# AGENDA

## SFPO MEETING ON VULNERABILITY ASSESSMENTS

## FOR DRY SPENT FUEL STORAGE SYSTEMS

February 13, 2002
1:30 - 3:00 @ O-13B4

**INTRODUCTION** — **5 min**

- Dry Spent Fuel Storage Task Group (1 of 3 in SFPO)
- Members
- Coordination within SFPO (w/other two TGs & Specialty Groups)
- Coordination within NMSS and across NRC

**CURRENT DRY STORAGE SYSTEMS** — **10 min**

- Listing
- Types of Systems
- Current Population In Use

**ELEMENTS OF VULNERABILITY ASSESSMENTS** — **10 min**

**PROGRAM PLAN** — **25 min**

- Development of Senarios
- Analysis ~~Optins~~ Options
- Development of Models
- Perform Analyses

**SCHEDULE** — **10 min**

**REPORT OUTLINE** — **10 min**

**DISCUSSION** — **20 min**

2/12/02
FILE:AGENDA-2-13-02



H12

# TYPES OF DRY SPENT FUEL STORAGE SYSTEMS

SINGLE BARRIER (Cask-confinement barrier)

Single Material - Castor V/21, Castor X/32S, TN-24, MC-10

Multi-layer Materials - NAC-C28 S/T, NAC-I28 S/T, NAC-ST, TN-40, TN-32/68

DOUBLE BARRIER (Cask/Overpack and Canister-confinement barrier)

Multi-layer Metallic Materials & Steel Canister - HI-STAR100

Multi-layer Steel w/Concrete Fill & Steel Canister - HI-STORM100

Reinforced Concrete (R/C) w/Steel Liner & Steel Canister - VSC-24, NAC-MPC, NAC-UMS, BNFL-FS-W150/W74

Reinforced Concrete (R/C) Bunker Module & Steel Canister - NUHOMS-32P

2/12/02
FILE:SFStorSysTypes

DRY SPENT FUEL STORAGE CASK POPULATION CURRENTLY IN USE
(From S. O'Connor's Licensing Status File, 11/16/01)

2/3/02

| IDENTIFICATION | No. LOADED | No. DEFINED FOR LOADING | |
|---|---|---|---|
| BNFL-FS | | | |
| W21 | 0 | | X |
| W74 | 0 | Start 3/02 | 7 |
| | 0 | Start 3/02 | 1-GTCC |
| VSC-24 | 70 | | X |
| CASTOR | | | |
| V-21 | 25 | | X |
| X/33 | 1 | | X |
| HOLTEC | | | |
| HI-STAR 100 * | 7 | | X |
| HI-STORM 100 | 9 | | 55 + PFS(4000) |
| HI-STORM 100S | 0 | Start 3/04 | 3 |
| WESTINGHOUSE MC-10 | 1 | | X |
| NAC | | | |
| 128 | 2 | | X |
| UMS * canister | 0 | | X |
| MPC * canister | 0 | Start 3/02 | 55 |
| | 0 | Start 3/02 | 4-GTCC |
| TN | | | |
| -32 | 26 | | 1 |
| -40 | 14 | | X |
| -68 * | 9 | | X |
| TN WEST NUHOMS | | | |
| -7P | 8 | | X |
| -12T(-12P mod) | 2 | | X |
| -24P * canister | 101 | Start 6/02 | 8 |
| -32P | 0 | | X |
| -52B * canister | 10 | | 8 |
| -61B | 0 | | X |
| TN WEST ADVANCED NUHOMS | | | |
| -24P * canister | 0 | | X |
| TOTAL | 285 | | 142 |

