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NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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April 2, 2003

FILE *Spent Fuel Pool
Studies
(or related
file?)*

NOTE TO COMMISSIONER ASSISTANTS

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FROM: *Linda Hallory*
for John W. Craig
Assistant for Operations, OEDO

SUBJECT: FACT SHEET ON RISK AND CONSEQUENCES ASSOCIATED WITH
TERRORIST ATTACKS ON SPENT FUEL POOLS

Attached for your information is an unclassified fact sheet that provides additional information and perspectives related to the risk and consequences associated with terrorist attacks on spent fuel pools. The information and perspectives are based on preliminary results of the NRC's ongoing studies in this area. The staff intends to distribute this fact sheet on April 7, 2003, to the Regions for use as a reference when answering questions pertaining to spent fuel pool issues from the media and other external stakeholders.

Attachment:
As stated

- cc: W. Travers, EDO (w/attachment)
- C. Paperiello, DEDMRS (w/attachment)
- W. Kane, DEDR (w/attachment)
- P. Norry, DEDM (w/attachment)
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- OCA (w/attachment)
- OPA (w/attachment)
- OIP (w/o attachment)
- CIO (w/o attachment)
- CFO (w/o attachment)
- EDO R/F (w/attachment)

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MEMORANDUM TO: Regional Administrators

**FROM: William F. Kane
Deputy Executive Director for Reactor Programs**

**SUBJECT: FACT SHEET ON RISK AND CONSEQUENCES ASSOCIATED WITH
TERRORIST ATTACKS ON SPENT FUEL POOLS**

The attached fact sheet provides additional information and perspectives related to the risk and consequences associated with terrorist attacks on spent fuel pools. The information and perspectives are based on preliminary results of the NRC's ongoing studies in this area. This fact sheet is intended assist your staff in answering questions pertaining to spent fuel pool issues from the media and other external stakeholders.

Attachment: As stated

**cc w/attachment:
W. Travers, EDO
C. Paperiello, DEDMRS
S. Collins, NRR
A. Thadani, RES
M. Virgilio, NMSS
R. Zimmerman, NSIR
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STP
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DRAFT

**ADDITIONAL INFORMATION AND PRELIMINARY PERSPECTIVES RELATED TO THE RISK
AND CONSEQUENCES ASSOCIATED WITH TERRORIST ATTACKS
ON SPENT FUEL POOLS**

- Nuclear power reactor spent fuel pools are robust structures constructed of very thick concrete walls with stainless steel liners. Since September 11, 2001, additional measures have been taken to reduce the likelihood of a terrorist attack and to further improve existent capabilities of nuclear plants to resist and withstand an attack. These measures include specific enhancements associated with the protective strategies for ground attacks on spent fuel pools. Access to spent fuel pools requires passage through multiple physical barriers which must be of sufficient strength to provide high assurance in the protection of public health and safety from radiological sabotage. Reactor safeguards contingency plans provide for protection of the spent fuel pools similar to that of the reactors themselves. An attempt to commit radiological sabotage at a spent fuel pool would result in a security response to neutralize the threat. Furthermore, the NRC has been coordinating with the Federal Aviation Administration and other Federal agencies, to reduce the opportunity for terrorists to use aircraft to threaten the security of nuclear facilities.
- Design of pools with fuel located below grade or shielded by other structures make them highly resistant to damage and unlikely to fail due to an aircraft impact.
- Current analysis is underway utilizing updated methods that build upon the results of thermal hydraulic and severe accident research and experience from probabilistic risk assessments.
- Insights from current and more realistic analyses suggest that the spent fuel stored in spent fuel pools is more easily cooled than predicted in earlier NRC studies.
- Preliminary insights from current analyses indicate that even if water was lost and fuel was not cooled, most fuel would not be adversely affected. Accordingly, the consequences of such an accident would be much less severe than previously estimated in NUREG-1738, in particular:
 - the radioactive release would be much smaller (by at least a factor of 10 for the scenarios analyzed)
 - the radioactive release would begin later
 - providing more time for implementing effective protective measures, e.g., evacuation of the EPZ
 - resulting in reduced health effects
 - resulting in reduced land contamination
- Previous analyses, such as NUREG-1738, were based on more conservative assumptions and analytic models than current analyses. Current analyses are using more sophisticated models and techniques that allow more realistic calculations and reductions in unnecessary conservatism. Thus, while the previous analyses provided the technical bases needed to support the decisions being made at the time, using them in spent fuel pool vulnerability assessments inappropriately provides overly conservative and misleading results. The current analyses are intended to provide a much more realistic assessment of the consequences of spent fuel pool security events and are

much more appropriate for informing vulnerability assessments and assessing security risks.

- The new insights are based on the best understanding from more detailed analysis of a BWR spent fuel pool and will undergo an external peer review.
 - more detailed analyses use integrated thermal hydraulic and severe accident modeling
 - model developed based on actual operating reactor pool with detailed information on fuel loading and design
 - additional analyses are underway to address different scenarios
 - confirmatory research to address new modeling is planned