment which is in U.S. waters.

Objective. The purpose of this requirement is similar to that for road and rail shipments, which is primarily to assure that a capability exists to contact the LLEA in case a threat is detected to the safety or security of the shipment.

Communications equipment. The communications equipment provided may be radiotelephone equipment, or the ship's regular ship to shore radio communications system may be used. For shipments within a heavily populated area, a single LLEA member serving as escort is required to be equipped with the normal LLEA communications.

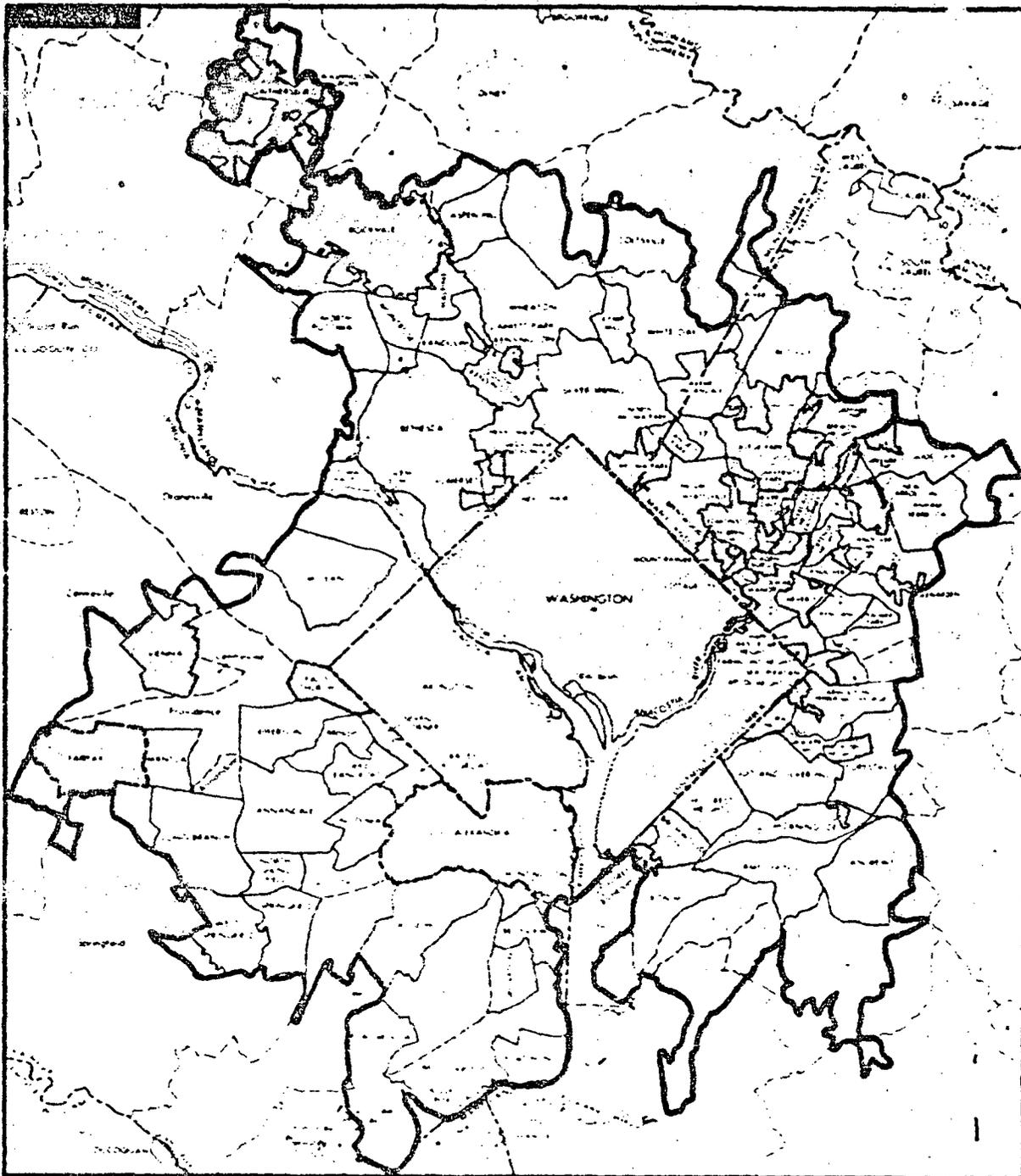
APPENDIX A
LIST OF
DESIGNATED HEAVILY POPULATED AREAS

A1. Introduction

Heavily populated areas are designated for purposes of the regulation of spent fuel shipments in terms of urbanized areas. Urbanized areas are regional areas within United States territory which have been defined by the Bureau of the Census (U.S. Department of Commerce) to indicate the extent of urbanization surrounding the larger cities in the United States.* In some cases, two or more large cities may be clustered together to form a single urbanized area. In other cases, extensive urbanization surrounds relatively small cities.

