

June 1, 2007

Michael Kohn, President  
Pa'ina Hawaii, LLC  
P.O. Box 30542  
Honolulu, Hawaii 96820

SUBJECT: CONSIDERATION OF ATTACKS ON THE PROPOSED PA'INA HAWAII, LLC  
IRRADIATOR

Dear Mr. Kohn:

The U.S. Nuclear Regulatory Commission staff has completed its consideration of terrorist attacks on the proposed irradiator facility. Enclosed is a supplemental appendix to the draft environmental assessment which was previously issued for public comment on December 28, 2006. The staff is issuing this supplemental appendix for a 30-day public comment period. This information will be published shortly in the *Federal Register*. Related documents are also available on the NRC's website: <http://www.nrc.gov/materials.html> by selecting "Pa'ina Irradiator" in the Quick Links box.

If you have any questions, please contact Matthew Blevins at (301) 415-7684 or by email at [mx6@nrc.gov](mailto:mx6@nrc.gov).

Sincerely,

**/RA/**

Gregory Suber, Branch Chief  
Environmental Review Branch  
Division of Waste Management  
and Environmental Protection  
Office of Federal and State Materials  
and Environmental Management Programs

Docket No.: 030-36974

Enclosure:  
Supplemental Appendix

cc: Enclosed list

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**Appendix B: Consideration of Terrorist Attacks  
on the Proposed Pa'ina Irradiator**

## **APPENDIX B CONSIDERATION OF TERRORIST ATTACKS ON THE PROPOSED PA'INA IRRADIATOR**

### **BACKGROUND**

In May of 2002, during the NRC licensing review for the Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI), an intervenor petitioned the NRC to hold a hearing to address a number of contentions. These included a contention that the NRC must consider terrorist acts in assessing the environmental impacts of the ISFSI, in order to comply with the National Environmental Policy Act (NEPA). On December 2, 2002, the NRC's Atomic Safety and Licensing Board (ASLB) denied this contention. The ASLB referred its denial of the terrorism contention to the Commission for review. On January 23, 2003, the Commission affirmed the ASLB's rejection of the terrorism contention. In its decision, the Commission held that NEPA does not require a review of impacts from acts of terrorism, and that an environmental review is not the appropriate forum in which to address the challenges of terrorism.

After the NRC issued the 10 CFR Part 72 license for the Diablo Canyon ISFSI in March 2004, the intervenor and other parties filed suit in the United States Court of Appeals for the Ninth Circuit, seeking that the NRC staff be required to consider terrorist acts in its environmental review associated with this licensing action. In its decision, dated June 2, 2006, *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016, 1028 (9<sup>th</sup> Cir. 2006), the Court held that the NRC's "categorical refusal to consider the environmental effects of a terrorist attack" in this licensing proceeding was unreasonable under NEPA. The Ninth Circuit remanded the "NEPA-terrorism" question to the Commission for "further proceedings consistent with this opinion."

Following the remand from the Ninth Circuit, the Commission directed the staff to prepare a revised EA addressing the likelihood of a terrorist attack at the Diablo Canyon ISFSI and the potential consequences of such an attack. The Commission further directed the staff, to the extent practicable, to base its analysis on information already available in agency records, and to make as much of its analysis public as possible. As a result of the Ninth Circuit's decision, the NRC determined that consideration of the environmental impacts of terrorism in the context of this application is warranted. At the outset, it should be noted that in connection with this facility additional security measures will be imposed by order.

### **OVERVIEW OF SECURITY**

The NRC has historically considered the potential impacts of terrorist acts in the development and implementation of its security requirements. Following the September 11 terrorist attacks, the Commission initiated prompt and

comprehensive actions to address both immediate and longer-term security measures for NRC-regulated facilities. In the months immediately following the attack, the Commission issued numerous safeguards and threat advisories to its licensees in order to strengthen licensees' capabilities and readiness to respond to a potential attack on a nuclear facility. As part of the longer-term efforts, the NRC has conducted a comprehensive review of the agency's security program. This review has led to the imposition of additional requirements, through orders and rules, affecting many categories of licensees, including large irradiator licensees.

