Blue Ridge Environmental Defense League

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Secretary, U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
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RE: Docket ID: NRC-2010-0131
Advanced Passive (AP) 1000 Design Certification Amendment
76 FR 10269, 10 CFR 52

To the Commission:

On behalf of the Blue Ridge Environmental Defense League, I submit the following remarks.

First, in light of the tragedy in Japan, we call upon the Nuclear Regulatory Commission to re-visit all nuclear issues—power, waste and mining. Earthquakes are not unusual in Japan. If an advanced, industrial nation like Japan with nuclear safeguards in place can be blind-sided by such an event, the United States should question all its assumptions about nuclear technology. This is the least we can do to honor the brave souls who sacrificed their lives to control the disaster in Fukushima, and to commemorate the the terrible loss of life among the innocent.

Second, the Commission should release undisclosed information and tell the truth. We recommend the following: Stop hiding computer codes, financial and commercial data, and other technical information under the cloak of "proprietary" and "SUNSI"[1] designations. Do an energetics model of nuclear power and a comparable one for all alternative energy sources; release the results. Discuss the threats to a democratic society posed buy a plutonium economy. Talk about the ethics of consuming electricity from fission reactors and saddling 20,000 future generations with the social and environmental problems of high-level radioactive waste.[2] The nuclear disaster at Fukushima has made these actions more necessary than ever. We agree with the following critique:

- You say you'd rather not? You don't have a choice.
- We critics discuss these problems all the time.
- The more you ignore us, the less credible you become.

[1] SUNSI: sensitive, unclassified non-safeguards information. According to the Nuclear Regulatory Commission, "SUNSI" means any information of which the loss, misuse, modification, or unauthorized access can reasonably be foreseen to harm the public interest, the commercial or financial interests of the entity or individual to whom the information pertains, the conduct of NRC and Federal programs, or the personal privacy of individuals. *See* http://www.nrc.gov/reading-rm/doc-collections/commission/comm-secy/2005/2005-0054comscy-attachment2.pdf

- Perhaps you fear that a full and frank discussion of these issues will result in no further use of light-water fission reactors for generating electricity.
- So be it. That is the price of living in a democratic republic.
- "But the nation's economic health demands use of nuclear power, regardless of how a majority of the public feels about it." Is that your belief?
- You have just had an insight into your own totalitarian tendencies.[2]

"If the first tiny droplet of truth has exploded like a psychological bomb, what will happen in our country when waterfalls of Truth come crashing down?"[3]

Background

The U.S. Nuclear Regulatory Commission proposes to amend its regulations to certify an amendment to the Westinghouse AP1000 standard plant design. The purpose of the amendment is to replace the combined license (COL) information items and design acceptance criteria (DAC) with specific design information, address the effects of the impact of a large commercial aircraft, incorporate design improvements, and increase standardization of the design. On January 20, 2010, Westinghouse submitted to NRC design changes that would be included in Revision 18 of the AP1000 DCD (ADAMS Accession No. ML100250888). Subsequently, Westinghouse narrowed the focus of the changes, and on December 1, 2010 submitted Revision 18 (ADAMS Accession No. ML103480572).

Comments

What is perhaps most troubling about the AP1000 design approval is the lack of final NRC review. The Commission states:

> No technical review of Revision 18 by the NRC is necessary, because only [confirmatory items] and design changes pursuant to [interim staff guidance] previously accepted by the NRC are contained in Revision 18 to the DCD.[4]

The purpose of the cited interim staff guidance (DC/COL-ISG-011) is to finalize the review of the design. Although it may clarify things for license applicants, its effect is to freeze out the interested public's ability to bring new issues before the Commission. The guidance document states:

> The NRC is issuing its Final Interim Staff Guidance (ISG) DC/COL-ISG-011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML092890623). This ISG is to clarify the NRC staff position on finalizing licensing basis information at a point during the licensing review, a

[2] Adapted or copied from "A Critic Looks at Industry Credibility," David Dinsmore Comey, Director of Environmental Research Businessmen for the Public Interest, paper presented to the Atomic Industrial Forum, February 5, 1975
[3] Aleksandr Solzhenitsyn, *Id*
[4] Federal Register /Vol. 76, No. 37 /Thursday, February 24, 2011 / Proposed Rules 10269

so-called freeze point, and the control of licensing basis information during and following the initial review of applications for design certifications (DCs) or combined licenses (COLs). The NRC staff issues COL/DC-ISGs to facilitate timely implementation of current staff guidance and to facilitate activities associated with review of applications for DCs and COLs by the Office of New Reactors (NRO). The NRC staff intends to incorporate the final approved DC/COL-ISG-011 into the next revision of Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants."

