

**Testimony of Paul Gunter, Beyond Nuclear  
US NRC Petition Review Board  
Emergency Enforcement Petition to Revoke the Operating License of the  
GE Mark I and Mark II Operating Licenses  
May 02, 2013**

**SLIDE 1 TITLE SLIDE**

Thank you, my name is Paul Gunter with Beyond Nuclear based in Takoma Park, MD. Post-Fukushima, the Mark I and Mark II boiling water reactor containments are demonstrated to have a 100% failure rate (3 of 3 operating units) under severe accident conditions with catastrophic releases of radiation. In 2012, the NRC staff recommended to the Commission that the agency issue an immediate Order to require operators to install severe accident capable vents on containment with engineered radiation filters. The hardened vents are designed to manage the controlled release of extreme heat, high pressure and explosive hydrogen gas while the radiation filter is proposed to restore some reasonable measure of containment integrity during venting operations. By majority vote on March 19, 2013, the Commissioners failed to support their staff's technical judgment and recommendation. The Commission vote approved the development of an Order to install the vent but defer action on the radiation filter pending a lengthy and contentious rulemaking.

In the public's view, this is a Fukushima lesson unlearned.

[NEXT SLIDE]

**SLIDE 2 NRC GENERAL DESIGN CRITERIA**

As part of the licensing agreement, the NRC General Design Criteria provides the design criteria and performance requirements for systems, structures and components important to safety so as to provide "reasonable assurance" that the reactor operates without undue risk to public health and safety. The petitioners have charged that the operators for 31 Mark I and Mark II units are currently in violation of Criterion 16. [NEXT SLIDE]

**SLIDE 3 CRITERION 16—CONTAINMENT DESIGN**

Criterion 16 for containment design reads that the "Reactor containment and associated systems shall be provided to establish **an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment** and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require." [NEXT SLIDE]

#### **SLIDE 4 GDC 16 MARK I SUPPRESSION POOL BYPASS**

It has come to our attention that a potential bypass pathway exists for Mark I wetwell suppression pool containment component that introduces significant uncertainty to current activity to installation of the hardened vent without any provision for an engineered radiation filter. The torus/drywell vacuum breakers (in the diagram at about the 10 o'clock position) are components of the reactor containment system. The vacuum breakers are installed to limit the differential pressure between the suppression pool components for the wetwell airspace and the drywell airspace during an overpressure accident.

If a pipe connected to the reactor vessel breaks, steam jets into the drywell. The drywell pressure increases, forcing steam and non- condensable gases (nitrogen) through vents from the drywell to the wetwell. This steam flow is released below the waterline. The steam is condensed by the suppression pool water and non- condensable gases collect in the wetwell's airspace. After this initial blowdown phase, the containment structure runs the risk of implosion, if drywell spray causes steam to condense (its initial inventory of nitrogen gas was carried off to the wetwell during the blowdown).

The wetwell/drywell vacuum breakers open to allow non- condensables to flow back into the drywell from the wetwell airspace. However, if one or more of these vacuum breakers sticks open, it creates a pathway for flow from the drywell to reach the wetwell airspace without first passing through the suppression pool's water resulting in **unfiltered radiation release contrary to the design requirement**.

The Petitioners request that the NRC respond to this potential Mark I suppression pool bypass **without filtration** in the context of the current Order without an engineered filter and GDC 16 requirements. **[NEXT SLIDE]**

#### **SLIDE 5 GDC 16 MARK II SUPPRESSION POOL BYPASS**

Both the Electric Power Research Institute and the NRC have identified an unresolved containment failure mode for Mark II units as the result of containment over-pressurization with suppression pool bypass due to the failure of in-pedestal drain lines or drain plate covers shortly after vessel breach **resulting in an unfiltered radiation release and violation of GDC 16**.

The NRC staff identified in SECY 2012-0157 that given a severe accident involving core damage, there is only roughly a 50-50 chance of recovering from the nuclear accident within the pressure vessel with no significant radioactive release from containment. If the vessel fails there is only a 25% chance that the operators might cool the molten core inside the containment with no significant

release to the environment. That said, NRC states there is an 11.8% chance that a severe core damage sequence will lead to early overpressure containment failure where there is a 90% chance the molten core bypasses suppression pool because of drain line failure or a rupture in the drywell.” (p. 10-11 of 26) This would result in a very large unfiltered release of radioactivity to the environment and population exposures. This vulnerability is a violation of GDC 16.  
[NEXT SLIDE]

#### **SLIDE 6 MARK I & II CONTAINMENT ARE NOT LEAK TIGHT**

The Mark I and Mark II containment systems are fundamentally flawed by design, construction and operation in the event of a nuclear accident. The pressure suppression containment systems are identified by the NRC as “too small” to contain severe accidents involving fuel damage. The current Order action do not reasonably address these uncontrolled and unfiltered radioactive releases to the environment,” which we charge is a violation of the licensing agreement and the license should therefore be revoked. [NEXT SLIDE]

#### **SLIDE 7 COMMISSION VOTE**

The Commission had the opportunity **to not only restore** some reasonable measure for “an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment” but to restore some reasonable measure of regulatory oversight for the protection of public safety. If the agency is to restore any public confidence in its mandate to protect public health and safety it must now demonstrate its commitment by revoking these operating licenses.