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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555 SG: PD

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MEMORANDUM FOR: Upgrade Working Group  
FROM: L. J. Evans, Jr., Chief  
Requirements Analysis Branch  
SUBJECT: REVIEW OF BASIC CAPABILITIES FOR TRANSPORTATION  
AND NARRATIVE FOR BASIC CAPABILITY FOUR

Attached please find a draft paper by Marty Levy presenting some potential basic capabilities for transport safeguards and a rationale for their choice. These, like the one circulated by my February 16 memorandum, are obviously not fully developed and, therefore, the thrust of your comments should relate to whether these capabilities would provide coverage of all the essential functions which must be performed in order to adequately safeguard SNM while being transported. In addition, your comments would be appreciated regarding whether this breakout provides a readily useable, logical means of assuring that all such functions and any essential system specifications are covered.

Your comments would also be appreciated regarding the attached basic capability narrative. As you review this narrative, any assistance you can develop regarding the issues delineated in the cover sheet entitled "Discussion of Basic Capability 4" would be appreciated. Also, as you did with the First thru Third Capability Narratives, please organize your comments under the following categories: (1) Are all sections and entries complete? (2) Are all the sections organized logically? and (3) Is the narrative concise and does it say which you believe should be said?

Please submit your comments on the attached drafts by c.o.b. Tuesday, March 1. We will schedule a meeting for Wednesday afternoon, March 2, to review your comments. The second cut at the essential safeguard systems which should be specified in the rule should be available for your review and comment either at the meeting or shortly thereafter.

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PDR FOIA  
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Attachment  
As stated

→ Bud Evans  
L. J. Evans, Jr., Chief  
Requirements Analysis Branch  
a day late but maybe of use. JW

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*This is, good but misses the mark to some*

SUBJECT: ALTERNATIVE APPROACH TO THE BASIC CAPABILITIES REQUIRED FOR SAFEGUARDING SSNM WHILE IN THE TRANSPORT SYSTEM

1. The purpose of this paper is to discuss the three basic capabilities that I recommend as being those required for the protection of SSNM while in the transport system. By transport system is meant the transporter; the escorts; the communication system between the transporter, the escorts and the outside world; and anything else required for a complete transport system. It is not intended to exclude the transport system while it is immobile, but it is intended to exclude the base of operations, the fixed sites themselves and their communications. The goal is for the three basic capabilities to be the basis for developing the regulations for the protection of SSNM while in the transport system. A future memorandum will give a detailed discussion of the system specifications and performance functions required for each capability.

2. The first of the basic capabilities to be discussed will be the capability to efficiently avoid situations which may lead to the loss of SSNM or increase the danger of injury to the public. There are several factors that contribute to the capability to avoid problem situations. Unlike the fixed site, the transport system is moveable and this gives it an advantage over the fixed site in that it has, with proper planning and training, the ability to stay clear of problems. While the transport system does have this advantage, it also has certain disadvantages and they are; the adversary force can select his location of operations, adversary information requirements are greater in that the location of the attempt to obtain SSNM or sabotage the system will be important but difficult to obtain, communications will be more difficult and there are many problems in isolating the transport system and thus the SSNM. If we can nullify the disadvantages and then use the advantage of mobility, the transport system will have a capability for the protection of SSNM not available for fixed sites. The proper approach to the problem is to first consider the routes that can be taken as primary routes and then consider those routes available as contingency routes in an emergency. Next the ability to receive and utilize information as to adversary activities must be considered. Once the routes are selected and communications considered, then maximum use should be made of the mobility of the transport system which can be accomplished through proper training of drivers and guards. Appropriate guard and driver training will also prepare them for required communications, the isolation of the transport system and the defending of it if necessary.

