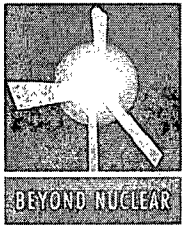


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DOCKETED
USNRC

December 17, 2007 (3:10pm)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Email: info@beyondnuclear.org

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December 15, 2007

Ms. Annette Vietti-Cook
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0111

Attention: Rulemaking and Adjudications Staff

By email: SECY@nrc.gov

Comments of Beyond Nuclear on Proposed Rule "Consideration of Aircraft Impacts for New Nuclear Power Reactor Designs" (RIN 3150-A119)

Dear Ms. Vietti-Cook:

Please find the attached comments of Beyond Nuclear pursuant to the notice of the proposed rulemaking that was published in the Federal Register (Volume 72, No. 191, October 3, 2007, pp. 56287-56308).

Beyond Nuclear additionally endorses, adopts and incorporates the submitted comments of the Union of Concerned Scientists and Greenpeace USA on this proposed rulemaking.

Sincerely,

Paul Gunter, Director
The Reactor Oversight Project

Attachment
NUREG/CR-2859

Template = SECY-067

SECY-02

The Comments of Beyond Nuclear on the NRC's Proposed NRC Aircraft Rule

In response to the notice in the Federal Register dated October 3, 2007 (Vol. 72, No. 191, pp. 56287-56308) Beyond Nuclear submits the following comments on the United States Nuclear Regulatory Commission's (NRC) proposed rule "Consideration of Aircraft Impacts for New Nuclear Power Reactor Designs."

1. Beyond Nuclear insists that NRC release all publicly available, non-classified, non-safeguards documents in their entirety as submitted in support of the public comments on this proposed rulemaking.

On page 56287, the published notice states: "Comments on rulemakings submitted in writing or in electronic form will be made available to the public in their entirety on the NRC rulemaking Web site."

Beyond Nuclear requests that the NRC follow through as it has indicated in the referenced Federal Register notice to include all publicly available documents in their entirety that were docketed in Local Public Document Rooms and the NRC central Public Document Room as pertain to this proposed rulemaking and the issue of aircraft hazards. This is to include public documents that Beyond Nuclear is submitting in support of its public comments. The NRC has made a determination that no further steps are necessary to review or control documents in Local Public Document Rooms which are no longer being updated.

2. In the best interest of the public health, safety and the common defense and security, Beyond Nuclear contends that all current operating reactors and closed reactor units with irradiated fuel assemblies in onsite pool storage structures must be subject to intentional aircraft impact hazards assessment as proposed by the rulemaking.

At page 56290 of the Federal Register notice under Part II, the Commission states that all of the currently operating power reactors, together with the security program actions mandated by NRC orders as well as additional protection from the Federal, State and local authorities provide a reasonable assurance of adequate protection against aircraft impact and penetration. However, the NRC and the nuclear industry have repeatedly ignored and resisted efforts in the interest of public health, safety and security to effectively address identified vulnerabilities at existing reactor sites from a deliberate malicious aircraft attack. Publicly available documents from NRC and other sources support the Beyond Nuclear contention and contradict NRC's claim that operating reactors are adequately protected and can be exempted from further aircraft impact hazard assessment.

A) NRC "Technical Study of Spent Fuel Pool Accident Risks for Decommissioning Nuclear Power Plants" (NUREG-1738) at Section 3.5.2 "Aircraft Crashes" identifies significant concern with the vulnerability of the structural integrity irradiated fuel storage pools in General Electric Boiling Water Reactors (BWRs) which by design elevate the irradiated fuel (high-level radioactive waste) storage pools six to ten stories above grade (60 to 100 feet).

NUREG-1738 states:

"Mark-I and Mark-II secondary containments generally do not appear to have any significant structures that might reduce likelihood of penetration due to other structures being in the way of the aircraft, although a crash into one of four sides may have a reduced likelihood of penetration due to other structures being in the way of the aircraft. Mark-III secondary containments may reduce the likelihood of penetration somewhat, as the spent fuel pools may be considered protected by other structures. If instead of a direct hit, the aircraft skidded into the pool or a wing clipped the pool, catastrophic damage may not occur."¹

The technical study identifies that a direct hit on three of the four sides of the reactor building by an aircraft is likely to cause "catastrophic damage" to pools each storing hundreds of tons of intensely radioactive irradiated fuel. Catastrophic failure of the fuel pool would include not only drain away protective and cooling water coverage over the irradiated fuel, loss of configuration of the used fuel assemblies in high density storage racks and potentially the structural collapse of the walls and floor of the pool itself. The structural collapse of the pool would allow fuel assemblies to fall and congregate at various elevations of the reactor building outside of primary containment. Irradiated fuel over-spray cooling systems, if not destroyed or damaged by the aircraft impact itself, would be ineffective to prevent an exothermic reaction or zircoloy fuel fire. The resulting nuclear waste fire could potentially cause offsite releases of radiation in excess of 10 CFR 100 limits thereby jeopardizing public health and safety.

