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Florida Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72

March 30, 2000
3F0300-11

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attention: Rulemaking and Adjudication Staff

Subject: Response to the Solicitation of Comments on Draft Regulatory Guide (DG) 1081, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," dated December 1999, and Standard Review Plan (SRP) 15.0.1, Revision 0, "Radiological Consequence Analyses Using Alternative Source Term" (64 FR 71998-71999)

Dear Sir:

The purpose of this letter is to respond to the NRC's request for public comment as noticed in the Federal Register (64 FR 71998-71999). Florida Power Corporation (FPC) recognizes and appreciates the opportunity to comment on the guidance in DG-1081 and SRP 15.0.1. In addition to the attached comments, FPC endorses the comments of the Nuclear Energy Institute (NEI) prepared on the industry's behalf.

Please contact Mr. Sid Powell, Manager, Nuclear Licensing at (352) 563-4883 if you require further information regarding FPC's comments.

Sincerely,

SLBernhoft

S. L. Bernhoft
Director, Nuclear Regulatory Affairs

SLB/lvc

Attachment

xc: Regional Administrator, Region II
Senior Resident Inspector
NRR Project Manager
NRC Document Control Desk

Florida Power Corporation's (FPC's) Comments on 64 FR 71998-71999

Comments on Draft Regulatory Guide (DG) 1081, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," dated December 1999, and Standard Review Plan (SRP) 15.0.1, Revision 0, "Radiological Consequence Analyses Using Alternative Source Term"

The Federal Register Notice invited advice and recommendations on the content of the draft regulatory guide and draft SRP section. FPC is providing the following comments:

General (DG-1081 and SRP)

Neither the draft DG or SRP contain guidance on several issues. Guidance is necessary to ensure consistent application and interpretation of the following issues:

1. Clarifications related to the sliding 2 hour window for dose acceptance criteria

   The new concept of a sliding 2 hour window to determine the maximum 2 hour dose results in questions that should be resolved in the new guidance. Such issues include:

   a. The level of detail in calculated dose information that should be included in license amendment applications or in the Final Safety Analysis Report (FSAR). For example, does the maximum 2 hour dose need to be provided, or should the results for other time periods also be presented to demonstrate that they were evaluated in establishing the maximum 2 hour period?

   b. Clarification that a significant increase in the dose during a period that is not part of the worst 2 hour period is not an Increase in Consequences for 10 CFR 50.59 reviews.

2. Justification that no skin dose limit applies

   There are current guidelines, such as the SRP acceptance criteria for control room dose, which have an acceptance criterion for skin dose. Total effective dose equivalent (TEDE) does not include the skin dose, and hence the new Alternative Source Term (AST) acceptance criteria contains no limit for skin dose. This difference needs to be discussed in DG-1081. This would facilitate performance of Safety Evaluations for FSAR changes where the current calculated control room skin dose is being eliminated.

SRP 15.0.1

1. Page. 15.0.1-4, Item 3 and Page. 15.0.1-12, Item 5

   These two sections state that core inventory should be based on rated thermal power, enrichment and burnup. The codes used in design bases accident (DBA) analyses, such as TACT and RADTRAD, determine core inventory solely as a function of rated thermal power. There are no current requirements, DBA dose models, or guidance on how to adjust the inventory as a function of enrichment or burnup. There is no need to adjust for enrichment or burnup as errors associated with these parameters are small compared to the significant uncertainty and general conservatism of other parameters. Reference to these two parameters should be deleted from the SRP.

2. Page 15.0.1-11, Section (3) at top

   This section implies that the only radiological aspects to consider in the extension of a containment isolation valve closure time is the timing of the AST gap release for the DBA loss-of-coolant accident (LOCA). There are other accidents such as a control rod ejection where the fuel failure results from the reactivity excursion and hence occurs faster than the DBA LOCA gap release. The containment isolation signal may not occur for this accident until the failed fuel fission products are already dispersed in primary containment. The dose consequences of an increased containment isolation time would have to be addressed for this accident. The importance of addressing other accidents such as the control rod ejection should be mentioned in this section where containment isolation time is discussed.

DG-1081

1. Page 8, Section 1.3.2, last paragraph

   See Comment 2 above in the SRP comments. For a similar reason, this section should also highlight the importance of considering accidents such as the control rod ejection in regard to containment isolation closure time.

2. Page 10, Section 1.5, last two paragraphs

   The last sentence of the second to last paragraph of Section 1.5 indicates that there are two options for providing the details of the revised radiological analyses in the license amendment application. One is a marked up version of the FSAR, the second is a copy of the actual calculation. The subsequent paragraph seems to provide an acceptable third option. That would be the submittal of the detailed listing of the code inputs if an NRC sponsored code was used (e.g., RADTRAD). The DG should state that this is an acceptable option for the detail needed in the license amendment application.

3. Page 12, general comments

   The DG should specify what the required source term is for an assessment of small break LOCA (SBLOCA) doses. It is assumed that the source term specified in Tables 1 and 2, through the Early In-vessel phase, is for the DBA LOCA which is the large break LOCA. There are numerous licensees who have performed dose assessments for SBLOCA cases, whether it is for environmental qualification (EQ) of components only required for SBLOCA scenarios, or public doses from a release pathway that would only exist under SBLOCA conditions. These analyses have typically assumed a release of the gap activity, previously assumed as 10% of the core inventory of noble gas and 10% of the core iodine. It is not clear what should be assumed per the DG for a SBLOCA. Is it the gap release fraction in Tables 1 and 2 or those in Table 3? What is the timing of the release for the SBLOCA, since Table 4 applies to the DBA large break LOCA (LBLOCA)?

