



SUMMARY of the REPORT:

“Security Assessment Report for 1. Plutonium Transport in France”

**Report prepared by
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- The report assesses the security vulnerabilities for the transportation of U.S. plutonium in France, and an overview of the security for French domestic plutonium transports.
- The risk assessment methodology employed in this report is used to evaluate the protection effectiveness for loss prevention. The risk assessment methodology, developed for the U.S. Department of Energy, is used in the protection of nuclear weapons and other attractive nuclear materials. It has been selected because it employs a robust approach in the evaluation of risk.
- Within the “consequence of loss” importance for the United States only a nuclear weapon is considered more important. A nuclear weapon has a normalized “C” value of 1.0, the maximum value of any societal asset in the U.S., the quantity of weapons grade PuO₂ in the French shipment is 0.8. The form of the U.S. PuO₂ transportation in France is considered a prime sabotage target,

- The threat to important assets, such as weapons-grade PuO₂, and other nuclear materials and nuclear weapons is described in a Design Basis Threat (DBT) statement.
- The casks used for transporting plutonium in France were not designed for malevolent attacks.
- A terrorist attack would not use the methods described in the French Institute for Radiation and Nuclear Safety (IRSN) report because of the low probability of success that was described in the IRSN report.
- The ISO container used in France for transporting plutonium has few security features and the delay to breach and gain access to the FS 47 casks is estimated to be not more than tens of seconds using hand tools, power tools and/or explosives.
- The transport delay against the terrorist attack and access to the inventory of PuO₂ in the U.S. and France is dramatically different from one another.
- The author has direct experience in convoy neutralization protection effectiveness testing by specially trained convoy couriers in the U.S. with the pre-9/11 threat. The experience was gained as part of the simulated terrorist team comprised of U.S. Army Special Forces personnel, as well as a controller in force-on-force testing.
- The convoy was in transit 26 hours and varied in configuration in the metro areas and in the countryside.
- To limit the scope of analysis it is desirable to develop those scenarios which are deemed credible and that have a high degree of success from the terrorists' point of view. It is unlikely that a terrorist group will expend its resources on an attack that has a low probability of success.
- A cursory review of the terrorists' potential weapon set in table 3 would seem to indicate the ability to mount superior fire power especially when it is coupled with a concentration of a large force in pre-staged positions.

U.S. Protection Factors, P(E)			French Protection Factors, P(E)		
Detection, P(D)	Delay SST/SGT	Response, P(N)	Detection, P(D)	Delay ISO container	Response, P(N)
1.0	≈ 30 minutes	3:1 ratio	1.0	seconds	~ 3:1 ratio

Table 4. P(E) Convoy Comparison

- When the DOE tested the configuration of its convoy in transit they found that it failed to protect the materials over 50% of the time with the 30 minutes of delay. In other words, the P(N) was less than 0.5.
- It should be noted that a convoy's escorting protective force in the U.S. is specially trained to the highest degree available to the U.S. DOE for offensive tactics that are necessary for the protection of nuclear materials convoys.

- The shipment in France had no security delay features for the trailer or the casks; therefore the entire burden for protection or recapture of the PuO₂ before it could be dispersed at the attack point was left to the main convoy forces and the rapid response of the support convoy forces.
- The stops at commercial rest locations were occupied by civilian personnel and vehicles to include trucks and cars. The comparison of Protection Factors for a convoy at rest in the U.S. and France are the same as those described in Table 1. The failure rates of testing results in the U.S. for rest stops were also greater than 50%.
 1. The lack of robust delay protecting the PuO₂ in the trailer, and
 2. The low effectiveness of the response in the convoy protective force.
- Therefore, the risk to the U.S. weapons grade plutonium in transit in France is high.
- Regardless of the reason, the basic review of the security elements used on the French portion of the shipment did not meet U.S. Standards. **Thus, the shipment of PuO₂ made in France in October 2004 was at high risk.**
- Based on the risk and protection effectiveness evaluated for the U.S. shipment, it can be determined by comparative analysis, or simply inspection, that the risk to these shipments is greater than the high risk to the U.S. PuO₂. Even with a pre-2004 design basis threat, these convoys would be at high risk. Since no adjectival rating greater than “high” for risk is commonly used we would have to propose one for the French convoy’s that move the materials in the everyday convoys addressed in this addenda and that would be **“EXTREME.”**
- The nuclear inventory of a two- trailer van that is subject to a radiological dispersal device or theft of the materials to be used against other targets is of grave concern. **The protection afforded these “every day” shipments is virtually non-existent.** The protective force in the convoy is at best useful for accident conditions and would have no effect against a pre-emptive attack by even a small group of terrorists, estimated to be as few as three! It is not clear what mission the convoy members have, or their training, or even their weaponry, but a simple review of the photo shows no level of alert or preparation to address an attack. **They basically would have no effectiveness.**