* Dual Purpose-Transportation and Storage
FILE:CaskPop011802

# VULNERABILITY ASSESSMENT FOR DRY STORAGE CASKS

## MATERIALS AND BARRIER THICKNESSES (Preliminary 2/12/02)

| CASK | TOP | SIDE | Vulnerability Rating |
|---|---|---|---|
| CASTOR V/21 | 15" Steel | 15" Steel | |
| NAC-ST | 6.5" Steel | 4.21" Stl + 3.2" Lead | |
| NAC-C28 S/T | 6.5" Steel | 4.21" Stl + 3.2" Lead | |
| TN-24 | 11.2" Steel | 11.0" Steel | |
| VSC-24 | 10.5" Steel | 29.0" R/C+2.75" Stl | |
| HI-STORM 100 | 14.0" Stl+10.5"Conc | 3.5" Stl + 27.0" Conc | |
| TN-32 | 9.88" Stl-32A<br>11.0" Stl-32/32B | 10.0" Steel | |
| CASTOR X/32S | 13.6" Steel | 9.05" Steel | |
| NAC-I28 S/T | 6.5" Steel | 4.21" Stl + 3.2" Lead | |
| TN-40 | 10.5" Steel | 10.0" Steel | |
| MC-10 | 12.5" Steel | 10.0" Steel | |
| HI-STAR 100 | 16" Steel | 9.5" Steel | |
| TN-68 | 9.75" Steel | 8.25" Steel | |
| NAC-UMS | 15.625" Steel | 28.2" R/C+3.125"Stl | |
| STD. NUHOMS-32P | 32.0" R/C + 0.5" Stl<br>BACK 36.0" R/C +<br>9.0" Stl | 42.0" R/C + 0.5" Stl<br>FRONT 30.0" R/C +<br>7.5" Stl<br>DOOR 5.9" Conc +<br>10.25" Stl | |
| FUEL SOLUTIONS | 12.75" R/C+11.75"Stl | 30.5" R/C+2.625"Stl | |
| NAC-MPC | 13.625" Steel | 21.0"R/C+4.125" Stl | |
| SNC TRANSTOR | (Withdrawn) | | |
| | | | |
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| | | | |
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| STORAGE SYS<br><br>THREAT | Trans Nuclear<br>TN 32<br><br>NOTE 1 | Holtec<br>HI-STORM 100-<br>32<br>NOTE 2 | BNFL-FS<br>VSC-24<br><br>NOTE 3 | TransNucWest<br>NUHOMS-<br>32P<br>NOTE 4 |
|---|---|---|---|---|
| Ex 2 | | | | |
| | Ex 2 | | | |
| Ex 2 | | | | |
| Ex 2 | | | | |
| Ex 2 | | | | |

NOTE 1: Represents a combined transport and storage system with no separate overpack and canister. Vertical carbon steel vessel with bolted flanges on the confinement barrier lid that has double metallic O-ring seals with volume in-between under constant helium pressure. Body of confinement vessel is welded nickel alloy steel plate for pressure vessels. Outer shield of pressure vessel carbon steel forging for gamma shield. An outer borated polyester layer

Portions Ex 2

provides neutron shield. Spent fuel basket is of fusion welded SS cells separated by aluminum and poison plates for thermal and criticality control. Stored vertically on reinforced conc. mat.

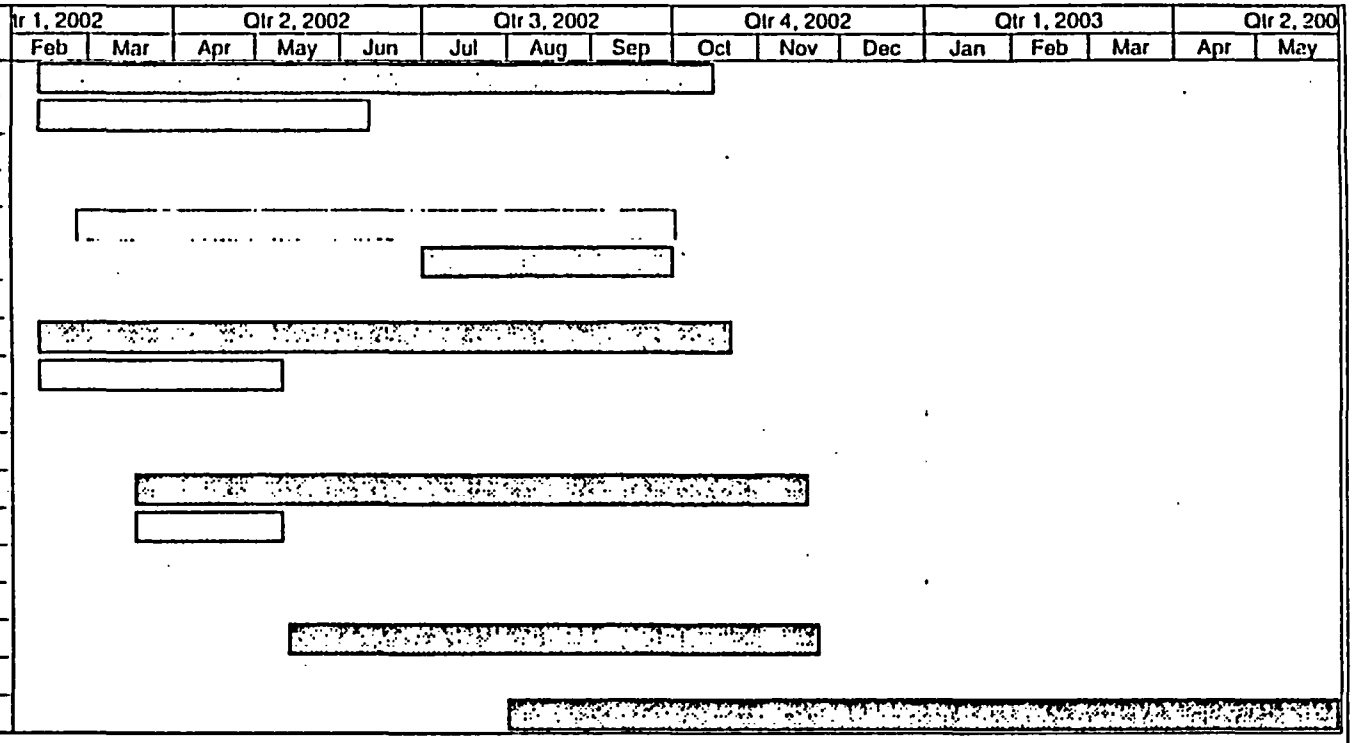
NOTE 2: A vertical cask/overpack w/inner and outer carbon steel shells filled with unreinforced conc. with bolted cask non-confinement closure. Canister insert confinement barrier, multi-purpose canister (MPC), is leak-tight, welded, pressurized SS vessel containing honey-comb cellular SS basket with Boral panels. Canister closure is welded. Canisters of MPC-24, -32 and -68 series exist. System is stored vertically on a reinforced conc. mat and may or may not be anchored.