For purposes of regulation, a shipment is said to lie within a heavily populated area if it is within three miles of the boundary of an urbanized area, as defined by the Bureau of the Census, having a total population greater than or equal to one hundred thousand (100,000) persons. It is noted that the boundaries of many urbanized areas do not necessarily conform to the boundaries of the political subdivisions of which they are composed. Detailed maps of the urbanized areas, such as the example shown in Figure A-1, may be found in the reference cited below.

*U.S. Bureau of the Census, Supplementary Report, 1970 Census of Population, Series PC(S1)-108, "Population and Land Area of Urbanized Areas for the U.S.: 1970 and 1960." April 1979. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.



Typical mapping of an urbanized area as provided by the Bureau of the Census. The heavily populated area corresponding to this urbanized area includes the area extending three miles beyond the indicated boundary lines of the urbanized area.

Figure A-1

A2. List of Urbanized Areas

The following list includes those urbanized areas designated as heavily populated areas. It is to be used to facilitate planning protection for spent fuel shipments. From time to time the designation of heavily populated areas may be changed to reflect new information. Thus, this list may not be complete at the time of a given shipment. An updated list of heavily populated areas designated by the Commission for purposes of the regulation of spent fuel shipments should be obtained from the Commission at the time proposed shipment routes are being planned.

Within the United States

Akron, Ohio

Albany-Schenectady-Troy, New York

Albuquerque, New Mexico

Allentown-Bethlehem-Easton, Pa. - New Jersey

Amarillo, Texas

Anchorage, Alaska

Ann Arbor, Michigan

Appleton, Wisconsin

Atlanta, Georgia

Atlantic City, New Jersey

Augusta, Georgia - S.C.

Aurora-Elgin, Illinois

Austin, Texas

Bakersfield, California

Baltimore, Maryland

Baton Rouge, Louisiana
Beaumont, Texas
Biloxi-Gulfport, Mississippi
Binghamton, New York
Birmingham, Alabama
Boston, Massachusetts
Bridgeport, Connecticut
Brockton, Massachusetts
Buffalo, New York
Canton, Ohio
Cedar Rapids, Iowa
Champaign-Urbana, Illinois
Charleston, South Carolina
Charleston, West Virginia
Charlotte, North Carolina
Chattanooga, Tennessee-Ga.
Chicago, Illinois-Northwestern Ind.
Cincinnati, Ohio-Ky.
Cleveland, Ohio
Colorado Springs, Colorado
Columbia, South Carolina
Columbus, Georgia-Ala.
Columbus, Ohio
Corpus Christi, Texas
Dallas, Texas
Davenport-Rock Island-Moline, Iowa-Ill.

Dayton, Ohio
Daytona Beach, Florida
Decatur, Illinois
Denver, Colorado
Des Moines, Iowa
Detroit, Michigan
Duluth-Superior, Minnesota-Wis.
Durham, North Carolina
El Paso, Texas
Erie, Pennsylvania
Eugene, Oregon
Evansville, Indiana
Fall River, Massachusetts-R. I.
Fayetteville, North Carolina
Flint, Michigan
Fort Lauderdale-Hollywood, Florida
Fort Wayne, Indiana
Forth Worth, Texas
Fresno, California
Grand Rapids, Michigan
Green Bay, Wisconsin
Greensboro, North Carolina
Greenville, South Carolina
Harrisburg, Pennsylvania
Hartford, Connecticut
Honolulu, Hawaii

Houston, Texas

Huntington-Ashland, West Virginia-Ky.-Ohio

Huntsville, Alabama

Indianapolis, Indiana

Jackson, Mississippi

Jacksonville, Florida

Joliet, Illinois

Kalamazoc, Michigan

Kansas City, Missouri-Kansas

Knoxville, Tennessee

Lancaster, Pennsylvania

Lansing, Michigan

Las Vegas, Nevada

Lawrence-Haverhill, Massachusetts-N.H.

Lexington, Kentucky

Lincoln, Nebraska

Little Rock-North Little Rock, Arkansas

Lorain-Elyria, Ohio

Los Angeles-Long Beach, California

Louisville, Kentucky-Ind.

Lowell, Massachusetts

Lubbock, Texas

Macon, Georgia

Madison, Wisconsin

Melbourne-Cocoa, Florida

Memphis, Tennessee-Miss.

