UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C 20555

February 16, 1977

MEMORANDUM FOR: Upgrade Working Group

FROM: L. J. Evans, Jr., Chief
Requirements Analysis Branch

SUBJECT: REVIEW OF BASIC CAPABILITIES FOR TRANSPORTATION

Attached is a draft paper presenting proposed basic capabilities for transport safeguards and the rationale for their choice. Five capabilities, which are similar to the fixed site basic capabilities but tailored to in-transit security, are presented. Another draft paper, which will present an alternative set of transportation security capabilities is being developed for review by the Working Group. It will be circulated in the near future for your comments.

In the meantime, please review and submit comments regarding the attached to me by February 23, 1977. I will arrange for a meeting to discuss all comments after that date.

L. J. Evans, Jr., Chief
Requirements Analysis Branch

Enclosure: As stated

DISTRIBUTION:

Upgrade Working Group
O. Chambers (IE)
R. Jones (SD)
T. Michaels (SD)
R. Fonner (ELD)
Mike Smith (SG)
D. Kasun (SG)
C. South (SG)
B. Natter (SG)
A. Poltorak (SG)
John J. Miller (NRR)
B. Nulsen (SG)

Information List

R. Page (SG) ✓
B. Erickson (SG)
J. Powers (SG)
T. Thayer (SG)
R. Brightsen (SG)
E. Perchonok (SG)
F. Arsenault (RES)
M. Elliott (NRR)
N. Haller (IE)
T. Sherr (SG)
E. McAlpine (SG)
F. Crane (SG)
D. Sutton (SG)
D. Kunihiro (SG)
J. Prell (SD)
R. Ramirez (SD)

February 14, 1977

BASIC CAPABILITIES FOR TRANSPORTATION

The basic capabilities essential to assure control and protection of SNM against theft or diversion while on transports have generally the same characteristics as the fixed site capabilities required for the protection of SNM against theft or diversion. The more obvious differences are in the transportation characteristics of: mobility, control of transports, accessibility of material loaded on transports and the requirement to utilize transfer points under certain conditions. This can be elaborated as follows:

The mobility of the transport precludes it from taking advantage of static defenses, but on the other hand, it does provide the capability to avoid a dangerous situation if sufficient timely intelligence is received.

Since the transports will generally be those of a common carrier (trucks, airplanes, ships and rail cars) there is a security problem that is unique to transportation. For example, carriers are exempt from licensing and the licensed organization for which the carrier is under contract is not able to exert direct control in order to properly safeguard the SNM.

The SNM loaded on transports presents another dimension of accessibility that differs from that at fixed sites, namely an adversary force can gain control of the transport. Therefore, it is not necessary for the adversary force to physically remove the SNM from the transport at the time of the theft as long as the movement of the transport can be controlled. Once the transport is hijacked, the SNM can be removed at the convenience of the adversary.

In addition, the SNM will be most vulnerable to theft or diversion while transfers are being made from one mode of transportation to another. When formulating basic capabilities for protection of in-transit SNM, the existence of transfer points, either inside of or outside of protected areas, must be considered. The transfer of SNM within protected areas should be the joint responsibility of the fixed site and the transport security organization. However, since the fixed site facility has the original control of and inherent capabilities to protect the SNM, the transport system will rely heavily on protection from the fixed site security forces. Security should pass from joint responsibility to the transport driver and guards when the material has been locked and sealed aboard the transport and the transport leaves the protected area. Transfers outside of protected areas requires that some type of temporary protected area be established to facilitate the passing of responsibility from the consignor to the consignee.

Basic Capabilities

The basic functional capabilities are intended to assure the protection of SNM against theft or diversion while on transports. Five basic capabilities to assure the physical security of SNM while on transports have been identified. Two of these capabilities relate to control of access to SNM. Two relate to the containment of SNM, and the last relates to protection against external assaults. While the SNM loaded transports are in transit outside of a protected area, the basic capabilities are those that will assure:

1. Admission of only authorized personnel on carriers associated with transport of SNM.

2. Timely detection and effective responses to unauthorized conditions of access to SNM on transports or unauthorized activities on and around transports carrying SNM.

3. Removal from and loading on transports of only authorized and confirmed materials.

4. Timely detection and effective responses to attempts to breach the containment of SNM while on transports.

5. Timely detection and effective engagement of intruders using force prior to penetrating shipping containers or gaining control of transports carrying SNM.

