

Draft 2/12/02

**PROGRAM PLAN FOR
VULNERABILITY ASSESSMENT
FOR SPENT FUEL DRY STORAGE**

Purpose: Given a set of potential terrorist threats, develop a series of event scenarios and assess the vulnerability of spent fuel dry storage systems to those events in terms of potential loss of function(s) of the storage systems. If vulnerabilities are identified, additional protective measures to reduce these vulnerabilities will be identified and evaluated in support of recommended actions.

Threats: Defined threats as identified in Attachment #10 of RTA Scoping Paper to the Commission, dated 11/28/01.

Scenarios: Event scenarios will be developed from the defined threats in coordination with safeguards and security personnel for use in the vulnerability assessment. Coordination of developed scenarios within NMSS and across the NRC is necessary.

Scope: Consideration of all spent fuel dry storage systems with a certificate of compliance or utilized under a site specific license shall be made for the vulnerability assessment.

Vulnerability

Assessments: A screening process shall be developed to identify specific storage systems, vendor models, etc. that represent the types of storage systems and the worst case source term contents for that system. These will constitute the examples for which detailed assessments of vulnerability will be performed. A logic system shall be developed to allow reasonable estimates regarding the vulnerability of specific storage systems not identified for detailed assessment. Bounding concepts shall be utilized where there is a defensible basis. Preliminary screening results being developed are included in the attached matrix identifying threats and examples of storage systems to be studied in detail. The next step is to identify the analyses necessary to assess the vulnerability of each example spent fuel storage unit to each of the defined threat scenarios. Determine whether the necessary analyses will be performed by NRC staff or contractor personnel. The necessary analyses to be performed can be considered as addressing the following subject areas.

Analysis Areas:

- Definition of environmental conditions/loadings created by the threat scenarios
- Structural/Mechanical/Materials analyses to define any breaching of the containment/confinement boundary of the storage system
- Materials damage analyses to determine the extent of change of conditions of the stored source materials (the use of an Expert Panel is planned)

Portions Ex 2

E/15

Define the Threat

- Attachment #10 of RTA Scoping Paper to Commission, dated 11/28/01, Identifies Defined Threats
- Large Commercial Jetliner Event (per Congressional Inquiries)

Porton EX 2

ID	RTA Analyses To Be Completed	Qtr 1, 2002			Qtr 2, 2002			Qtr 3, 2002			Qtr 4, 2002			Qtr 1, 2003			Qtr 2, 2003			Qtr 3, 2003			Qtr
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
1	Large Plane Crash onto ISFSI																						
2	Mechanical Analysis																						
3	Thermal Analysis																						
4	Source Term Calculation																						
5	Fission Product Transport (MELCOR or Other)																						
6	Consequence Calculation (MACCS/RADTRAD/Other)																						
7																							
8	Small Plane Crash onto ISFSI																						
9	Planes () Scenarios <i>FX2</i>																						
10	Modeling (includes MELCOR/MACCS/RADTRAD/Other)																						
11																							
12	Simplified Plane Model (For Desktop App. And Train Crash)																						
13	Model Development																						
14	Model Validation																						
15																							
16	Storage Cask Sabotage Scenario (Using HiStorm/HiStar)																						
17																							
18	Storage Cask Sabotage Scenario (Using NUHOMS, NAC, TN-68, Castor)																						

Project: Storage Program Plan
Date: Wed 02/13/02

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

STORAGE SYS THREAT	Holtec HI-STAR 100 - 32 NOTE 1	Holtec HI-STORM 100- 32 NOTE 2	BNFL-FS VSC-24 NOTE 3	TransNucWest NUHOMS- 32P NOTE 4
()	Ex2			
()	Ex2			
()	Ex2			
()	Ex2			
()	Ex2			

NOTE 1: Represents a combined transport and storage system with a separate overpack/cask and canister/containment. The cask cylinder wall is fabricated from 6 layers of SS and CS welded to top and bottom forgings with a bolted flanged closure at the top with double metallic seals. Neutron shielding is attached to the outer cylindrical shell. The various canisters that can be use are welded SS pressure vessels with redundant welded closures containing the

Portions Ex2

ELEMENTS OF VULNERABILITY ASSESSMENT
FOR BREACHING SPENT FUEL DRY STORAGE SYSTEMS

THREATS

() Ex2

SCENARIOS

(To be developed from Threats based on Briefing held
on 2/11/02 and in coordination with Safeguards experts)

INDUCED ENVIRONMENT/LOADINGS

- Pressure vs Time
- Temperature vs Time
- High temperature/high velocity fluid flow
- Mass and Velocity of
- Geometry and Physical Properties of

) Ex2

POPULATION OF DRY SPENT FUEL STORAGE CONTAINERS

- Single Barrier System Cask w/Cask Containment
- Double Barrier System Cask w/ Cask or Overpack and Canister Containment
- Number Now in Use
- Number in Future Use
- Number at a Given Site
- Materials of Construction
- Wall Thicknesses
- Containment Closure System
- Containment Internal Pressurization Environment

CONTAINED/STORED SOURCES

- Spent Fuel Type and Quantity
 - PWR
 - BWR
- Max. Initial Enrichment
- Max. Burnup
- Heat output
- GTCC Material Type and Quantity/Activity

CASK/OVERPACK BREACHING

- Cask Failure Modes (Transfer Casks are not included in current plan)
- Gross Overpressure from

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Portions Ex2

Outline for Report on the

VULNERABILITY ASSESSMENT
FOR SPENT FUEL DRY STORAGE

- I. Executive Summary
 - A. Purpose and Background
 - B. Analysis Results
 - C. Recommendations

II. Introduction

III. Purpose

IV. Background

- A. New security environment in U.S. .
- B. Independent Spent Fuel Storage Installations(ISFSIs)
 - 1. Fuel Handling and Loading
 - 2. Transfer Equipment and Transfer Operations
 - 3. Dry Storage Units
 - 4. Dry Storage Support Pad
 - 5. Monitoring and Maintenance
- C. Threat Development/Definition Process
- D. Scenario Development Process
- E. Discussion of Realistic, Bounding or Other Conditions
- F. Threat Assessment of ISFSIs Prior to 9/11/01

V. Description of New Threats (Ref: Commission Scoping Paper of 11/28/01, Attach. #10)

Ex 2

VI. Description of New Event Scenarios from New Threats Against ISFSIs

- A. (To be determined)
- B. (")
- C. (")
- D. (")
- E. (")
- F. Results of Scenarios
 - 1. Release of Radioactive Materials from a Breach During Handling/Transfer on ISFSI Site
 - 2. Release of Radioactive Materials from a Breached Storage System on ISFSI Site
- G. Scenario Assumptions
 - 1. Theft of radioactive material for diversion from ISFSI site will not occur

Portions Ex 2