The flawed nature of the Westinghouse AP1000 should not be frozen at this time. At present, fourteen AP-1000s are planned in the United States and twelve more in China. Among the specific technical issues which are yet unresolved is "Extension of Seismic Spectra to Soil Sites and Changes to Stability and Uniformity of Subsurface Materials and Foundations." In the wake of the Fukushima disaster, the NRC cannot certify the AP1000 without further review and analysis. The following pages outline some of the design weaknesses and safety flaws.

Flawed Design

The proposed Westinghouse AP1000 nuclear power reactor should rightly be re-named *inherently dangerous*. Based our review of the so-called inherently safe design, the reactors, if constructed, would be accidents waiting to happen.

The AP-1000 is based on an earlier design, the AP-600, which was deemed too expensive to be competitive in today's energy market.[5] To bring down costs, they added more, larger fuel assemblies and a bigger reactor core, raising power from 1,933 megawatts-thermal to 3,400 MWt, a 76% increase. Westinghouse has worked for a decade to get the new AP-1000 design approved, but has run into a series of stumbling blocks. Today, it's in its 17th revision.

The two basic problems with the AP-1000 are:

1) Modular construction of the reactor shield building and an 800,000 gallon tank of water suspended above the reactor core, subjecting it to severe stress and instability in the event of an earthquake, tornado or hurricane;
2) A ventilation system which allows the free flow of air from inside the reactor containment building to outside air, allowing radiation to escape in the event of a reactor core breach.

Modular Construction

One of the cost-cutting measures employed by Westinghouse is modular construction of the reactor containment structure. Older plants cast the concrete structure as a unit. Making matter worse is an emergency cooling water tank holding eight hundred thousand gallons of water. This tank would weigh 3,334 tons. For comparison, the total weight of

[5] *A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010*, Volume II, Main Report, Appendix D: Design Description AP-1000, US Department of Energy, October 31, 2001

the nuclear reactor vessel itself is 417 tons.[6] The water tank would sit atop the modular structure of the AP-1000 building.

Nuclear reactor shield buildings are supposed to guard against shocks from the outside and provide a barrier to radiation from the inside. Federal regulations require nuclear power plants to withstand earth tremors, severe weather and impacts from missiles and aircraft. In October 2009 the Nuclear Regulatory Commission sent Westinghouse back to the drawing board because the company had not demonstrated the ability of the AP-1000 structure to meet these standards. NRC said, "Specifically, the design of the steel and concrete composite structural module (SC module) must demonstrate the ability to function as a unit during design basis events."[7] In response to a question about the AP-1000, the chairman of the NRC replied, "Changes need to be made and additional information needs to be provided."[8] However, NRC itself is a leaky vessel for hope. At the Plant Vogtle nuclear power station in Georgia, Southern Company is pushing to build two AP-1000s. It will require effective action on the part of residents, activists, elected officials and others to prevent an aggressive company with powerful political support from riding roughshod over safety issues.

Reactor Containment System

To reduce expensive plumbing, pumps and other hardware, the AP-1000 relies on so-called passive safety systems; that is, in the event of an accident, the reactor is to be cooled and controlled without electrical power and would "require no operator actions for 72 hours."[9] However, this passive design feature is the source of a fundamental weakness so far overlooked by the Nuclear Regulatory Commission.

According to a comprehensive review of the AP1000 by Arnold Gundersen, reactor containment failures at Florida's Crystal River and Pennsylvania's Beaver Valley reactors reveal fundamental problems which point to a dangerous design flaw in the freestanding steel and concrete containment system of the new AP-1000.[10] Gundersen stated the danger bluntly:

> The unique AP1000 containment design allows it to develop a preexisting condition that could lead to a reduction in its wall thickness that would result in a rapid release of radiation. This scenario is likely and is not anticipated in the current design basis AP1000 analysis nor in the SAMDA analysis.

(SAMDA means severe accident mitigation design alternatives.) According to

[6] AP1000 Design Control Document Reactor Coolant System and Connected Systems 5.3.4.1, Revision 15
[7] Letter to Westinghouse From Dave Matthews to Rob Sisk regarding AP1000 Shield Building Design, 10/15/2009, ADAMS ML092320205
[8] "NRC chairman says Vogtle design needs safety changes" *The Atlanta Journal-Constitution*, David Markiewicz, November 5, 2009
[9] *Roadmap*
[10] Arnold Gundersen is the Chief Engineer with Fairewinds Associates, Inc., specializing in nuclear safety, engineering, and reliability issues. Gundersen is a nuclear engineer with more than 38 years of experience in nuclear power plant operation, management and design.

