

Meeting with United States Nuclear Regulatory Commission  
Rockville, MD  
June 4, 2008

Duke Participants:

Stephen Newman, Regulatory Compliance

Lawrence Llibre, Major Projects Group

Clifford Davis, Major projects Group

Dr. Sami Rizkalla, Testing Director, NCSU Constructed Facilities Lab

Agenda:

- Introductions
- Purpose of Meeting
- Brief Description of Natural Phenomenon Barrier System (NPBS) Modifications Employing a Fiber-Reinforced Polymer (FRP) System
- Proposed Utilization of FRP System on Solid Concrete Brick Masonry
- Overview of FRP Test Program Presently Being Conducted at North Carolina State University
- Discussion of FRP Test Program and NRC's Questions/Concerns
- Closing Remarks



# Description of NPBS Modifications

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- Unit 3 Control Room North Wall
  - fortify wall to address tornado wind & differential pressure loads and tornado-generated missiles
  - install structural steel barriers (wind, differential pressure, and missiles)
  
- Standby Shutdown Facility (SSF) Systems Located within Units 1, 2, and 3 West Penetration and Cask Decontamination Tank Rooms
  - improve protection of SSF-related cabling and piping from tornado wind & differential pressure loads and tornado-generated missiles
  - apply FRP system directly to existing masonry construction (differential pressure) and install heavy-duty siding / girt system (wind)
  - utilize TORMIS (missiles)

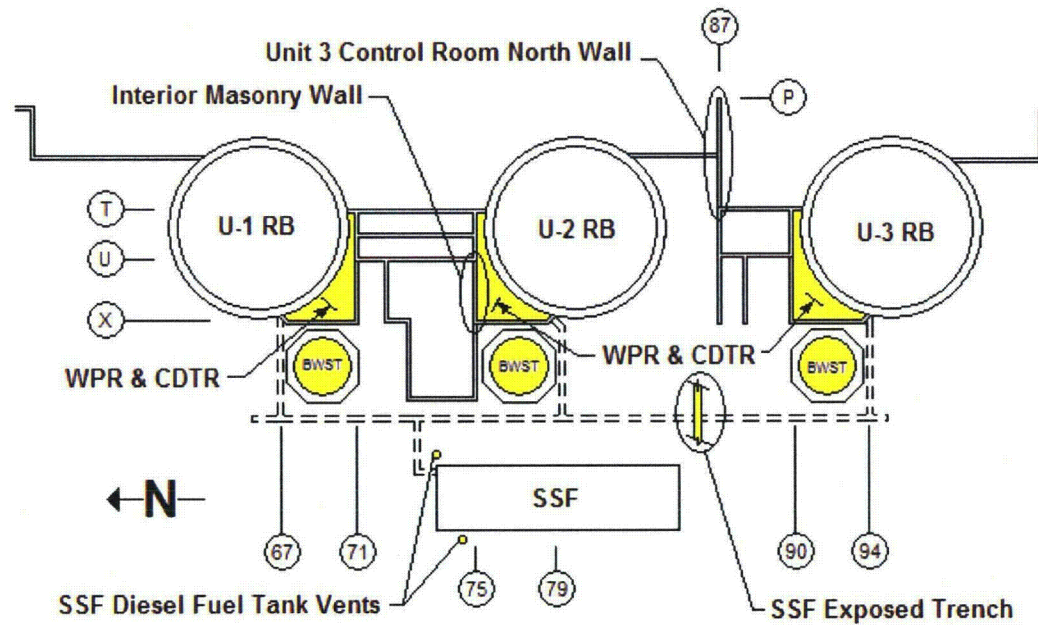


# Description of NPBS Modifications

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- SSF Diesel Fuel Tank Vents
  - protect vent path from tornado wind load and tornado-generated missiles
  - reconfigure vent located immediately adjacent to SSF wall and install structural steel barrier
  - modification complete
  
- SSF Trench Cover
  - protect elevated portion of cable / pipe trench from tornado wind & differential pressure loads and tornado-generated missiles
  - install reinforced concrete structure over affected portion of trench
  - modification complete
  
- Units 1, 2, and 3 Borated Water Storage Tanks (BWST's)
  - improve protection of critical volume of each unit's BWST from tornado-generated missiles
  - install structural steel barrier wall with independent foundation

# Description of NPBS Modifications



## Proposed Solution Using FRP System

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- **Application:** Bond-critical application for flexural strengthening of non-load bearing, infill masonry walls to resist higher design loads.
- **Loading Condition:** Uniform pressure on masonry wall resulting from tornado-induced differential pressure causing tensile stresses in FRP system.

Note: FRP system will not be relied upon as a compressive reinforcement.

## Proposed Solution Using FRP System

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- **Location:** Surfaces of selected Units 1, 2, and 3 West Penetration and Cask Decontamination Tank Room walls.
  - Cask Decontamination Tank Room walls: single wythe, in-fill panels constructed of hollow-core concrete blocks (corrected Safety Evaluation received March 26, 2008)
  - West Penetration Room walls: double wythe, in-fill panels constructed of solid concrete bricks (subject of current testing program and future LAR)

# Proposed Solution Using FRP System



## Typical FRP Application