NOTE 3: A vertical reinforced conc. cask/overpack with an inner carbon steel liner with the closure being a bolted lid. The canister that fits inside is the multi-assembly sealed basket (MSB) that is a leak-tight, welded vessel of low-carbon pressure vessel steel, helium pressurized that is the confinement barrier containing the spent fuel basket made up of welded square carbon steel tubes to create a honey-comb structure. Closure of the MSB is welded. The system is stored on a reinforced conc. mat.

NOTE 4: Vault-type cask system with vault, horizontal storage module (HSM), being a reinforced conc. structure w/internal structural steel canister support system for canister horizontal storage. Vault closure is mechanical but may be welded. Canister insert confinement barrier is leak-tight, welded, helium pressurized SS vessel containing guide sleeves/honey-comb cellular SS basket. Canister closure is welded. Soluble boron is used with the -24P basket whereas other NUHOMS canisters such as -32P, -52B and -61B use borated plates in the basket structure. HSM is installed as a structure on a reinforced conc. foundation or mat.

2/12/02
FILE:MATRIX00

| ID | Analysis To Be Completed |
|---|---|
| 1 | Large Plane Crash onto ISFSI |
| 2 | -Mechanical Analysis |
| 3 | -Thermal Analysis |
| 4 | -Source Term Calculation |
| 5 | -Fission Product Transport (MELCOR) |
| 6 | -Consequence Calculation (MACCS) |
| 7 | |
| 8 | Small Plane Crash onto ISFSI |
| 9 | -Planes, Scenarios |
| 10 | -Modeling (includes MELCOR and MACCS) |
| 11 | |
| 12 | Simplified Plane Model |
| 13 | -Model Development |
| 14 | -Model Validation |
| 15 | |
| 16 | Storage Cask Sabotage Scenario |
| 17 | |
| 18 | Transport Cask Sabotage Scenario |




Project: Storage Program Plan
Date: Tue 02/05/02

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

| | Top | Side | No. Loaded |
|---|---|---|---|
| Coster V/21 | 15" steel | 15" steel | 25 |
| Coster X/32S | 13.6" Steel | 11.8" steel | 1 |
| TN-24 | 11.2" Steel | 11.0" Steel | 0 |
| NAC-10 | 12.5" Steel | 10.0" Steel | 1 |

| | | | |
|---|---|---|---|
| NAC-C28 S/T | 6.5" Steel | 4.21" Steel + 3.2" Lead | 0 |
| NAC-I28 S/T | 6.5" Steel | 4.21" Steel + 3.2" Lead | 2 |
| NAC-ST | 6.5" Steel | 4.21" Steel + 3.2" Lead | 0 |
| TN-40 | 10.5" Steel | 10.0" Steel | 14 |
| TN-32 | 9.66" Steel - 32A<br>11.0 " Steel - 32/32B | 10.0" Steel | 26 |
| TN-68 | 9.75" Steel | 8.25" Steel | 9 |

| | | | |
|---|---|---|---|
| Hi-Star 100 | 16" Steel | 9.5" Steel | 7 |
| Hi-Star M 100 | 14" Steel + 10.5" Conc. | 3.5" Steel + 27" Conc. | 9 |
| VSC-24 | 10.5" Steel | 29" R/C + 2.75" Steel | 70 |
| NAC-MPC | 13.625" Steel | 21" R/C + 4.125" Steel | 0 |
| NAC-UMS | 15.625" Steel | 28.2" R/C + 3.125" Steel | 0 |
| BNFL-ES-W150/W74 | 12.75" R/C + 11.75" Steel | 30.5" R/C + 2.625" Steel | |
| NUHOMS-32P | | | 0 |