ATTACHMENT 2

NTD-NRC-95-4474

Westinghouse Electric Corporation

Energy Systems

Nuclear Technology Division

Box 355
Pittsburgh Pennsylvania 15230-0355

June 2, 1995

Mr. John C. Hoyle
Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Docketing and Service Branch

Dear Mr. Hoyle:

Subject: Comments on Proposed Rule -- 10 CFR Parts 50, 52, and 100, "Reactor Site Criteria Including Seismic and Earthquake Engineering Criteria for Nuclear Plants" (60 *Federal Register* 10810 - February 28, 1995)

We believe that the proposed rulemaking, associated regulatory guides, and standard review plans should contain unambiguous language, and clear and consistent technical guidance to establish a stable licensing basis for the siting of future nuclear power plants. And, we further believe that a stable licensing basis will create the environment for a successful rebirth of nuclear power plant construction.

As a major NSSS vendor who has a major stake in the success of nuclear power industry, Westinghouse personnel over the past four years have participated in industry advisory committees and task forces associated with NRC's proposed rulemaking referenced above. Through this participation, many Westinghouse concerns regarding the proposed rulemaking have been addressed. Specifically, the concerns were captured in the letter from the Nuclear Energy Institute (W.H. Rasin to J.C. Hoyle) dated May 12, 1995 and in the letter from EPRI ALWR Programs (A. Machiels to J.C. Hoyle) dated May 12, 1995.

Since the proposed rule revision will have an enormous impact on the future of nuclear power, we are augmenting the comments provided by the industry associations with our own comments. Our comments are provided in Enclosure 1.

We want to commend the NRC for addressing industry concerns in a very professional manner through the previous round of comments on this proposed rule. We hope that the Staff will do an

equally diligent job in addressing the concerns of the industry through this round. Westinghouse would be pleased to meet with the Staff to discuss any comments offered in this letter.

Very truly yours,

N. J. Liparulo, Manager
Nuclear Safety Regulatory and Licensing Activities

Enclosure

cc: James S. Taylor, NRC
William T. Russell, NRC
David L. Morrison, NRC
Leonard Soffer, NRC
Andrew J. Murphy, NRC

ENCLOSURE 1

Comments on Proposed Rule -- 10 CFR Parts 50, 52, and 100, "Reactor Site Criteria Including Seismic and Earthquake Engineering Criteria for Nuclear Plants"

NON-SEISMIC

Comments on the proposed revision (59 Federal Register 52255, October 17, 1994) to paragraph (a)(1) of part 50.34 of the Code of Federal Regulations.

1.1 Comments on the identification of the two hour interval to be used for calculating the dose at the Exclusion Area Boundary

The proposed time period for calculating the Exclusion Area Boundary (EAB) dose is "any 2 hour period following the onset of the postulated fission product release." Since the dose calculated over the time interval has value only relative to the potential for an individual to be exposed, the dose interval should bear a relationship to the presence of a population in the vicinity to the plant. Presently, EAB doses are calculated based on the assumption that the people in the low population zone are at the site boundary for a two hour period at the beginning of the accident, thus conservatively calculating the potential dose during the two hour interval over which evacuation of this zone is assumed to take place.

With the implementation of the source term described in NUREG-1465, "Accident Source Terms for Light-Water Nuclear Power Plants," February 1995, the release of activity from the core is modeled as occurring over a period of time instead of the instantaneous release assumed in Regulatory Guides 1.3 and 1.4. This creates the likelihood that the calculation of the dose over the 0 to 2 hour time interval will not result in the most conservative determination. Additionally, the development of passive plant designs has demonstrated that it is feasible to design plants to substantially delay the onset of core damage in the event of an accident. Instead of core damage initiating at the very beginning of the postulated large break Loss-of-Coolant Accident, it has been shown that the core damage will be delayed for approximately an hour. This is a substantial improvement in plant safety relative to currently operating plants. Theoretically, it would be possible to design a plant such that the onset of core damage would be more than two hours after accident initiation. In this instance, a two hour dose calculated from the beginning of the accident would not be significant since the only radioactive material that would be available for release would be the activity from the reactor coolant which would enter the containment building as a result of the accident.