The Radiation Source Protection and Security Task Force Report to the President and Congress, dated August 15, 2006 (NRC, 2006a), evaluated and provided recommendations to the President and Congress relating to the security of radiation sources in the United States from potential terrorist threats, including acts of sabotage, theft, or use of a radiation source in a radiological dispersal device (RDD) or radiological exposure device (RED).

The U.S. framework for security and control of radioactive sources requires multi-jurisdictional coordination. Several U.S. Governmental agencies have authority, sometimes overlapping authority, to regulate radioactive materials. Reducing the risk of the malevolent use of radioactive material involves many crosscutting activities and issues. Protection of risk-significant sources is important in preventing RDD and RED proliferation.

The NRC has been proactive in determining whether the facilities it regulates are adequately protected in light of the September 11 attacks. Specifically, on June 6, 2003 (NRC, 2003), NRC issued Orders to large panoramic and underwater irradiator licensees to make mandatory the voluntary actions taken by those licensees in response to the advisories, and to implement additional security enhancements identified in the NRC's ongoing comprehensive review of its safeguards and security programs and requirements.

In addition, the staff has performed security assessments to evaluate the effects of different threat scenarios and to assess the adequacy of the existing security measures (NRC, 2004).

By their nature, terrorist acts are intended to harm society and possibly the environment. The tragic events of September 11 illustrate too vividly that successful attacks against highly symbolic elements of the US infrastructure (the World Trade Center and the Pentagon), can have serious to grave impacts. The NRC's approach, therefore, focuses on ensuring that the security requirements, design features, and other security measures are adequate and effective in reducing the likelihood and mitigating the effects of terrorist acts using radioactive materials or against nuclear facilities.

## **TERRORIST ACTIVITIES**

In describing the potential for environmental impacts from terrorist activities a description of the relevant terminology is necessary and includes three broad topics: threat, vulnerability, and consequences, as discussed below.

### **Threat**

A threat is considered present when an organization or person has the intent and capability to cause damage to a target. The NRC staff operates on the premise that a general credible threat exists (i.e., the likelihood of attack has a probability of 1). However, this general credible threat should not be confused with the likelihood of a successful terrorist action (i.e., the probability of a successful attack is  $< 1$ ). Generally in NEPA analysis, the NRC must consider reasonable foreseeable impacts including those from potential accidents. Due to the unique nature of terrorist activities the following discussion focuses on the qualitative probability of a successful attack because at this time it is only possible to assign qualitative probabilities to these events.

The NRC has a Threat Advisory System that it expanded after the September 11 terrorist attacks to include a broader range of licensees, including large irradiator facilities. The NRC has incorporated the threat condition levels used in the DHS's Homeland Security Advisory System, into its own Threat Advisory System. The NRC threat assessment staff reviews, analyzes, coordinates, and disseminates threat and intelligence information, relevant to its licensees, at both strategic and tactical levels. The NRC threat assessment staff also serves as NRC's liaison and coordination staff with other organizations and agencies, including the intelligence and law enforcement communities. Through these improved coordination and communication functions, the NRC is able to efficiently develop and transmit Advisories to the appropriate licensees, who then are able to take prompt action. Thus, the broad actions taken by the Federal government and the specific actions taken by the NRC since September 11, 2001 have helped to reduce the potential for terrorist attacks against NRC-regulated facilities.

NRC currently assesses that there is a general, credible threat to NRC-licensed facilities and materials, although there is no specific information available that indicates a specific threat to panoramic or underwater irradiator facilities.

### **Vulnerability**

Vulnerability in this context refers to a weakness to incur physical damage, or to lose control of the radioactive material in a manner which can lead to unacceptable consequences. Vulnerabilities are specific to the type of attack.

