



U.S. ATOMIC ENERGY COMMISSION

REGULATORY GUIDE

DIRECTORATE OF REGULATORY STANDARDS

REGULATORY GUIDE 5.31

SPECIALLY DESIGNED VEHICLE WITH ARMED GUARDS FOR ROAD SHIPMENT OF SPECIAL NUCLEAR MATERIAL

A. INTRODUCTION

Paragraph 73.31(c) of 10 CFR Part 73, "Physical Protection of Plants and Materials," requires that road movements of special nuclear material (SNM) in quantities identified in §73.1(b)(2) be protected by one of the following methods: (1) shipment with at least two armed guards accompanying the shipment in a separate escort vehicle or (2) shipment in a specially designed truck or trailer which reduces the vulnerability to diversion by design features that permit immobilization of the van and provide barriers or deterrents to physical penetration of the cargo compartment. If armed guards are used with the specially designed vehicle, immobilization is not required. Paragraph 73.30(d) requires that the qualification of individuals to act as guards used pursuant to §73.31(c) be documented. This guide describes features acceptable to the Regulatory staff for a vehicle operated by armed guards to ship special nuclear material by road and for the qualification of the armed guards.

B. DISCUSSION

There are two approaches that can be taken to satisfy §73.31(c)(2), i.e., specially designed truck or trailer. One method would be the use of a specially designed secure cargo vehicle that is constructed so as to resist entry for a substantial period of time by unauthorized personnel using a wide variety of tools and weapons. The penetration time would be commensurate with the time needed for law enforcement agencies to respond to the scene of an emergency. The vehicle would be designed to be immobilized upon command in case of a diversion attempt.

The other method would be through the use of armored car service. In this case resistance to unauthor-

ized entry is provided, in part, by the armed personnel within the vehicle who are in turn protected by the inherent design of the armored vehicle.

Acceptable characteristics of vehicles and personnel used in armored car service are provided in this guide.

1. ARMOR

Armored vehicles are supplied to the industry by a very small number of manufacturers. The specific design of the armor supplied by each company is considered proprietary information. The armor can generally be described with respect to its resistance to projectile penetration. All manufacturers provide armor which will resist initial penetration by bullets from readily available small arms. The armor is usually affixed to the vehicle in such a way as to provide protection to the occupants against attack from any external direction.

2. CAB-CARGO INTERFACE

The cab-cargo interface can be provided with several options. In most cases the separating wall between cab and cargo compartment is armored to provide protection in case either compartment is compromised. A window of bullet-resistant material which allows the crew in one compartment to have a clear view of the access doors of the other compartment is also provided. Some models have a door that allows passage from the cab to the cargo compartment without leaving the vehicle. Other models are equipped with gunports that permit firing from cab to cargo compartment.

3. GUARDS AND DRIVERS

Normally an armored vehicle crew consists of two or three individuals divided between the cab and cargo compartments. For long-distance trips the crew is often increased to allow rest periods for drivers and guards.

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SNM shipments are expected to involve frequent long-distance trips of two or more days. In order to maintain the full protective capacity of the armored service during these trips, it is important that adequate crews for continuous manning of both compartments during normal operation be supplied. Considerable flexibility in achieving this end would be provided if both guards and drivers were qualified and permitted to perform either function (guard or driver).

4. DOOR LOCKS

All armored vehicles are supplied with compartment locks for both the cab and cargo doors. In many cases access to the cargo compartment requires positive action by personnel in both compartments when the cargo compartment is occupied by a guard.

5. ALARM SYSTEM

Many of the armored cars presently in service are equipped with audible alarms and/or flashing lights similar to those used by police and emergency vehicles. The awareness of attack that such alarms elicit in the general public can facilitate response to attack or recovery of diverted material.

6. SECURING OF CARGO

Armored cars have no standard provision for tying down cargo. This is understandable in view of the types of cargo normally handled by these carriers. For SNM cartage, where larger and heavier cargos can be expected, some provision for adequate tie-down restraint will be required to provide for cargo integrity and personnel safety. It is expected that only minor effort and expense would be required to equip existing vehicles with tie-down fittings.

7. RADIATION MEASUREMENTS

Each shipment will be configured at origin to be in compliance with Department of Transportation (DOT) general packaging and safety requirements (DOT regulation 49 CFR 173.393). Additionally, in order to monitor total radiation absorbed by personnel, some type of personnel dosimetry should be considered. Types of personnel dosimeters are the film badge and pocket dosimeter for gamma radiation, and the thermoluminescent neutron dosimeter (TLD) for neutron radiation. The film badge consists of a film packet in a plastic holder. The film badge or TLD provide an accurate indication of exposure to radiation over a long period of time. Since the film has to be developed and read on a densitometer, it may take some time to obtain a radiation reading. The pocket dosimeter, on the other hand provides a quick estimate of radiation received over a short period of time, but is not as accurate as the film badge for gamma radiation.

8. GAS PROTECTION

Many of the newer armored vehicles use a flow-through (front-to-back) air system for heating and cooling the vehicle interior. Typically, these systems

draw outside air from the front (cab area) of the vehicle and expel exhaust air through vents in the upper areas of the vehicle. A slight positive internal pressure provided by the air system offers some resistance to the introduction of gaseous substances. The air intake is under occupant control and can be closed. Some vehicles are normally equipped with gas masks. The use of gas masks, filters, and internal air supplies for carriers of SNM would enhance the ability of vehicle crew members to resist gas attacks.