3. If the transport system is unable to avoid situations which could lead to the loss of SSNM, then in order to carry out its mission of protecting and controlling the SSNM, it must have the capability to timely detect adversary attempts to obtain the SSNM. The adversary has basically three different modes for obtaining SSNM from the transport system and they are by stealth, by deceit and by force. Regardless of the mode used by the adversary, the transport system must detect unauthorized activities in and around the transport system and must detect the unauthorized removal of SSNM from the

*it would seem to me another philosophy worth establishing is that theft or sabotage only can occur by overt act due to nature of the beast. Shipment is, in effect, under continuous surveillance.*

transport system. In order for the detection to be timely, the transport system must be able to delay the adversary and identify the threat. *Minor factors*

a. In this paper, by delay is meant the difference between the time when an adversary will obtain the SSNM or sabotage the transport system and the time he would have, had not something increased his time. Note that this can be developed into a very useful definition of delay since it gives the overall delay which is of prime importance in protecting SSNM while in the transport system. Partial delays which occur because, for example, a given barrier was used may not contribute to the ability to protect since the time lost may be recovered by taking a different route or in avoiding detection. Once we accept this definition, then if delay is to have any value, it is in the use that can be made of the delay and not in the delay itself. Delay is important for detection in that the longer the delay, the greater the probability of detection. *defeat of the act.*

b. In order to respond to any adversary attempts to obtain SSNM, the transport system guards or drivers must first have an indication that something is happening and then some idea of what it is. If the detection is simply that something is happening and they don't have any idea what it is, their reaction may be ineffective. Therefore, the transport system must identify the threat.

4. The timely detection of attempts by an adversary to obtain SSNM by stealth, deceit or force, is not sufficient for the protection of the SSNM. The transport system, or some outside force must have the capability to effectively respond to the threat. The response can either be by forces internal to the transport system or external to it or both.

a. By internal response is meant the ability of the transport system guards or drivers to respond either actively or passively. By active response is meant to take some action back against the adversary by for example, the use of force, the use of delaying tactics or the use of communications to bring in reinforcements. The purpose of the internal response should be to neutralize the threat forces but if unable to neutralize, to delay until sufficient reinforcements can arrive. By passive response is meant those actions which while not directed at the adversary force, will still deny the transporter and its SSNM to him. Passive response should be used when active response will not protect the SSNM. The passive response can include deactivating the tractor so it cannot be driven, immobilizing the trailer so it cannot be hauled and inundating the trailer so that it cannot be penetrated and even if penetrated, nothing can be removed. Such actions will add to the delay allowing the reinforcements to respond in the required effective manner. *ore*

b. By external response is meant the ability to reinforce, with the use of force if necessary. There must be adequate communications between the transport system and the external response forces in order for the external response forces to react in an effective manner. In addition the transport system itself and actions taken by the internal response forces must delay the adversary forces to the extent necessary for the reinforcements to react in an effective manner. *ore*

## Discussion of Basic Capability 4:

Timely Detection and Effective Response to Unauthorized Breaches  
in Containment of SNM

This capability has been developed with the following definition of containment: Safeguard system components <sup>in structures</sup> encompassing an authorized amount of SNM which must be breached to gain effective access to SNM.

The intent of this capability is to cause the licensee to provide appropriate containment for SNM, whether it be physical barriers, surveillance systems, or personal responsibility and control for SNM during processing. The purpose of this encompassing or enveloping of the SNM is to protect against theft by providing early warning and delay of attempted adversary access. (It should be recognized that this is the third layer in a defense in depth to an outside adversary, but may be the only layer of defense to an insider.) The capability requires that detection be made and appropriate response be taken when the security of the SNM is threatened by any of these protective envelopes being breached. If a breach is detected, the response should correct the situation to the extent that an attempted theft would be prevented or discovered in time to prevent the loss of SNM.

In developing this capability some problems in terminology and emphasis have been identified for which comments would be especially welcome. These are in the areas of:

- a. Clarification of the description of the envelope that "contains" the SNM which can be comprised of either physical or personnel components of the safeguard system or both;
- b. The assurance that containment is provided for small enough amounts of material;

- c. Should containment be increased in intensity as the desirability of the SNM increases;
- d. Is there sufficient emphasis in the capability on looking for the holes or breaches in the containment.