The NRC used a security assessment framework that provided a process and criteria for evaluating results of security assessments for a broad range of activities subject to the NRC's regulatory authority (NRC, 2004) including large irradiator facilities. The security assessment framework is a screening and assessment tool to determine whether additional security measures beyond those required by the 2003 security orders, are warranted for NRC-regulated facilities, including large irradiator facilities. The security assessments analyze the risk of sabotage and malevolent use of stolen material. Consistent with the NRC's overall approach, security assessments continue to be performed for licensed users possessing risk-significant quantities of radioactive material. Because of the great number and diversity of users, the assessments target representative facilities. The NRC performed security assessments on a range of threat scenarios for the transportation and licensed uses of Category 1 and 2 sources (IAEA 2005). The staff evaluated a spectrum of threat scenarios. Initially, the NRC screened threat scenarios to determine plausibility. Remote or speculative scenarios and scenarios with insignificant consequences were screened out based on threat assessments and engineering evaluations. For those scenarios deemed plausible, NRC assessed the attractiveness of the facility to attack by taking into account factors such as iconic value, complexity of planning required, resources needed, execution risk, and public protective measures. In addition, the NRC made conservative assessments of consequences to assess the potential for early fatalities due to radiological impacts. The NRC then looked at the combined effects of attractiveness and consequence analyses to determine whether additional security measures for large irradiator facilities were necessary.

### Consequences

Consequences relate to the magnitude and type of effect from terrorist actions. For the proposed irradiator, a range of consequences can result from radiological sabotage of the irradiator or from theft of the material. The proposed irradiator has numerous protective features that help to prevent or mitigate consequences of potential terrorist attacks. Physical protections are more fully described in the "The Proposed Action" section of the draft EA and generally consist of the robust characteristics of the sources, pool structure, plenum mechanism, and source location. Potential consequences are highly dependent on the type of attack or event scenario.

In conducting the security assessments for irradiator facilities, the NRC chose several designs which were representative of most currently licensed designs. The NRC staff reviewed the analyses done for the irradiator facility security assessments, and compared the assumptions used in these generic assessments to the relevant features of the Pa'ina facility. Based on this comparison, the staff determined that the assumptions used in these generic security assessments regarding irradiator design and the source term (amount of radioactive material), were representative, or conservative, relative to the design

of the Pa'ina irradiator. Radiological sabotage of the proposed irradiator is expected to result in generally small radiological consequences. This is due the passive nature and location of the sources and the source design and construction. More specifically, the sources are below ground level (approximately 18 feet), under approximately 5,000 gallons of water, and contained in a very robust pool structure. Additionally, the sources themselves are very robust; made of essentially non-dispersible and insoluble materials (i.e., metal "slugs") which are further encapsulated in two layers of stainless steel. Therefore, it is unlikely to have an offsite release of radioactive material from radiological sabotage of the sources in the irradiator (NRC, 2006b). The most likely outcome of an act of sabotage is that some of the sources would be damaged and some "slugs" of cobalt metal could be released to the pool water. However, this material is essentially non-soluble in water and therefore, there is a low risk of radioactive material escaping the pool (CNWRA, 2007).

Theft or diversion of the radioactive sources presents different scenarios for terrorist threats. The events of September 11 heightened the Nation's concerns regarding the use of radioactive materials in a malevolent act. Such an attack has been of particular concern because of the widespread use of radioactive materials (often contained in sealed sources) in the United States and abroad by industry, hospitals, and academic institutions. Loss or theft of such materials could lead to their diversion for malicious use in an RDD or RED. An RED is a device whose purpose is to expose people to radiation, rather than to disperse radioactive material into the air, as would an RDD. An RDD is a device or mechanism that is intended to spread radioactive material from the detonation of conventional explosives or other means. An RDD explosion could create fear and panic, contaminate property, and require potentially costly cleanup. RDDs are considered weapons of mass disruption; immediate health effects from exposure to the low radiation levels expected from an RDD would likely be minimal (NRC, 2005). In most cases, any immediate deaths or serious injuries would likely result from the explosion itself, rather than from radiation exposure. It is unlikely that the radioactive material contained in a dirty bomb would result in direct deaths. Use of a dirty bomb could result in radioactive contamination of several city blocks to an entire city. The extent of the contamination depends upon a number of factors including the size of the explosive, the amount and type of radioactive material used, and weather conditions. (DHS, 2003). REDs may result in a few deaths, but would not cause widespread contamination (NRC, 2006b).