There are 23 Mark I, 8 Mark II and 5 Mark III BWR units operating around the United States. Many of the BWRs are located amid the nation's megalopolis regions, close to major population centers including New York, Chicago, Philadelphia and Detroit.

B) NRC has publicly documented that all of the currently operational reactors (boiling water and pressurized water reactors) were not designed, constructed nor thoroughly evaluated for all hazards from aircraft impacts. According to the attached 1982 study by Argonne National Laboratories, "Evaluation of Aircraft Hazards Analysis for Nuclear Power Plants" (NUREG/CR-2859)², the national lab identifies to NRC that for existing reactor sites;

--the major threat from aircraft impacts on currently operational nuclear power plants come from the combined effects of aircraft impact and fire/explosion from aircraft fuel;

--it was considered not necessary that U.S. reactor containment domes be constructed to take the impact of aircraft crashes;

¹ "Technical Study of Spent Fuel Pool Accident Risks for Decommissioning Nuclear Power Plants," NUREG-1738, U.S. Nuclear Regulatory Commission, ML01043066, Section 3.5.2 Aircraft Crash, p. 3-23

² "Evaluation of Aircraft Hazards Analysis for Nuclear Power Plants," Argonne National Laboratories, NUREG/CR-2859, US Nuclear Regulatory Commission, 1982.

--a number of safety-related systems, structures and components are outside of the containment and are not protected in hardened structures;

--a number of additional ways exist in which current nuclear power plant safety can be seriously damaged by aircraft that are different from the direct impact on safety-related structures;

--the sequence of failure events as a result of aircraft impact on systems, structures and components other than hardened safety systems can result in the release of radioactive materials "far in excess" of 10 CFR 100 guidelines;

--even a very small percentage of jet fuel can create the equivalent to a large TNT blast environment;

--fire and explosion hazards were treated by NRC and industry with much less care than direct aircraft impact leading the national laboratory to conclude that NRC claims that fire/explosion do not constitute a threat to nuclear power plants are not supported.

It is unreasonable and irrational to exclude existing reactors from being subject of the proposed rulemaking. Therefore, it is imperative that an updated state of the art aircraft impact hazards analysis be applied to all operating reactors.

C) Currently operating reactors should not be exempted from the proposed aircraft impact assessment rule because of inadequate and non-compliant safety related fire protection systems. Contrary to NRC assertions of adequate protection a large number of operating reactors are currently in violation of duly promulgated fire protection law. These long standing violations are compounded by the absence of an effective NRC enforcement policy. Therefore, currently operating reactors should go through a rigorous reassessment in context of both coming into compliance and then enhancing fire protection by the proposed aircraft rule for the hazards associated with blast and fire from fuel laden and potentially explosive laden aircraft.

Nuclear power plants are critical infrastructure targets. The consequences of a successful attack could be far reaching with unacceptable consequences. Fire protection is vital security infrastructure. Malicious use of an aircraft to cause damage to a nuclear power plant cannot be determined by through a probabilistic approach. Such actions must now be anticipated and addressed by deterministic means. Malicious acts are intentional and must be considered as pre-meditated acts by intelligent adversaries who are looking to exploit vulnerabilities to cause as much damage as they can. Those vulnerabilities must be determined and effectively addressed.

It is well documented that the nuclear power industry does not comply with current prescriptive fire protection measures for safe shutdown systems at nuclear power stations as currently required under 10 CFR 50.48, 10 CFR 50 Appendix R III.G.2 and Branch Technical Position 9.5.1. Chiefly, a variety of widely deployed fire barrier products designed and installed to protect safe shutdown electrical circuits have proven to be inoperable after dramatically

failing the ASTM E-119 standardized time/temperature fire test. The violations have persisted since at least 1989 while the number of inoperable unqualified fire barrier products has grown to include Thermo-Lag 330-1 fire barriers, FS195, Kaowool, HEMYC and MT fire barrier systems to name some.