The following descriptions are intended to amplify and give examples of the basic capabilities.

Capability 1: Admission of only authorized personnel on carriers associated with the transport of SNM.

The basic detection systems and identification procedures used to identify individuals entering at fuel cycle plants can be used to identify only authorized guards and drivers and must be developed to the same degree of effectiveness. Identification and verification procedures of authorized drivers and guards are needed for all points while in transit and at all transfer points.

Capability 2: Timely detection and effective responses to unauthorized conditions of access to SNM on transports or unauthorized activities on and around transports carrying SNM.

Safeguards should detect and deal with any conditions in and around a transport that might permit unauthorized persons to have access to and steal SNM. These conditions could include leaving a transport unattended, unguarded or unobserved, thus providing easy access to the interior of the transporter or to its controls. Detection of unauthorized conditions could be accomplished by the use of various alarm systems (such as when a key is left in the transport or a door is left unlocked, etc.) and by requiring surveillance activities by the personnel on the transport and in the escort vehicles. Many of the same detection systems can be used on a transport that are used for fixed sites but are not as necessary if proper surveillance techniques are used.

Capability 3: Removal from and loading on transports of only authorized and confirmed materials.

Systems and procedures must be established to monitor SNM being loaded or unloaded to determine that it is what it is supposed to be and in authorized quantities. Once the SNM is loaded and sealed on the transport and leaves the protected area, no one is authorized to open the sealed compartment until the shipment reaches its ultimate destination. Thus the complexity of protection is less during the intransit phase than at a fixed site since the material is never exposed or handled. As stated earlier, the responsibility for protection is retained by the fixed site licensee until the SNM is loaded and the transport leaves the protected area.

Capability 4: Timely detection and effective responses to attempts to breach the containment of SNM on transports.

Much of the protection afforded SNM while on a transport will be provided by the structure of the transport and the size and strength of the containers holding the SNM. The other major aspect of protection will be provided as a result of the training and care with which transport personnel guard and survey the transport. In addition, detection could be aided by the use of alarms and inspection. If a breach is detected, an appropriate response should correct the situation.

Capability 5: Timely detection and effective engagement of intruders using force prior to penetrating shipping containers or gaining control of transports carrying SNM.

Defense against external assault can be viewed in both passive and active terms. Passive defenses are expressed by hardened containers, transport immobilizing characteristics, maneuverability of the transport and route selection. Active defenses are expressed in terms of guard and escort reactions and response force activities. An expected sequence of response to an external assault might consist of attempted intrusions being detected, assessed, and delayed by means immediately available until an effective response can be summoned. The maneuverability of the transport should also be considered. If intelligence is received that intruders will attempt to penetrate the transport while it is outside of a protected area, efforts should be made to get the transport to a safe haven. If this is not possible, then a route should be taken that will take

the transport closer to alerted responsive forces to make use of the more active defensive measures. If the situation is such that the mobility of the transport cannot be utilized, then the personnel on or attending the transport must ~~be capable of some degree of~~ delay utilizing passive defenses to allow the response forces more time to act. Reliable communications will be required to facilitate the timely arrival of the response force.

The response force could include the escort guards, private guard forces in the area, local police forces, the National Guard, or the Military. The emergency signal could be communicated direct to the local police forces over their net, by CB to private citizens, by radio telephone, ham radio, or any other means which would allow an effective response.

Performance Criteria

The safeguard systems designed to provide these capabilities should be expected with high confidence to thwart a theft of SNM. A theft should be considered successful when the adversary has taken possession of the SNM free from any immediate interceding actions (engagement or hot pursuit) of the response forces.

The nuclear materials of greatest concern are those which could be used for nuclear explosives. Protection of SNM should preclude the theft of 2000 grams or more of plutonium or uranium-233, or 5000 grams of uranium-235 (contained in uranium enriched to 20% or more in the U-235 isotope) in a single theft or continuing series of thefts within a 12 month period. These quantities are judged to be substantially less than that required for the illicit manufacture of a nuclear explosive.

2/23/77 I 24

copy to Derek

"You should ... of attached, which was written by Dr. Miller. It's be prepared to respond to the pts. which you made on Miller against so well as ... [illegible] ... your ... [illegible] ... [illegible] - [illegible]"