The potential deterministic health effects from risk-significant sources are the consequences of concern that form the basis of the NRC safeguards and security program for protecting against malevolent events. The security and control requirements focus on protecting against these severe immediate or short-term health consequences. Changes in the consequences of concern are being evaluated as part of the National Infrastructure Protection Plan (DHS,

2006) to provide a consistent level of protection with other sectors in the Critical Infrastructure Plan.

The security compensatory measures, issued by Orders to irradiator licensees, include: enhanced access controls; background screening of personnel; intrusion detection, assessment and alarm response; and coordination with local law enforcement. These enhanced security measures are intended to prevent the theft of radioactive material for malicious purposes and assure prompt response by law enforcement to interdict terrorist or to implement protective actions to mitigate severe consequences of potential terrorist actions (NRC, 2006a). Collectively, these measures further reduce the already low probability of a successful terrorist attack on an irradiator facility and reduce the risks of potential radiological consequences if an attack was successful. The same enhanced security measures will be imposed, by Order, for the Pa'ina irradiator if a license is issued. These measures will be fully implemented before the initial movement of the cobalt-60 sources into the facility.

Because of the uncertainty inherent in assessing the likelihood of a terrorist attack, the NRC recognizes that while the probability, under general credible threat conditions, of such an attack is believed to be low, it cannot be reliably quantified. To ensure that the risk is minimized, the NRC has adopted an approach which focuses on ensuring that the security measures are adequate and effective in countering and mitigating the effects of terrorist attacks against large panoramic and underwater irradiator facilities. To provide high assurance that a terrorist act will not lead to significant radiological consequences, the NRC has analyzed plausible threat scenarios and required enhanced security compensatory measures to protect against the threats. In addition, advanced coordination and planning with local law enforcement and the draft DHS Protective Action Guides for Radiological Dispersal Devices and Improvised Nuclear Devices are intended to mitigate potential radiological consequences. As stated above, all these actions have been taken without regard to the probability of an attack. This protective strategy reduces the risk from a terrorist attack to an acceptable level, thereby reducing the potential for the facility to be considered an attractive target.

## **CONCLUSION**

Based on its ongoing consideration of safeguards and security requirements, its review of information provided by the intelligence community, and the implementation of security compensatory measures at the nation's irradiator facilities, the Commission considers that public health and safety and the environment, and the common defense and security, continue to be adequately protected in the current threat environment.

Based on the various protective and mitigating factors described above, the NRC staff finds that no significant environmental impacts exist from potential terrorist

actions which may result from licensing the proposed irradiator. This finding is based, in part, on (1) the continual evaluation of the threat environment by the NRC, in coordination with the Intelligence and law enforcement communities, which provides, in part, the basis for the compensatory measures currently required; (2) the compensatory measures that are in place to reduce the chances of an attack that leads to unacceptable radiological consequences (3) NRC security assessments of the potential consequences of terrorist attacks against irradiator facilities that inform the decisions made regarding the types and level of protective measures; and (4) coordination with law enforcement agencies to mitigate consequences should there be an attempt to steal radioactive material for malevolent purposes.

The NRC staff concludes that the construction, and operation, of the Pa'ina irradiator facility, even when potential terrorist attacks on the facility are considered, will not result in a significant effect on the human environment. NRC safety and security requirements, imposed through regulations and orders, and implemented by the licensee, in combination with the design requirements for panoramic and underwater irradiators, provide adequate protection against successful terrorist attacks on irradiator facilities.

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