Basic Capability 4 Narrative

The safeguard system shall provide the capability to assure no unauthorized breaches in containment of SNM. The licensee must provide SNM containment systems that are able to detect unauthorized breaches in containment of SNM in sufficient time to permit an effective and acceptable response which corrects the situation to the extent that an attempted theft would be prevented or discovered in time to prevent the loss of SNM.

The following safeguard subsystems are necessary to assure the detection capability. (See section \_\_\_ for necessary aspects of the response capability.)

1. Containment Controls: The licensee shall provide containment controls and procedures that establish authorized envelopes for SNM which:

- a. delineate authorized location for SNM; and
- b. provide early warning and delay of adversary access to SNM.

2. Authorization Controls: The licensee shall provide controls and procedures which:

- a. establish the authorized amounts of SNM within the various envelopes; and
- b. provide for authorized movement and operations on SNM.

3. Detection Systems: The licensee shall provide detection systems and procedures that, in a timely manner, will:

- a. surveil, monitor and/or inspect to discover SNM in unauthorized amounts within authorized envelopes;
- b. surveil, monitor and/or inspect to discover unauthorized envelopes containing SNM;
- c. collect sufficient information to permit assessment of the

*Don't  
worry  
with what  
people do  
to you*

*Don't  
worry  
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*are there  
MTR's  
near  
envelopes*

condition of the unauthorized amounts of SNM within authorized envelopes and/or the unauthorized envelopes containing SNM;

- d. assess the information; and
- e. appropriately communicate with reaction/response force.

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(1) W.G. Ming

Contain/ BC 4

R. Jones

- use QA type approach
- expand BC 3 (removal) to define all contain areas (vaults, vault-like rooms in addition to NAA)

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Discussion of Basic Capability 4:

Timely Detection and Effective Response to Unauthorized Breaches

in Containment of SNM

from ...  
Unauthorized movement (of material)  
of material

This capability has been developed with the following definition of containment: Safeguard system components encompassing an authorized amount of SNM which must be breached to gain effective access to SNM.

The intent of this capability is to cause the licensee to provide appropriate containment for SNM, whether it be physical barriers, surveillance systems, or personal responsibility and control for SNM during processing. The purpose of this encompassing or enveloping of the SNM is to protect against theft by providing early warning and delay of attempted ~~unauthorized~~ access. (It should be recognized that this is the third layer in a defense in depth to an outside adversary, but may be the only layer of defense to an insider.) The capability requires that detection be made and appropriate response be taken when the security of the SNM is threatened by any of these protective envelopes being breached. If a breach is detected, the response should correct the situation to the extent that an attempted theft would be prevented or discovered in time to prevent the loss of SNM.

In developing this capability some problems in terminology and emphasis have been identified for which comments would be especially welcome. These are in the areas of:

- a. Clarification of the description of the envelope that "contains" the SNM which can be comprised of either physical or personnel components of the safeguard system or both;
- b. The assurance that containment is provided for small enough amounts of material;

Handwritten notes in a large oval shape, including the word "mean".

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Vertical handwritten notes on the right margin.

- c. Should containment be increased in intensity as the desirability of the SNM increases;
- d. Is there sufficient emphasis in the capability on looking for the holes or breaches in the containment.

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Basic Capability 4 Narrative

The safeguard system shall provide the capability to assure no unauthorized breaches in containment of SNM. The licensee must provide SNM containment systems that are able to detect unauthorized breaches in containment of SNM in sufficient time to permit an effective and acceptable response which corrects the situation to the extent that an attempted theft would be prevented or discovered in time to prevent the loss of SNM.

The following safeguard subsystems are necessary to assure the detection capability. (See section \_\_\_ for necessary aspects of the response capability.)

1. Containment Controls: The licensee shall provide containment controls and procedures that establish authorized envelopes for SNM which:

- a. delineate authorized location for SNM; and
- b. provide early warning and delay of adversary access to SNM.

