Union of Concerned Scientists
Citizens and Scientists for Environmental Solutions

March 26, 2010

Chief, Rulemaking and Directives Branch (RDB)
TWB-05-B01M
Division of Administrative Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: **Federal Register** Notice, Vol. 75, No. 40, pp. 9445-9449, Hope Creek Generating Station, License Amendment Request for Cobalt-60 Isotope Rods (Docket 50-354)

Good Day:

On behalf of:

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and the Union of Concerned Scientists, I am providing the enclosed comments on the proposal by PSEG to load cobalt-60 producing rods in the reactor core at the Hope Creek Generating Station. As detailed in our comments, PSEG's license amendment request had blatant and inexplicable shortcomings.

At a site chronically plagued by human performance problems,* PSEG proposes to reduce safety margins by replacing physically assured protection (e.g., any irradiated fuel bundle can be safely placed in any storage location in the spent fuel pool) with protection requiring zero mistakes by workers (e.g., irradiated fuel bundles can only be safely placed in storage locations more than four feet from the spent fuel pool's walls to avoid damage to the concrete). PSEG will further erode safety margins by planning to place the high-risk fuel bundles in the fuel preparation machine, within a foot of the vulnerable concrete spent fuel pool walls.

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The NRC must not grant this amendment until these serious shortfalls are fully remedied.

Sincerely,

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Comment 1 – License Amendment Request (LAR) Att. 1, Section 2.0

PSEG proposed to modify Technical Specification 5.3.1 to include the following language covering the isotope test assemblies:

> *"A maximum of twelve GE14i Isotope Test Assemblies may be placed in non-limiting core regions, beginning with Reload 16 Cycle 17 core reload …".*
>
> *"Each GE14i assembly contains a small number of Zircaloy-2 clad isotope rods containing Cobalt-59."*

The latter sentence is unacceptable for inclusion in the Technical Specifications. Whereas the first sentence explicitly defines a requirement (i.e., no more than 12 GE14i assemblies), the latter sentence is both vague and unenforceable (i.e., a small number of isotope rods.)

The explicit first sentence would require PSEG to return to the NRC for permission if it sought to place 13 or more ITAs in the Hope Creek reactor core. The latter sentence would allow PSEG to redefine "some" from the specific number specified (presumably) in the proprietary report NEDC-33529P to a larger number without prior NRC review and approval.

The final Technical Specification language must, as a minimum, explicitly limit the number of isotope rods within the GE14i assemblies. Apparently, the actual number is a trade secret. But the Technical Specification could and should replace the vague "small number" text with words to the effect "Each GE14i assembly contains the number of Zircaloy-2 clad isotope rods specified in NEDC-33529P, dated December 2009." With such definitive language, PSEG would have to seek NRC approval to increase the number of isotope rods in each GE14i assembly, rather than doing it sans NRC review under 10 CFR 50.59.

Comment 2 – LAR Att. 1, Section 4.0

Page 4 of Attachment 1 states:

> *"These cycle specific analyses will also ensure that the core loading had been designed such that the ITAs will not be the most limiting fuel assemblies at any time during the operating cycles, based on planned control rod patterns."*

Due to circumstances beyond the control of the core designers when they speculate about future operating cycles, it is not uncommon for actual control rod patterns to differ significantly from planned control rod patterns. An inoperable control rod drive mechanism may require that a control rod, and perhaps its symmetrical partners, be fully inserted into the reactor core. Likewise, power suppression efforts to restrict radioactive releases from damaged fuel assemblies may require that control rod(s) be partially or fully inserted into the reactor core. As a consequence, actual control rod patterns during an operating cycle can unexpectedly shift the location of limiting fuel assemblies.

PSEG should commit to not operating the Hope Creek reactor core with the ITAs as the limiting fuel assemblies. Planning not to do so is a good intention, but not doing so is the proper safety measure. All that PSEG currently commits to is designing the core loading patterns and future cycle control rod patterns with the ITAs not being most limiting. PSEG should make the more important commitment to operate the core with the ITAs not being the most limiting.

Comment 3 – LAR Att. 1, Section 4.0

The 4th paragraph on page 5 states:

> *"Due to gamma radiation heating affects on concrete, GE14i bundles are restricted to a location four feet from the Spent Fuel Pool (SFP) walls."*

The last paragraph on page 5 states:

> *"In addition to these ITA examinations, cobalt isotope rods will be removed intact from the ITAs using the fuel prep machine in the HCGS spent fuel pool."*

These two statements are contradictory.

The fuel preparation machine at Hope Creek is not floating about in the middle of the spent fuel pool. According to section 9.1.4.2.3.1 of the Updated Final Safety Analysis Report for Hope Creek, "*The fuel preparation machine, shown on Figure 9.1-7, is mounted on the wall of the fuel storage pool.*" A fuel assembly residing in the fuel preparation machine is well within four feet of the spent fuel pool wall. Therefore, a GE14i bundle can either be kept four feet from the spent fuel pool walls or placed in the fuel preparation machine – not both. This inconsistency must be resolved.

Comment 4 – LAR Att. 1, Section 4.0

The aforementioned 4th paragraph on page 5 describes the evaluation of gamma radiation effects from the GE14i assemblies. This description clearly indicates that the gamma radiation from the GE14i assemblies is significantly greater than the radiation from other assemblies; so much greater that the GE14i bundles cannot be placed within four feet of the concrete walls to preclude damage to the structure.

