Research & Test Reactor Security
Questions & Answers

Background

Research and Test Reactors (RTRs) are licensed and regulated by the U.S. Nuclear Regulatory Commission (NRC). Security requirements at these facilities are based on a "graded" approach; in general, RTRs that possess larger quantities of nuclear material or utilize material that is potentially more attractive to adversaries have more security measures in place. The quantity of nuclear material at these facilities is very small when compared to commercial power reactor facilities. In addition, RTRs have robust engineering designs that incorporate a variety of safety features which make them highly resistant to mis-operation (intentional or unintentional).

Physical security strategies at these facilities employ "defense-in-depth," and are founded on the "detect, delay, assess and respond" model. Applicable regulations (in Title 10 of the Code of Federal Regulations, Part 73) are principally focused on preventing the theft or diversion of nuclear materials at RTRs. Subsequent to September 11, 2001, the NRC ensured that numerous additional security-related measures were instituted at RTRs to enhance protection against facility sabotage.

In addition to these post-9/11 actions, the NRC, in conjunction with two national laboratories, initiated a comprehensive security assessment of the nation's RTRs to determine whether additional security measures are warranted. This effort is ongoing, however, preliminary results indicate that there are no credible sabotage scenarios that result in significant off-site consequences.

The NRC maintains an active oversight program of all RTRs which includes routine safety and security inspections and assessments. If as a result of the continuing RTR oversight activities, any additional security measures are necessary to assure the health and safety of the public, the NRC will not hesitate to implement additional security measures as appropriate.

Questions and Answers

Q1. What risk does an RTR pose to the public if attacked by terrorists intent on radiological sabotage, or in stealing radioactive material? What effect would contamination have from dispersal of radioactive material at an RTR?

A1. *RTRs have only limited quantities of radioactive material on-site. The nature and form of this material make it not easily dispersed or handled. As a result, RTRs pose a relatively low risk to public health and safety from potential radiation exposure or theft of the nuclear material. Moreover, these reactors are designed and operated in a manner that minimizes the possibility of unintended radiation exposure.*

Q2. What has happened in the RTR security arena since 9/11?

A2. *After the September 11 attacks, the NRC worked with RTR licensees to implement additional security measures where needed. The specifics of any post-9/11 security*

enhancements at individual RTRs cannot be made publicly available. However, general examples of the enhancements include:

- *enhanced background screening of staff,*
- *improved access controls to key areas within the facilities,*
- *augmented observation of activities within controlled areas,*
- *improved internal and external communication systems,*
- *additional vehicle and package searches, and*
- *enhanced coordination with appropriate local, state, and federal response organizations.*

Through on-site inspections, NRC has verified that all RTRs have measures in place to protect their nuclear material and to limit the radiological consequences following potential acts of sabotage. Nonetheless, we continue to evaluate the effectiveness of these security measures and will take additional steps if necessary.

Q3. Has there been any strengthening of RTRs against the threat from a truck bomb?

A3. *Enhancements against the threat of vehicle-borne explosives have been considered and implemented where needed.*

Q4. Does the security at research and test reactors deal with airborne threats?

A4. *The Aviation and Transportation Security Act of 2001 provides for additional protection against air attacks on all industrial facilities, both nuclear and non-nuclear. The NRC has been in regular communication with other federal agencies, such as the FAA and the DOD to enhance protection against airborne threats. RTRs have also established liaison with the FAA, and continue to report unusual overflights or potential airborne threats to the FAA and NRC. Additionally, the level of damage estimated in comprehensive security assessments for RTRs is consistent with the level of damage anticipated from an airborne threat.*

Q5. Do RTRs have guards? Armed guards? Twenty-four hours a day, seven days a week? If not, why not?

A5. *The use of dedicated armed guards varies among the RTRs. Most university research reactors rely on armed police officers, usually campus-based police officers for security protection. These officers are on duty and continuously available to respond to the reactor when needed, and are supplemented by local, county and state police. Every RTR conducts periodic exercises with these security forces to ensure that a fast and effective response to any incident can be provided.*

Q6. In some cases, people have observed guards outside the RTR buildings that appeared to be not attentive. Instances have also been reported that people can walk around outside an RTR facility without being detected. Why is this okay?

A6. *Based on our independent follow up, we determined that the "inattentive guards" outside the RTR buildings were not assigned to any reactor security-related duties as established in the facilities' security plans (e.g., one was a parking lot attendant).*

The fact that individuals can loiter around RTR buildings without being challenged by security personnel is assumed in facility protective strategies and plans.

Q7. If RTR fuel is stolen, could it be used to make a "dirty" bomb?

