

## Rulemaking1CEm Resource

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**From:** Santa Lucia Chapter of the Sierra Club [mailto:sierraclub8@gmail.com]  
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December 19, 2013

Secretary  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001  
ATTN: Rulemakings and Adjudications Staff

Dear Sir:

The Santa Lucia Chapter of the Sierra Club represents Sierra Club members who live in San Luis Obispo County, California, the reactor community of the Diablo Canyon Nuclear Power Plant. We offer the following comments on the Waste Confidence Draft Generic Environmental Impact Statement and proposed rule.

**A Generic EIS cannot adequately analyze seismic risk**

The 100+ commercial nuclear reactors in the U.S. differ in their design, age, and siting. The GEIS offers a single analysis to assess the probability of an earthquake anywhere in the U.S. and its effects on a reactor, spent fuel



pools or dry casks and the release of nuclear materials. The inadequacy of this approach is illustrated in a recent report by the Union of Concerned Scientists:

In particular, the chance of an earthquake causing ground motion at Diablo Canyon greater than 0.75g is  $3.9 \times 10^{-3}$  per year (NRC 2011). Put another way, such an earthquake is likely to happen once every 256 years. To put this value in context, the Diablo Canyon reactors are more than 10 times more likely to experience an earthquake larger than they are designed to withstand than the average U.S. reactor. Of the 100 reactors currently operating in the U.S., the two at Diablo Canyon top the NRC's list as being most likely to experience an earthquake larger than they are designed to withstand.... [T]he chance such a large earthquake will occur at Diablo Canyon over the 40-year lifetime of the plant is 40 divided by 256, or about 1 in 6—which is a toss of a die.<sup>1</sup>

The GEIS states that the NRC in March 2012 requested information from all U.S. nuclear power plants, and “these assessments may make use of new consensus seismic hazard estimates for the power plants in the central and eastern United States.” This is of little use to residents in the vicinity of a nuclear plant on the coast of California. Nor does the accompanying statement -- “In the 2010 assessment, the NRC chose seismic core damage frequency as the appropriate risk metric to changes in the seismic hazard” -- offer reassurance on the issue of seismic hazard to spent fuel pools, which, as seen at Fukushima, present a risk of disaster as great or greater than a core meltdown.

The GEIS states the following as the basis for its earthquake risk assessment:

The NRC requires licensees to design, operate, and maintain safety-significant structures, systems, and components, including spent fuel pools, to withstand the effects of earthquakes and to maintain the capability to perform their intended safety functions. The agency ensures these requirements are satisfied through the licensing, reactor oversight, and enforcement processes (NRC 2011g).

Further:

[T]he environmental risk of these postulated accidents involving continued storage of spent fuel in pools are SMALL, because all important to safety structures, systems, and components involved with the fuel storage are designed to withstand these design basis accidents without compromising the safety functions.

This criteria, the basis of seismic risk assessment in the GEIS, does not apply to our reactor community. Alone among U.S. nuclear facilities, Diablo Canyon has been allowed to operate outside its design basis. In 2008, the NRC was informed of a previously unknown earthquake fault line that runs as close as 2,000 feet from Diablo Canyon's reactors and could cause more ground motion during an earthquake than the plant was designed to withstand.<sup>2</sup> Since this fault was discovered, the NRC has not demonstrated that the reactors meet NRC safety regulations. Per UCS, “At other facilities, the NRC enforced its safety regulations and protected Americans from earthquake threats. Today, in the case of Diablo Canyon, the NRC is ignoring its regulations, unfairly exposing millions of Americans to undue risk.”

### **The GEIS omits meaningful description of risk**

In virtually every instance, the GEIS underplays or omits the actual consequences of a nuclear accident or an attack on a facility resulting in the release of radioactive material into the environment. The GEIS primarily



contents itself with a single adjective – “small” or “large,” or “significant” and “destabilizing” – offered as an analysis of environmental impacts. Had such an analysis been performed for Fukushima Daiichi, pre-tsunami, the potential impact of multiple reactor core meltdowns would have been classified as “small” because the possibility was remote. Potential effects would have been termed “large” or “significant and destabilizing” but such details of the possible evacuation of Tokyo and the destruction of Japan’s economy would have been omitted. Should a comparable incident occur at the Diablo Canyon Nuclear Power Plant, California, the world’s seventh-largest economy, would undergo a severe disruption and displacement of the population, with attendant environmental impacts, and suffer losses to the fishing, agriculture and tourism sectors of its economy measured in the billions of dollars.<sup>3</sup> The omission of analysis of such impacts points up both the insufficiency of the GEIS and the error in considering a generic environmental review to be a substitute for the necessity of preparing a specific EIS for each facility.