In response to these long standing industry quality assurance failures and widespread violations of Code of Federal Regulation that prescribe the fire protection standards, industry and NRC are moving to significantly diminish the standard for requiring qualified passive design features for the fire protection of electrical circuitry vital. This electrical circuitry is vital to control room's ability to safely shutdown of the reactor in the event of fire. The industry and agency are planning to implement a compliance strategy largely through substituting "operator manual actions" for currently required qualified passive design features such as fire barriers and minimum cable separation.³ The substitution of operator actions for qualified design fire protection features is contrary to the stated "overriding goal" of this proposed rulemaking to implement "design and other features that could provide additional inherent protection to avoid or mitigate, to the extent practical, the effects of an aircraft impact, with reduced reliance on operator actions."⁴

While NRC makes claims that operating plants are adequately protected so as not to need any further assessment under the proposed rule, this has not been demonstrated as the result of NRC repeated failures to implement and enforce the very intent of the proposed rule to make nuclear power stations more robust by qualified passive design features rather than rely on operator actions. In this case NRC clearly stands for "Not Really Consistent" in its regulatory approach to assuring the common defense.

D) All operating reactors must be included in the proposed rule for aircraft impact assessment to incorporate design features such as sustainable protective camouflage smoke screens and protective I-beam structures erected around reactor site to break up incoming aircraft. Systems using sustainable ground launched smoke flares such as are already deployed around German reactors to be used to obscure the target in the event of an air attack.

It is utterly irrational for NRC to require new un-built designs to uphold an enhanced protective standard vital to our common defense and security, while both exempting vulnerable, non-compliant and deficient operating reactors from a required further assessment and enhancement.

3) The proposed aircraft assessment rulemaking must be applied to all currently approved Standard Design Certifications but unbuilt reactors.

³ "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire, Final Report," NUREG-1852, US Nuclear Regulatory Commission, September 2007.

⁴ "Consideration of Aircraft Impacts for New Nuclear Power Reactor Designs," US Nuclear Regulatory Commission, Federal Register, Vol. 72, No. 191, October 3, 2007, Introduction, p. 56288.

At page 56290 Part III Column 2, the Commission states that the currently approved Standard Design Certifications meet adequate protection requirements and do not need to meet this proposed new aircraft impact rule. These proposed exempted designs include the General Electric Advanced Boiling Water Reactor, the Combustion Engineering System 80+ pressurized water reactor and the Westinghouse AP 600 and AP 1000 pressure water reactor designs.

It is particularly egregious that prior to NRC certification of these designs the agency had published NUREG/CR-1345 "Nuclear Power Plant Design Concepts for Sabotage Protection," Volumes 1 and 2, in January, 1981 but failed to apply the knowledge of the protective strategies garnered by the Design Study Technical Support Group in its certification process for the proposed exempted new designs. This study group was comprised of representatives of Combustion Engineering, General Electric and Westinghouse. According to the Union of Concerned Scientists comments on this rulemaking those known sabotage resistant enhancements were not incorporated into the certified ABWR, System 80+, AP 600 and AP 1000 designs.

NRC now wishes to ignore or gloss over its failure to incorporate these enhancements in the certification process by exempting the designs from further aircraft impact hazard assessment or revisiting the enhancements provided in 1981.

Such irrational actions give the appearance that NRC is more concerned with cost containment for the industry rather than radiation containment in our common defense.

4) In response to the Commission request Beyond Nuclear provides comments on the following design areas:

A) The proposed rulemaking should apply the knowledge gained by previous technical design study groups such as that gained and published by NRC more than 15 years ago in NUREG/CR-1345 "Nuclear Power Plant Design Concepts for Sabotage Protection," January 1981. The agency is already aware of such design enhancements including physically separating the emergency diesel generator rooms and locating them on different sides of the reactor site, relocating the control room and irradiated fuel storage pools into more robust structures and other changes.

B) The proposed rulemaking needs to address previous criticisms made of typical aircraft hazards analyses where reasonable assurance is undermined by the lack of clear and supported statements on key underlying assumptions.

C) The proposed rulemaking needs to incorporate the comprehensive treatment of the overall hazard to include not only the impact phenomena of aircraft or aircraft missiles on substantial concrete structures but also on all potentially affected systems, structures and components. For example, aircraft impact and the resulting concussion on significant concrete structures can cause the chatter of electrical relay switches leading to the inoperability of safety-related

equipment or the spurious operation of equipment that interferes with safety-related functions. The proposed rule needs to assess and safeguard against such chains of events involving non-hardened plant systems and structures such as the switchyard and the turbine hall which could lead to severe accident consequence.