A7. *In the unlikely event that radioactive material was taken from an RTR, it could be used to make a "dirty bomb" (also known as a radiological dispersal device or RDD). The NRC has evaluated the potential consequences from such an unlikely event and concluded that no significant injuries from radiological exposure would result. The NRC has also studied the land contamination that would result from exploding an RTR fuel-based RDD and determined that the area impacted would not be extensive. Further, because of the nature of RTR fuel, any area that was affected could be cleaned and decontaminated.*

Q8. If RTR fuel was stolen, could it be used to make a nuclear bomb?

A8. *The use of RTR fuel to make a nuclear bomb (i.e., an improvised nuclear device or IND), though theoretically possible, is very remote. First, there are relatively few RTR facilities in the U.S. that utilize the type of fuel that is capable of being converted for use in an IND. Second, the nature and design of the fuel itself would require considerable manipulation and complex reprocessing to get into a form suitable for use in an IND. Third, RTR fuel is manufactured, shipped, and maintained in limited quantities so that gaining an amount necessary to make an IND would be very difficult. Lastly, a defense-in-depth protection strategy (using design features and security programs) is employed at each RTR facility to ensure that access to the fuel is highly restricted.*

Q9. Do you think that it is appropriate to allow public tours of RTRs? Further, it appears that it is fairly easy for an individual to gain access to some of the university RTRs. Individuals can receive a tour of an RTR simply by giving the impression that they are potential students, with no verification of their identity. Also, doors and windows of some classroom or engineering buildings were left open and unattended; terrorists could easily enter the building without notice. Given this, how do you prevent a terrorist from getting access, under false pretenses, and taking over the facility?

A9. *Yes. Almost every research reactor has "public education" as a key element of its mission. Tours are a routine and integral part of an RTR's function on a university campus, and the security plans and strategies at these facilities take this fact into account. Though each facility maintains its own guidelines on how tours are conducted, the NRC requires that all visitors touring a reactor must be escorted by authorized facility staff.*

Tours are typically under continuous observation by other facility staff using remote surveillance (e.g., cameras), or other means are employed (e.g., duress alarms) to

ensure that a prompt response is initiated in case of a visitor-induced event. If a potential or actual threat to the facility was presented by the visitors, law enforcement would be promptly notified and would respond as needed. Further, being able to peer into a window or door, or enter a door or window of an adjacent classroom or engineering building, which are publicly accessible areas, without being detected or challenged does not mean that safety and security measures that protect the reactor are ineffective. There are multiple safety and security measures in place, many of which cannot be seen from the outside perimeter of the facility.

Q10. Why don't individuals have to be screened by metal or explosive detection devices prior to entry into an RTR facility?

A10. The type and quantity of security measures in place at any given facility are "graded" depending on the potential for radiological release or exposure from the specific facility. Security plans describing the details of the searches that are conducted and what types of materials are permitted in each facility, in combination with other safety and security measures, collectively provide assurance that the public remains protected.

Q11. Why do some RTRs allow photography of reactor areas?

A11. *Photography is permitted at the discretion of individual licensees, principally because RTR security plans and facility protective strategies conservatively assume that adversaries know more than what can be learned from publically-available tours or information.*

Q12. What makes some research reactors more of a radiological risk than others?

A12. *The risk to the public from radiological exposure or release is primarily related to reactor power level and fuel quantity. RTRs are licensed to operate at different maximum power levels and utilize various quantities and types of nuclear material as fuel. The power levels and fuel quantities at these facilities are very small when compared to large electrical power generation plants. Because of the relatively low power levels, and the small quantities of material present, the risk to the public is also low. Inherently-safe facility designs, coupled with effective implementation of security measures and emergency preparedness plans ensure that the public remains at low risk.*

Q13. What is being done to convert U.S. RTR fuel from high enriched uranium to low enriched uranium?

A13. *Of the 34 operating RTRs in the U.S., 24 already use low-enriched uranium (LEU) fuel. The ten RTRs that still use highly-enriched uranium (HEU) are either already scheduled to convert to LEU or are planning to do so. The Department of Energy (DOE) is the lead agency for converting RTRs to LEU fuel, and the NRC has been working with DOE to facilitate their effort. The conversions to LEU fuel is conducted in accordance with 10 CFR 50.64, "Limitations on the Use of Highly Enriched Uranium in Domestic Non-*

Power Reactors." It is NRC's understanding that DOE plans to complete these conversions by 2012.

Q14. Why is the NRC asking for additional information from RTRs after concluding that security/physical protection at these facilities is sufficient?

A14. *As part of our ongoing oversight program, we continually review security at our licensed facilities to ensure that effective security measures remain in place. The information we requested from RTRs will help the NRC to re-validate how the existing security requirements, as supplemented by the additional security measures conveyed to the RTR community after 9/11, are being implemented to protect public health and safety.*