9. ANTENNA PROTECTION

Almost all armored vehicles are equipped with communication systems of some kind. Each vehicle is equipped by the purchaser of the vehicle although the manufacturer may provide mounting structures or access areas for the communication system components. In some instances, the purchaser may provide the communication equipment to the manufacturer who will install the equipment at the time the vehicle is constructed. Both radio and radiotelephone systems are in use. Each system is dependent on the use of radio signals received and transmitted from a vehicle-mounted antenna which could logically become the first target of an attack. Loss of an antenna during attack would preclude the vehicle occupants from either notifying external agents of the attack or from seeking aid or assistance. To provide for sufficient delay during an attack for a vehicle crew to transmit emergency messages, antenna protection is desirable. Such protection could be provided in the form of concealment, multiplicity, or hardening. The actual antenna could be concealed or designed to appear as some other object while conventionally appearing dummy antennas would be conspicuously located on the vehicle. Multiple antennas using internal switching could offer a delay sufficient to enable emergency messages to be transmitted. Hardened, attack-resistant antennas could be designed and used to provide a delay time. Combinations of these or other similar methods could enhance the viability of transmission.

C. REGULATORY POSITION

The characteristics listed below are acceptable to the Regulatory staff for a road vehicle operated by armed guards in order to comply with AEC regulations pertaining to SNM shipments. Additional Federal, State, and local requirements pertaining to safe interstate and local transport of cargo may also pertain to such shipments and compliance with these requirements is expected.

1. ARMOR

The vehicle should provide protection for the driver(s) and guard(s) against projectile impact. The external surface of the vehicle (side panels, floor, top, firewall area, and viewing areas) should be constructed of materials which are resistant to at least the muzzle impact energy of a .357 magnum bullet. The fuel tank(s) should also be provided with similar protection against projectile impact. The fuel tank(s) should be equipped

with a lock-type cap and a screen in the tank nozzle to prevent the insertion of an explosive device into the tank.

2. CAB-CARGO INTERFACE

The wall separating the cab and cargo compartments should be armored. Additional features to be considered in the detailed construction of the cab-cargo interface depend on the method selected for the protection of the shipment. At least one of the methods listed below should be used. These methods are similar in that each provides the capability for the crew to use firearms to prevent entry into the cargo compartment without leaving the vehicle.

a. An armed guard should be permanently stationed in the cargo compartment. In this case, a continuous wall of armor with a bullet-resistant window would be considered adequate as a cab-cargo interface.

b. Access to the cargo compartment from the cab should be available so that a guard can go directly from the cab to the cargo compartment without leaving the vehicle.

c. Gunports should be available which will permit firing from the cab into the cargo compartment. Additionally, the gunports should permit firing of the weapon at wide angles so that overt entry from all sides of the cargo compartment can be prevented.

3. GUARDS AND DRIVERS

All personnel of an armored vehicle should be qualified to perform all normal operational tasks involved with a shipment. Both guards and drivers should be qualified to perform either function, and interchange of function should be allowed if required for the safety and security of the cargo and crew.

Compliance with DOT regulation 49 CFR 173.393(j)(4) which deals with radiation levels in occupied vehicles, should be maintained in addition to other applicable State and local requirements. All guards and drivers should be qualified in accordance with AEC Regulatory Guide 5.20, "Training, Equipping, and Qualifying of Guards and Watchman," or an equivalent program.

4. DOOR LOCKS

The cargo compartment doors should normally be in a locked mode and should be secured by a locking mechanism requiring positive action by personnel in both the cargo and cab compartments for operation if the cargo compartment is occupied. If the cargo compartment is not occupied, the cargo compartment door lock should latch closed when shut, and should also be further secured by a padlock. Opening of the cargo

compartment door lock should require positive action by personnel at the cargo compartment door and in the cab compartment. The cab compartment doors also should normally be locked and should require key insertion for operation from the outside.

5. ALARM SYSTEM

The vehicle should be equipped with an audible and/or visual alarm which is activated from within the vehicle and which has the same range of detection as that normally required by emergency vehicles. Deactivation of the alarm system circuitry should require access to the armored compartments of the vehicle.

6. SECURING THE CARGO

The vehicle should be supplied with fittings in the cargo compartment to provide an adequate attachment for such securing devices as are required to provide restraint against substantial movement of or damage to the cargo in normal operation and during emergency stops. The cargo must be secured as required by 49 CFR Part 177.

7. RADIATION MEASUREMENTS

Personnel involved in the handling of radioactive material should be provided with a film badge, a pocket dosimeter and for plutonium shipments, a thermoluminescent neutron dosimeter. These should be monitored after each trip.

8. GAS PROTECTION

The vehicle compartments should be equipped with gas masks, filters, or an internal air supply to permit the crew to resist an attack by incapacitating gas for a sufficient time to allow transmittal of a distress message and, if possible, the arrival of aid.

9. ANTENNA PROTECTION

Either a concealed or a hardened antenna should be provided in order to afford sufficient time for the communication system to transmit an emergency message.

10. IMMOBILIZATION

Although there is no requirement for immobilization of vehicles which use armed guards, this is a desirable feature. The vehicle could have a provision for immobilization upon an authorized command originating from within the vehicle. Once commanded, the immobilization system should resist unauthorized deactivation for as long as feasible. Caution should be taken to assure that activation devices which cause immobilization are adequately shielded to prevent them from being energized from spurious electromagnetic signals.