Missing from this license amendment request is an evaluation of the gamma radiation effects from the GE14i assemblies on reactor vessel internal components. The evaluation for the majority of the internal components will be bound by the evaluations performed for the core operating at full power. But those full power evaluations are not bounding for the source range and intermediate range monitors, which reside outside of the reactor core region at full power and are inserted into the reactor core during shutdown and low power conditions. If the gamma emissions from the GE14i assemblies can degrade concrete less than four feet away, it would seem possible for these assemblies to have detrimental effects on nuclear instrumentation inches away.

PSEG should evaluate the effects of gamma radiation from the GE14i bundles on nuclear instrumentation and other vessel internals.

Comment 5 – LAR Att. 1, Section 5.2

The last paragraph on page 9 states:

> *"Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated."*

In light of the material contained in Attachment 1, this conclusion appears erroneous.

For example, the last paragraph on page 3 of Attachment 1 states:

> *"These ITAs will be located in non-limiting locations in the core with respect to thermal limit margins and shutdown margin."*

Previously, the fuel loading was assumed to be a single fuel assembly misloaded 180° from its proper orientation in the reactor core. As a result of this loading error, the fuel rods assumed to be located nearest the wide-water gap occupied by a control rod blade when inserted are actually located furthest from the control blade. In the future, the fuel loading error could be placement of a GE14i bundle into a limiting location in the core.

Thus, contrary to PSEG's assertion, new or different kinds of fuel loading errors are created with the introduction of the GE14i assemblies.

In addition, any irradiated fuel assembly can currently be placed in any location in the spent fuel pool. In the future, irradiated GE14i assemblies can only be placed in certain locations within the spent fuel pool. As PSEG stated on page 5 of Attachment 1, *"there is no restriction on the amount of time a GE14i bundle can be stored in the SFP, provided the bundle is stored at least one foot from the pool wall to avoid integrated dose effects."* Thus, storage of a GE14i bundle in a SFP storage location too close to the pool wall is clearly a new or different kind of accident than previously evaluated. PSEG's own analysis contradicts their answer to this question.

It is not simply semantics at stake. On March 5, 1996, the NRC proposed a $50,000 civil penalty (EA 96-019) to Duke Power Company for a violation at its Oconee nuclear station in which an irradiated fuel assembly was stored in an improper location within the spent fuel pool between December 14, 1995, and January 8, 1996. Administrative controls had been established at Oconee to preclude such an event, yet these administrative controls failed to prevent safety regulations from being violated. PSEG proposes to substitute administrative controls for design features, thereby introducing the potential for human error to cause safety problems that currently cannot physically occur at Hope Creek.

And the actual history of Hope Creek demonstrates beyond reasonable doubt that any assumption that PSEG will be able to abide by all the administrative controls on fuel handling and storage to achieve safety is fallacious. For example:

- On June 4, 1998, the NRC issued a notice of violation (NRC inspection report 50-354/98-05) to PSEG (then PSE&G) for failure to "*maintain the RHR* [residual heat removal] *system in operation or available to augment the FPCC* [fuel pool cooling and cleanup] *system*" as described in UFSAR section 9.1.3.2.3. The UFSAR specified that during periods when the entire reactor core is offloaded into the spent fuel pool, the RHR system will be available to augment the decay heat removal provided by the fuel pool cooling and cleanup system. The NRC found that PSEG violated this administrative control during the third refueling outage at Hope Creek by offloading the entire reactor core into the spent fuel pool when the RHR system was not available as required.

- On March 25, 1996, PSEG (then PSE&G) notified the NRC via licensee event report 95-042-00 that it had operated Hope Creek for an entire operating cycle with one fuel bundle misoriented in the reactor core by 180°. PSEG informed the NRC that the misorientation happened "*when a refuel bridge operator failed to correctly rotate a fuel bundle when moving it within the reactor core. In addition, the independent verification processes failed to identify the error.*"

The 1996 report of a misoriented fuel bundle in the reactor core involved errors made by more than one worker at Hope Creek. But at least the byproduct of these errors – the misoriented fuel assembly in the reactor core – was bound by the safety analyses. Section 15D.3.8.2 of the Hope Creek UFSAR describes the methodology, assumptions, and results from the safety analysis of such a situation. The operating limit minimum critical power ratio factored in the consequences of a misoriented fuel assembly to ensure that Hope Creek's operation, while impaired, was adequately safe.

Section 15D.3.8.1 of the Hope Creek UFSAR describes the safety analysis performed for a postulated mislocated fuel bundle. But this analysis is for a fuel bundle mislocated within the reactor core, not a fuel bundle mislocated in the spent fuel pool.

The fact that PSEG cannot place GE14i fuel bundles within 4 feet of the spent fuel pool walls does indeed create a new or different kind of accident; namely, that the mislocation of one or more GE14i fuel bundles into storage locations within 4 feet of the spent fuel pool walls damages the structural integrity of the storage pool.

PSEG must take the steps necessary to provide reasonable assurance that the production, handling and storage of cobalt-60 rods at Hope Creek is backed by safety analyses, not empty promises.