### **The GEIS does not calculate the level of risk from the ongoing production of nuclear waste vs. the cessation of waste production.**

The NRC attempts to dispense with its obligation to analyze this scenario by relegating it to the alternatives analysis as the “Cessation of Licensing or Cessation of Reactor Operation,” classifying it as an alternative to the proposed action to address the environmental impacts of continued storage, and dismissing it on the basis of the argument that “Abandonment of reactor licensing and the closure of existing plants is not a reasonable alternative to the proposed action because these actions would not meet the NRC’s stated objectives in proposing to revise 10 CFR 51.23.”

This argument does not exempt the GEIS from analyzing all aspects of the environmental effects of continued waste storage, including the potential difference in impacts from the ongoing re-racking of spent fuel pools and expansion of ISFSI sites and all activities attendant upon these actions, versus the lack of a requirement for same.

### **The NRC’s method of determining risk is deficient**

The NRC’s method of determining risk of accident or attack, in every instance, results in a determination that a high-consequence/low-probability scenario equates to a “small” environmental effect:

The NRC finds that even though the environmental consequences of a successful attack on a spent fuel pool during continued storage are large, the very low probability of a successful attack ensures that the environmental risk is SMALL. Similarly, for operational ISFSIs during continued storage, the NRC finds that the environmental risk is SMALL.

The NRC is inappropriately applying the same weighting of probability and risk ratios that one would apply to a standard industrial mishap to an accident involving the release of radio-nucleotides into the environment.

In fact, the NRC is unable to calculate the likelihood of all the variables and contingencies that attend major nuclear accidents, most significantly operator error. The NRC’s theoretical probabilistic risk assessment is fraught with ambiguity and uncertainty, and does not rise to the level of accuracy needed to justify the claim of insignificant risk. The GEIS cannot assess or quantify the billions of small events that contribute to nuclear accidents in the real world. We note that the probabilistic risk assessment used in the GEIS is the same approach used by Japan’s Nuclear and Industrial Safety Agency in assessing the safety of Fukushima Daiichi and served as the basis of approval of a ten-year extension of the plant’s operating license a month before it was destroyed by an earthquake and tsunami.



The GEIS fails to note that nuclear accidents happen with greater frequency than the NRC's probabilistic risk assessment model predicts.<sup>4</sup> The Bulletin of the Atomic Scientists cites the actual frequency of severe accidents in contrast to misleading claims about reactor accident frequency based on PRA, the poor record of PRA in modeling unexpected failure modes and common-cause failures, and the finding by MIT researchers that the PRA model fails to include indirect, non-linear and feedback relationships in chain-of-event risk assessments. It concludes: "The multiple problems with the probabilistic risk assessment method suggest that any conclusions about overall accident probabilities derived from its use are far from dependable.... [Probabilistic risk assessments] create overconfidence among those designing and operating reactors."

We agree that the complete reliance of the GEIS on probabilistic risk assessment to determine the actual risk and impact of accidents at nuclear power plants is misplaced.

Thank you for the opportunity to comment on these issues.

Andrew Christie, Director  
Santa Lucia Chapter of the Sierra Club

<sup>1</sup> "Seismic Shift: Diablo Canyon Literally and Figuratively on Shaky Ground," UCS, [http://www.ucsusa.org/assets/documents/nuclear\\_power/diablo-canyon-earthquake-risk.pdf](http://www.ucsusa.org/assets/documents/nuclear_power/diablo-canyon-earthquake-risk.pdf)

<sup>2</sup> "Several other important aspects of the Shoreline fault remain poorly characterized and therefore subject to uncertainty. These uncertainties include (1) the surface or subsurface rupture length of the fault, (2) structural relationships of the Shoreline fault to other faults, in particular the faults of the San Luis Bay fault zone, and (3) whether the Shoreline fault is capable of producing large enough earthquakes to affect the hazard at the DCP." Confirmatory Analysis of Seismic Hazard at the Diablo Canyon Power Plant from the Shoreline Fault Zone, NRC, Oct. 2012.

<sup>3</sup> The omission of any analysis of impacts to California's agriculture as the result of a radiological release is particularly unhelpful in light of the agricultural impacts of the Fukushima disaster, per Physicians for Social Responsibility: "80,000 farms in the Fukushima prefecture have been contaminated by the nuclear disaster, and crippling the local agriculture sector worth 250 billion yen. As of March 1, 2012, 25 percent of Japanese agriculture production or about 58 billion yen (\$694 million) had been lost. In 2011, the agriculture ministry reported that the cost of imported farm products jumped 16 percent to 5.58 trillion yen."

<sup>4</sup> Bulletin of the Atomic Scientists, "Beyond our Imagination: Fukushima and the problem of assessing risk," April 20, 2011.



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