2. Authorization Controls: The licensee shall provide controls and procedures which:

- a. establish the authorized amounts of SNM within the various envelopes; and
- b. provide for authorized movement and operations on SNM.

3. Detection Systems: The licensee shall provide detection systems and procedures that, in a timely manner, will:

- a. surveil, monitor and/or inspect to discover SNM in unauthorized amounts within authorized envelopes;
- b. surveil, monitor and/or inspect to discover unauthorized envelopes containing SNM;
- c. collect sufficient information to permit assessment of the

condition of the unauthorized amounts of SNM within authorized envelopes and/or the unauthorized envelopes containing SNM;

- d. assess the information; and
- e. appropriately communicate with reaction/response force.

(John Miller Comments

TRANS.

- Levy version better than Nutsen version
- Nutsen " too redundant

BC4 -

- no prob. -

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Basic Capability 4 Narrative

The safeguard system shall provide the capability to assure ~~no~~ <sup>only</sup> unauthorized breaches in containment of SNM. The licensee must provide SNM containment systems that are able to detect unauthorized breaches in containment of SNM in sufficient time to permit an effective and acceptable response, ~~which corrects the situation to the extent that an attempted theft would be prevented or discovered in time to prevent the loss of SNM.~~

The following safeguard subsystems are <sup>a minimum</sup> ~~necessary~~ <sup>required</sup> to assure the detection capability. (See section \_\_\_ for necessary aspects of the response capability.)

1. Containment Controls: The licensee shall provide containment controls and procedures that establish authorized envelopes for SNM which:

- a. delineate authorized location for SNM; and
- b. provide early warning and delay of <sup>unauthorized</sup> ~~adversary~~ access to SNM.

2. Authorization Controls: The licensee shall provide controls and procedures which:

- a. establish the authorized amounts of SNM within the various envelopes; and
- b. provide for authorized movement <sup>of</sup> ~~and~~ operations on SNM.

3. Detection <sup>and detection</sup> Systems: The licensee shall provide detection systems and procedures that, in a timely manner, will:

- a. surveil, monitor and/or inspect to discover SNM in unauthorized amounts within authorized envelopes;
- b. surveil, monitor and/or inspect to discover unauthorized <sup>amounts of</sup> ~~envelopes containing~~ SNM; <sup>outside of the authorized envelopes.</sup>
- c. collect sufficient information to permit assessment of the

condition of the unauthorized amounts of SIM <sup>or without</sup> within authorized envelopes, ~~and/or the unauthorized envelopes containing SIM;~~

- d. assess the information; and
- e. <sup>the assessment result to</sup> ~~appropriately~~ communicate <sup>with</sup> reaction/response force.



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@ South 3/1/77

COMMENTS ON "BASIC CAPABILITY FOUR AND ALTERNATE  
TRANSPORTATION CAPABILITIES APPROACH"

GENERAL - Attached are comments on the basic capabilities package included with the memorandum of 24 February to working group members.

Two general comments apply. First, the enclosure No. 2 on basic capability four, while following the same format and style of the previous draft covering capabilities one, two and three, reflected none of the comments previously made on that set. Second, requests have been made on two previous occasions for draft material to be double spaced for case of review and yet enclosure No. 1 violates this.

Are all sections and entries complete? Basically yes for capability four<sup>r</sup>, but corrections need to be made as indicated on the marked up copy attached. Basically no for the transportation enclosure, details of which are specified in an attachment on that subject.

Are the sections organized logically? Yes on both counts but that is not sufficient in the case of the transportation option, again see separate attachment.

Is the narrative concise and correct? Conditionally yes for capability four, pending comments inclusion. Not yet for the transportation option.

SPECIFIC - Comments included in the form of a marked up copy attachment for capability four. The transportation option is discussed in separate comments paper (attached).