D) Given that the results of aircraft impact are not just limited to the effect of the impact loads but also the potential introduction of large quantities of transient combustibles in the form of jet fuel and combustible oil, the proposed rulemaking needs to address through prescriptive passive qualified design features the protection of the control room operation of reactor safe shutdown systems by maintaining electrical circuit integrity of those systems, structures and components as currently prescribed and codified in 10 CFR 50 Appendix R III.G.1 and III.G.2 to maintain redundant electrical circuits free from fire damage by cable separation and qualified fire barriers used in conjunction with automated fire detection and suppression systems.

E) The proposed aircraft hazards assessment must consider all real consequences of aircraft impact including the spread of transient combustibles (principally aviation fuel) and the simultaneous occurrence of fire in multiple fire zones. Accompanying the high energy impact of the aircraft on the World Trade Center Tower was the release of nearly 22,000 gallons of partially vaporized aviation fuel that erupted into a fireball.

In the case of an aircraft attack on a nuclear power plant, vaporized and unburned fuel would be rapidly forced by expanding flame and pressure fronts into multiple fire zones through breaches in walls, cable tunnels, conduits, pipes and floor drainage systems into multiple areas of the plant followed by combustion. As seen in the case of the World Trade Center fire, ten floors of each of the structures were so intensely burning that steel support structures buckled followed by the progressive collapse of the entire structure; the South Tower collapse in less than one hour of impact.⁵ Even relatively small penetrations as the result of rigid projectiles off of the aircraft would allow aviation fuel to flow into containment and from one fire zone to another. NUREG-2859 calculates that 500 pounds of aviation fuel, or roughly 76 gallons, can create the blast equivalent of 1000 pounds of TNT.

F) Other real consequences of aircraft impact hazards include the effects of smoke on equipment and station personnel. Smoke can cause damage to safety-related equipment and can impede recovery operations. The technical issues discussion at page 56292 does not expressly require the fire assessments to include smoke resulting from aircraft impact.

G) Similarly for the same reason, the proposed rulemaking must additionally address through prescriptive passive qualified design features the protection of the control room operation of

⁵ "World Trade Center Building Performance Study: Data Collection, Preliminary Observations, and Recommendations," American Society of Civil Engineers, 2002, <http://www.fema.gov/library/wtcstudy.shtm>

safe shutdown systems from the effects of aircraft impact and blast by bunkering the redundant train of electrical circuits and equipment.

H) The proposed rule must assess and evaluate effective design features that are resistant to the destructive values from an intentional attack by one and more-than-one explosive and fuel laden private aircraft.

Contrary to NRC and industry repeated assertions that other federal and state agencies actions provide an adequate level of protection, private aircraft are not subject to any of the enhanced protective actions implemented in the commercial aircraft industry including increased passenger and cargo screening, fortified cockpit doors and armed sky marshals.

Private aircraft can be enhanced as improvised explosive devices with significant impact hazards. Multiple private aircraft can be coordinated in simultaneous and/or successive attacks.

NRC documents that there are numerous operative airports and airfields within 10-miles of a large percentage of US reactors. The close proximity of these airfields if used to launch attacks using high-explosive and fuel-laden private aircraft precludes early detection through falsified flight plans and timely protective actions taken by authorizes including the air national guard.

I) The proposed rule must include assessments of design features that can camouflage the reactor sites from a line of site air attack such as through the site deployment of sustainable smoke screen launching systems.

K) The proposed rule must include assessments of design features around the reactor site that would result in the breakup an incoming aircraft before making contact with reactor system, structures and components. Such a feature has been conceptualized by Committee to Bridge the Gap's "Beamhenge" steel I-beam and steel cable structure.

SECY - Beyond Nuclear comments to NRC proposed rule on aircraft impacts

From: <paul@beyondnuclear.org>
To: <SECY@nrc.gov>
Date: 12/15/2007 5:54 PM
Subject: Beyond Nuclear comments to NRC proposed rule on aircraft impacts

To the Office of the Secretary
US Nuclear Regulatory Commission

Dear Ms. Viette-Cook:-

Attached please find the comments of Beyond Nuclear on the proposed rulemaking on aircraft impact hazard assessment.

Paul Gunter, Director
Reactor Oversight Project
Beyond Nuclear at NPRI
6930 Carroll Avenue Suite 400
Takoma Park, MD 20912
Tel. 301 270 2209

Mail Envelope Properties (47645B25.FF0 : 4 : 24560)

Subject: Beyond Nuclear comments to NRC proposed rule on aircraft impacts
Creation Date Sat, Dec 15, 2007 5:54 PM
From: <paul@beyondnuclear.org>

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Security: Standard

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