With the "sliding dose window" concept, the interval over which doses would be calculated is not linked to any specific occurrence, not to the beginning of the accident, not to the onset of the gap release phase, and not to the onset of the core melt phase. Specifying that the interval for the EAB dose determination should be the two hours over which the highest doses would be accumulated is conservative but, since there is no direct link to any particular aspect of the accident sequence, there is a sense of the arbitrary that detracts from the technical authority that should be present in this document. The "sliding dose window" ignores the dose that would be accumulated during the time period between the accident initiation and the two hour interval of highest dose. It could, of course, be argued that the population in the vicinity of the plant leaves but that other members of the public initially at a far distance from the plant site choose to approach the plant during the time of the site emergency and at the precise time interval when they will accumulate the maximum dose. While theoretically possible, this is not an appropriate model.

A more reasonable approach would be to modify the use of the two hour dose concept, replacing it with a time interval of two hours starting at the onset of core damage plus the time interval between accident initiation and the onset of core damage. This has the advantage that it is linked to the beginning of the accident and thus has a rational connection with the concept of notification of the public and their evacuation. It does not ignore the dose accumulation that would occur prior to core damage. It also has the regulatory advantage in that the EAB dose calculation is not susceptible to being made trivial due to an extensive delay in reaching the beginning of core degradation.

The proposed use of a "sliding dose window" attempts to address the issue of evaluating the capabilities of the containment and other safety features to limit release of activity to the environment but, as discussed above, in its attempt to capture the period of greatest activity release, it introduces distortions into the determination of potential dose to the public. The evaluation of the ability of the plant to limit accident releases to the environment should encompass a sufficient portion of the accident duration to be said to characterize the event. For the postulated large break LOCA with core melt, an appropriate time interval would be 24 hours since, after this point, the accident is essentially complete. There would be continuing minor releases of activity to the environment but these would not be significant when compared to the first 24 hours. The releases over this 24 hour period would have to be demonstrated as being within some bounding value. One approach would be to specify that the EAB dose over the first 24 hours not exceed twice the identified dose limit for the "two hour" EAB dose. The calculation of a 24 dose at the EAB should not be construed as the consideration of the presence of any person at the EAB for that period; the determination of dose is only a surrogate used for evaluating the ability of the containment and other safety features to appropriately limit the release of activity to the environment.

1.2 Comments on the TEDE (Total Effective Dose Equivalent) dose limit

The proposed revision specifies a dose limit of 25 rem TEDE. From SECY-94-194, the approach used in determining this limit is based on starting with the current dose criteria of 300 rem thyroid and 25 rem whole body and determining the risk of latent cancer fatality associated with these combined doses. The resultant risk of latent cancer fatality is 2.7×10^{-2} (2.5×10^{-2} from the whole body dose and 2.0×10^{-3} from the thyroid dose). It is noted that this risk determination neglects the dose contribution from the remainder of the source term identified in TID-14844. That source term includes, in addition to the iodines and noble gases, one percent of the solids in the fission product inventory. This portion of the source term was not taken into consideration in the calculation of whole body doses or thyroid doses because the contribution is not significant but it has been included in the evaluation of in-containment radiation environment following the postulated accident. If these "other nuclides" are taken into consideration, the risk associated with the current dose methodology and source term is greater than the 2.7×10^{-2} that was determined and would lead to higher TEDE dose limits.

In addition to assuming a risk factor of 2.7×10^{-2}, SECY-94-194 also assumes that the dose is quickly accumulated over the designated two hour interval, thus justifying the risk coefficient of 10^{-3} per rem instead of the risk coefficient of 5×10^{-4} per rem that is associated with dose accumulation over the longer term (i.e., a period of days or more). Using this approach, the dose limit was calculated to be 27 rem but was reduced to 25 rem.