Gundersen, the NRC underestimates the radiation dose consequences of containment failure in the AP-1000. Corrosion, cracking and leakage in nuclear reactor containment structures are more serious than anticipated by the NRC. And the high-oxygen and high-moisture environment in the AP-1000 makes it even more susceptible to corrosion in inaccessible locations than older plants. The AP-1000 design would siphon radiation leakage from the reactor containment to the atmosphere unfiltered and unmonitored. And this leakage path is more dangerous than those previously identified. In the Crystal River and Beaver Valley plants, the steel and concrete containment have no gap between them; a breach of the steel structure would be blocked by the concrete. But an accident releasing radioactive gases from the AP-1000 reactor vessel would not be kept inside the containment structure because there is an annular gap between the steel containment and the concrete building. This gap is designed to draw air up and release it through the top of the building.

Post-9/11 Violation

In response to the terrorist attack on September 11, 2001, The Commission required nuclear reactor builders to make changes to withstand airplane impacts. In October 2010 the NRC issues a notice of violation to Westinghouse for failing to meet these safety standards in its AP1000 design. Specifically, NRC found failures to fully protect from fire the plant's concrete and steel shield building which houses the nuclear reactor. However, the violation carried no penalty.

Information Kept Secret

On September 29, 2010 the Division of New Reactors approved three related requests to withhold information from public disclosure.[11] These actions centered on withholding information on the AP1000 nuclear reactor's containment shield building. We believe these requests were improper, contrary to the interests of public health and safety and, coming at this time, an attempt to circumvent scrutiny by the affected public.

As you may also know, on June 25, 2010 Arnold Gundersen[12] briefed the Advisory Committee on Reactor Safeguards about serious design flaws in the AP1000 shield building, the steel and concrete structures which are supposed to contain radiation in the event of an accident. The ACRS determined that the issue would need to be addressed in both generic and site-specific proceedings; that is, during both overall design certification and individual license applications. On August 12, 2010 we filed a new contention in our Plant Vogtle license intervention based on this information.

In June, the Chairman of the Advisory Committee on Reactor Safeguards, Harold B. Ray, said that specific issues relating to accessibility, inspections and maintenance of the

[11] ADAMS Accession Nos. ML102660263, ML102670260 and ML102660378

[12] Arnold Gundersen is the Chief Engineer with Fairewinds Associates, Inc., specializing in nuclear safety, engineering, and reliability issues. Gundersen is a nuclear engineer with more than 38 years of experience in nuclear power plant operation, management and design.

containment should be addressed not in the pending generic review of the AP1000 design by the ACRS, but within individual combined operating license proceedings.

However, the Nuclear Regulatory Commission granted the request to withhold information from the public which is directly related to the ongoing determination of safety measures at Plant Vogtle. Even if such withheld information were deemed proprietary, which we dispute, the withholding should not have been permitted because it impaired procedural rights.[13]

Further, under 10 CFR § 2.390, the Commission may deny a request for withholding of information from the public. The relevant regulation states:[14]

> The procedures in this section must be followed by anyone submitting a document to the NRC who seeks to have the document, or a portion of it, withheld from public disclosure because it contains trade secrets, privileged, or confidential commercial or financial information.
>
> If the Commission determines, under paragraph (b)(4) of this section, that the record or document contains trade secrets or privileged or confidential commercial or financial information, the Commission will then determine whether the right of the public to be fully apprised as to the bases for and effects of the proposed action outweighs the demonstrated concern for protection of a competitive position, and whether the information should be withheld from public disclosure under this paragraph. If the record or document for which withholding is sought is deemed by the Commission to be irrelevant or unnecessary to the performance of its functions, it will be returned to the applicant. (emphasis added)

The purpose of the requests by Westinghouse was to withhold information on steel welding inspections and benchmarking, analysis, testing, design and audits of the reactor containment shield building. Shield building maintenance and inspection issues were and central to our intervention. The withheld AP1000 information was relevant and necessary for the licensing proceedings before the Atomic Safety and Licensing Board. Withholding relevant and material information in this matter was improper and outrageous.

Conclusion

If the NRC's response to technical problems is a cloak of secrecy, how can people have any confidence in the next generation of nuclear power? The problems with the AP1000 center on an inherently unsafe technology. Other problems are political: a deceitful marketing strategy and an oversight agency which mixes promotion with regulation.

[13] 42 USC 2231, Atomic Energy Act, Chapter 16, Sec.181
[14] 10 CFR § 2.390(b)(5) Public inspections, exemptions, requests for withholding

Respectfully,

Louis A. Zeller