   The titles of Tables 1 and 2 "...Fraction Released into Containment" (taken directly from NUREG-1465) adds confusion on how to treat the release. The new AST rule defines the source term as the "fraction released from the fuel." It is suggested that the titles of Tables 1 and 2 be changed to be consistent with the rule definition of source term. The Appendices then provide specific guidance on where this activity is assumed to be released, whether it would be to the containment atmosphere or the RCS/sump water.

4. Page 12, Tables 1 and 2

   A note needs to be added that the Early In-vessel column does not represent the cumulative total, but just the fraction released during that phase. For example, the total fraction of halogens released through the Early In-vessel phase at a boiling-water reactor (BWR) is 30%, not 25%. The proper usage may not be obvious to those who have not been involved with NUREG-1465.

5. Page. 14, Chemical Form

   This section needs to specify the chemical form in both the gap fraction and the Early In-vessel release. If they are the same, then it should be stated as such. It also needs to be stated as to which accidents these fractions apply LBLOCA, SBLOCA and/or non-LOCA accidents. Technical justifications need to be provided for differences. For example, why is 95% of the gap iodine, cesium iodide (CsI), in Section 3.5, but 99.75% is elemental iodine in Appendix B?

6. Page 14, Section 4, Dose Calculation Methodology, 1st paragraph

   This section needs to clarify the acceptance criteria that will be used for a limited application. For example, a timing-only application uses a combination of the NUREG-1465 timing with the TID-14844 release fractions and only addresses noble gas and iodine. The use of only noble gas and iodine could imply that the whole body and thyroid limits apply. However, since a change in the timing assumption is a change in the source term, it falls under the requirements of 10 CFR 50.67. This rule states that the TEDE criteria must be met.

7. Page 15, Section 4.1.5

   The last sentence states that the timing increments for dose calculations should be consistent with the rate at which analysis parameters change. The source term allows methods that continuously increase the source term over the phase duration. Hence, the change in one input parameter (source term) is continuous and the time increments could be one second. A statement should be made that a minimum increment for dose determinations of five minutes is acceptable.

8. Page 15, Section 4.1.6

   This section should specify that doses beyond 30 days do not need to be assessed for the low population zone (LPZ) dose.

9. Page 15, New Section

   Add a new Section (e.g., Section 4.1.8), and clearly specify that the dose from ground shine from particulate deposition does not have to be considered.

10. Page 16, Section 4.2.2

    The last phrase, "unless these assumptions would result in non-conservative results for the control room" is contrary to current licensing bases. Control rooms have typically been designed to the DBA LOCA as defined and calculated for the public dose assessment. This is a non-mechanistic scenario with built-in conservatisms to account for mechanistic variations in various assumptions

    There are numerous examples related to assumptions such as the timing of loss of offsite power, building ventilation flow status, and containment leakage paths that would have to be evaluated to establish the maximum dose. Given the numerous combinations of assumptions, it would be difficult to demonstrate that all combinations of mechanistic assumptions were analyzed. Such requirements are well beyond current rules and practices. Design of the control room to ensure doses remain within 5 REM TEDE for the DBA LOCA used for the public dose analysis simplifies the required analyses and ensures control room habitability for the vast majority of accident scenarios.

11. Page 16, Section 4.2.5

    This section specifies that credit should not be taken for personnel protective devices. This restriction fails to recognize the primary safety aspect of control room habitability which is to prevent the need for evacuation of the control room. Hence, it fails to recognize that the control room would never require evacuation due to iodines or particulates as protective measures, such as respirators or potassium iodide (KI) administration, could be used. The only dose that will require control room evacuation is whole body dose, most likely due to noble gas submersion. However, due to the need to meet thyroid or committed effective dose equivalent (CEDE) limits, without credit for protective equipment, licensees typically require designs that minimize iodine or particulate activity, such as a pressurized control room via filtered makeup. Filtered makeup increases the noble gas intake and hence

increases the possibility of control room evacuation. Allowing credit for personnel protective measures would simulate the real world, minimize whole body dose, and result in safer control room designs.

12. Page 18, Section 5.1.2, and Page. 19, Section 5.1.4

These two sections could severely restrict the number of licensees willing to submit AST applications and hence preclude the safety benefits and cost saving benefits afforded by more realistic treatment of the source term. There are numerous licensees who have one or more of the following in their licensing basis:

a. Credit for non-safety grade equipment.

b. No assumptions for single failures beyond the base assumption of a loss of one train of emergency equipment or specific agreements that certain single failures need not be considered (e.g., failure of steam generator (SG) blowdown valve to isolate).

c. No consideration of a smart Loss of Offsite Power (LOOP) at the worst possible time for dose mitigation. The LOOP is typically taken at the time of reactor trip as a causal effect. The LOOP at any other time as an independent event further reduces the overall probability of the assumed scenario to a non-credible scenario.

d. Assumptions and methods that are different from current SRP guidelines.

e. The implication of Sections 5.1.2 and 5.1.4 is that the NRC will use the AST submittal to impose changes to these agreed upon criteria in the current licensing basis. The specification of the fraction and chemical form of nuclides released from the core is independent of all of the above considerations. Hence, application of the AST should not require the modification of these current licensing bases.

13. Page 20, Section 6

This Section, combined with Appendix I, tend to imply that a requantification of EQ doses is required. This needs to be corrected and additional guidance added on how the EQ effects can be qualitatively justified. Statements related to the small percent increase in the six month integrated dose due to increased particulates should be included. Guidance should be included on how the licensee can take credit for the inherent conservatisms in current EQ analyses and use these to qualitatively justify the small source term effect. Reference to the generic safety issue on Cesium (Cs) should be made.