The calculation of 27 rem TEDE is based on the inappropriate assumption that the dose accumulation occurs over a short time. For the postulated two hour exposure interval, most of the anticipated dose would be as a result of long term dose accumulation from the nuclide body burden. Only a small fraction of the total dose would be acute dose from the immersion in the cloud of activity. This is especially true when taking into account the new source term set forth in NUREG-1465. Instead of basing the TEDE dose limit on the risk associated with short term dose accumulation, it should be

based on an appropriate combination of short and long term dose accumulation. It is appropriate to assume that the acute dose is substantially below this value - say 10 rem. Based on studies for the AP600 plant, the acute dose is expected to be well below this value. This 10 rem gamma body dose translates to a 1×10^{-2} risk for latent cancer fatality and corresponds to 10 rem TEDE. Using a risk coefficient of 5×10^{-4} per rem, the additional allowable TEDE dose that could accumulate over the long term without exceeding a risk of 2.7×10^{-2} would be 34 rem. The total is thus 44 rem TEDE.

However, this approach still does not accurately reflect the dose limit that is associated with the identified level of risk. As indicated in SECY-94-194, in the original determination of the level of risk, the risk identified for the 300 rem thyroid dose is 2×10^{-3}. Since 300 rem thyroid translates to 9 rem TEDE, the risk coefficient associated with this exposure is 2.2×10^{-4} per rem. For the postulated LOCA with core melt, more than half of the accumulated TEDE dose is expected to be from dose to the thyroid. If it is conservatively assumed that only 25% of the non-acute dose is from thyroid dose (and thus, 25% of the risk of 1.7×10^{-2} allocated for the non-acute dose is associated with the thyroid dose), this results in 19.3 rem TEDE associated with the thyroid dose and 25.5 rem TEDE associated with the remaining organ contributors. The resulting total of 55 rem TEDE could be rounded down to 50 rem. This would be a more appropriate TEDE dose limit than the 25 rem specified in the proposed revision to 10 CFR 50.

1.3 Comments on the concept of "caps" for specific organ doses

The idea of "caps" on the fraction of TEDE dose limit that could be associated with any specific organ is presented for discussion in SEC-94-194. This concept of having specific organ dose limits in addition to the overall TEDE dose limit adds to the complexity of the approach and implies that the methodology used in generating the TEDE dose limit is not viewed as valid. The TEDE dose limit is based on an identified level of risk. If the basis for the TEDE dose limit is valid, there is no need for caps on specific organ doses. The use of limits on specific organ doses in addition to the overall TEDE dose limit would result in an unnecessary complication to the rule and would not reduce the risk to the public.

SEISMIC

Westinghouse supports NRC's decision to move guidance material from the proposed rule to the proposed regulatory guides. We also support NRC's decision to eliminate the "dual" deterministic and probabilistic analyses from the proposed rule. We, however, are concerned that retaining deterministic evaluations in SRP 2.5.2 will lead to confusion as to whether future licensees will also need to perform a deterministic analysis even though such an analysis is only recommended for NRC staff to perform as a "sanity" check. This additional deterministic analysis will add to instability in the licensing process and increase a future license applicant's seismic analysis costs (in defending its probabilistic analyses) without any additional benefit to public health and safety. We recommend that references to deterministic analyses be removed from all documentation associated with the proposed rule revision.

Westinghouse shares NEI's concern with respect to the type of analyses needed to construct a new plant on an existing approved site, using the proposed rule and associated proposed regulatory guides. We also believe that site characterization analysis for existing sites should be confirmatory in nature and of "limited scope," rather than "full scope" as required for new sites.

There are several phrases that are used in the proposed rule that should be modified to make the rule more stable from a licensing point of view. Since these phrases are used in several places, only the

phrase and not the location, are identified below. We suggest that these phrases and others that are similar in nature be modified as well.

1. "...certain structures, systems, and components" should read: "certain structures, systems, and components as identified in Regulatory Guides xxx." By referencing the regulatory guides, the vagueness of the statement is eliminated from the rule and the description of the structures, systems and components can be changed, if necessary, via changes to the regulatory guides.

2. "...without loss of capability to perform their safety functions" should read: "...without loss of capability to perform their ~~safety~~ intended functions." The components perform a function and not a "safety" function -- components may be a part of a safety system or a non-safety system. There are other sentences which have similar phraseology -- for example, item 3 below. These sentences should be similarly modified.

3. "The required safety functions of structures, systems, and components must be assured..." should read: "The required ~~safety~~ functions of structures, systems, and components must be assured per the guidance provided in Regulatory Guide xxx..." The underlined phrase shows that the regulatory guide contains guidance as to how a future license applicant can provide "assurance."