C. South

GENERAL Each of the alternative approaches to the transportation basic capabilities question seems to have potential merit. However, as the authors are aware, the development of basic capabilities is a difficult problem with a number of subtle pitfalls. In particular, it is difficult to determine whether the basic capabilities can be developed into lower level system requirements which are both complete and consistent with good safeguards. Our present intuitive feeling is that neither set, as presented, can be used as the basis for such a lower level system. However, we find it extremely difficult to address specifics within these capabilities. Therefore, we feel that it would be extremely useful if the analysts who developed each approach would continue their approach to criteria analogous to the 14 Builder second level criteria for fixed site. At this level, we feel that we may be able to comment on the capabilities developed. Those comments could then be applied to the basic capabilities.

SPECIFIC The presentation of capabilities in the Alternative Approach paper should be presented at an equal level of detail throughout. The paper discusses some aspects of transportation records in much more detail than is required in a discussion of basic capabilities (such as intelligence assessment) while other aspects (such as promovement planning) are discussed only in passing, leaving the reader uncertain as to whether the discussion in detail connotes

emphasize upon this aspect of safeguards.

The basic presumption of this paper is that the safeguarding of fixed sites is significantly different from the safeguarding of road transportation. If this assumption is correct, any attempt to couple the two generically may only add confusion and overgeneralization.

Adversary attack of a fixed site, particularly with insider assistance, can aspire to complete information and the avoidance of random obstacles to which would defeat or abort the attack. Even without inside assistance the adversary can easily gain near complete information on routes of approach and escape, guard procedures and manning, production and shift procedures, and the capabilities of outside response forces. To collect this information requires only simple assets e.g. trained observers, binoculars, cameras, local research, reading room research, simple aerial photography, and simple communications monitoring. Even without inside assistance the adversary can gain detailed knowledge of internal floor planning, storage sites, and production procedures. He usually cannot gain information on details

of sensor systems and operations without inside assistance, which focus him to the action sequences which are overt and not surreptitious.

If the above discussion is essentially correct, the fixed site defense is very dependent upon rapid generation of strength to counter the adversary, specifically, guards and police response. While these guards and barriers can be given random unpredictability, they are essentially fixed and non-random.

Conversely, road transportation, using ~~is some~~ multiple escorts, and a transporter is inherently random, and presents a more difficult reconnaissance and planning problem to the attacker.

The size of the system of the transportation system derives only partly from the use of multiple escort guards and weaponry. Instead, the system strength derives from the combination of the major component elements. These include guards, limited armor protection and weaponry, redundant and highly reliable communications to coordinate the defense and sound the alert, and the use of various means designed to increase adversary time on target, specifically, random movement tactics, flexible delay tactics, and penetration resistance.

The ability of the defensive system to thwart attack and prevent the undetected escape of the adversary is moderately independent of the size of the adversary threat. The adversary is forced to mount near simultaneous attacks against a multiple targets (spare escorts and transporter). This is an extremely demanding task, which is not appreciably reduced by increase of his total strength. In most areas of the United States which would predictably be traversed by plutonium shipments the normal worst time for police response can be statistically bounded. When this is the case the basic convoy strength and lateral composition can be readily preserved to give high assurance that target delay time will permit reinforcement.

In many, perhaps most cases, the total number of escort guards required will be less than the eleven guard strength habitually present at fixed sites. So, the use of a minimum guard strength of eleven provides a very conservative and safe riding approach. In many cases, based upon developing experience, the ~~and~~ combination of the ICV and randomly spaced escort vehicles ~~and~~ may provide high assurance of adversary failure to reduce on target time with lesser numbers of guards than the eleven which are conservatively prescribed in this discussion. Conversely, in those few cases where response forces are not capable of reasonable response such as transit of highly isolated areas, or transit during periods of highly inclement weather, the escort requirement may be increased to meet the single case vulnerabilities.

Note: The foregoing comments were received from Jay Durst on 17 February, 1977. At that time he sketched out possible tactics and indicated that an adequate ~~escort~~ force would usually be: ICV, including driver-guard plus two guards; two escort vehicles containing two and three men respectively. Escort comma would ride in the three man vehicle.