Miami, Florida

Milwaukee, Wisconsin

Minneapolis-St. Paul, Minnesota

Mobile, Alabama

Modesto, California

Montgomery, Alabama

Muskegon-Muskegon Heights, Michigan

Nashville-Davidson, Tennessee

New Bedford, Massachusetts

New Britain, Connecticut

New Haven, Connecticut

New London-Norwich, Connecticut

New Orleans, Louisiana

Newport News-Hampton, Virginia

New York, New York-Northeastern New Jersey

Norfolk-Portsmouth, Virginia

Norwalk, Connecticut

Ogden, Utah

Oklahoma City, Oklahoma

Omaha, Nebraska-Iowa

Orlando, Florida

Oxnard-Ventura-Thousand Oaks, California

Pensacola, Florida

Peoria, Illinois

Petersburg-Colonial Heights, Virginia

Philadelphia, Pennsylvania-New Jersey

Phoenix, Arizona
Pittsburgh, Pennsylvania
Port Arthur, Texas
Portland, Maine
Portland, Oregon-Washington
Poughkeepsie, New York
Providence-Pawtucket-Warwick, Rhode Island-Mass.
Provo-Orem, Utah
Pueblo, Colorado
Racine, Wisconsin
Raleigh, North Carolina
Reading, Pennsylvania
Reno, Nevada
Richmond, Virginia
Roanoke, Virginia
Rochester, New York
Rockford, Illinois
Sacramento, California
Saginaw, Michigan
St. Louis, Missouri-Ill.
St. Petersburg, Florida
Salt Lake City, Utah
San Antonio, Texas
San Bernardino-Riverside, California
San Diego, California
San Francisco-Oakland, California

San Jose, California

Santa Barbara, California

Sarasota-Bradenton, Florida

Savannah, Georgia

Scranton, Pennsylvania

Seattle-Everett, Washington

Shreveport, Louisiana

South Bend, Indiana-Michigan

Spokane, Washington

Springfield, Illinois

Springfield, Missouri

Springfield-Chicopee-Holyoke, Massachusetts-Conn.

Stamford, Connecticut

Stockton, California

Syracuse, New York

Tacoma, Washington

Tampa, Florida

Toledo, Ohio-Michigan

Topeka, Kansas

Trenton, New Jersey-Pa.

Tucson, Arizona

Tulsa, Oklahoma

Utica-Rome, New York.

Waco, Texas.

Washington, D.C.-Md.-Va.

Waterbury, Connecticut

Waterloo, Iowa

West Palm Beach, Florida

Wichita, Kansas

Wilkes-Barre, Pennsylvania

Wilmington, Delaware-N.J.

Winston-Salem, North Carolina

Worcester, Massachusetts

York, Pennsylvania

Youngstown-Warren, Ohio

In Puerto Rico

Arecibo, P.R.

Mayaguez, P.R.

Ponce, P.R.

San Juan, P.R.

U.S. NUCLEAR REGULATORY COMMISSION
BIBLIOGRAPHIC DATA SHEET

1. REPORT NUMBER (Assigned by DDC)

NUREG-0561/Rev. 1

4. TITLE AND SUBTITLE (Add Volume No., if appropriate)

Physical Protection of Shipments of Irradiated
Reactor Fuel: Interim Guidance

2. (Leave blank)

3. RECIPIENT'S ACCESSION NO.

7. AUTHOR(S)

5. DATE REPORT COMPLETED

MONTH May YEAR 1980

9. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Regulatory Improvements Branch
Division of Safeguards
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

DATE REPORT ISSUED

MONTH June YEAR 1980

6. (Leave blank)

8. (Leave blank)

12. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

10. PROJECT TASK WORK UNIT NO.

11. CONTRACT NO.

13. TYPE OF REPORT

Regulatory Report

PERIOD COVERED (Inclusive dates)

One time issue; current as of June, 1980

15. SUPPLEMENTARY NOTES

Guidance to accompany Final Interim Rule on same subject.

14. (Leave blank)

16. ABSTRACT (200 words or less)

During May, 1979, the U.S. Nuclear Regulatory Commission approved for issuance in effective form new interim regulations for strengthening the protection of spent fuel shipments against sabotage and diversion. The new regulations were issued without benefit of public comment, but comments from the public were solicited after the effective date. Based upon the public comments received, the interim regulations were amended and reissued in effective form as a final interim rule in May, 1980. The present document supercedes a previously issued interim guidance document, NUREG-0561 (June, 1979) which accompanied the original rule. This report has been revised to conform to the new interim regulations on the physical protection of shipments of irradiated reactor fuel which are likely to remain in effect until the completion of an ongoing research program concerning the response of spent fuel to certain forms of sabotage, at which time the regulations may be rescinded, modified or made permanent, as appropriate. This report discusses the amended regulations and provides a basis on which licensees can develop an acceptable interim program for the protection of spent fuel shipments.

17. KEY WORDS AND DOCUMENT ANALYSIS

17a DESCRIPTORS

Irradiated fuel, spent fuel, physical protection, shipments of nuclear material

17b IDENTIFIERS OPEN-ENDED TERMS

18. AVAILABILITY STATEMENT

unlimited

19 SECURITY CLASS (This report)
unclassified

21 NO OF PAGES
65

20 SECURITY CLASS (This page)

22 PRICE