From: Lawrence Rossbach
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Date: 4/5/01 3:14PM
Subject: Health Physics questions for EPU

We would like to set up a call to discuss the attached questions.

CC: Anthony Mendiola; James Wigginton; Stewart Bailey

Docket Nos. 50-237, 50-249, 50-254, and 50-265

DRESDEN/QUAD CITIES EPU: Health Physics

All of the following questions apply to both Dresden and Quad Cities:

1. The Skyshine offsite external dose components (related to the 40 CFR 190 annual dose limit of 25 mrem) over the past three years (1997-99) have increase by about a factor of two and seven, respectively. What are the underlying reasons for these increases, and how will this power uprate (EPU) impact this apparent trend? Please identify the dose receptor for the skyshine component -- is it a member of the public in a nearby private residence, or a non-occupational licensee employee (a member of the public) working onsite?

2. The plant's licensing design basis for radiation shield design and resultant radiation zoning typically assume a source term based on 1% fuel leakage and contribution from water activation, neutron, coolant corrosion and wear products. The applicants have stated that increases in radiation levels resulting from the proposed power uprate will not be more than the percentage increase of EPU, and that these cumulative increased values will not substantially challenge current shielding and radiation zoning. However, the EPU will establish a new source term with increases in all dose components (e.g., 1% fuel leakage for EPU operations is a higher source term than was the original design basis). Additionally, activation, corrosion and wear products will likely increase above the existing coolant concentration.

   With the new, elevated source term design basis, is the existing physical shielding and radiation zoning in place adequate? Describe any physical changes in the shielding, and any resultant changes necessary in the radiation zoning.

3. The recent refueling outage at Quad Cities demonstrated a significant unexpected adverse effect of the noble metal injection process (NMIP). Rather than reducing area dose rates as expected, external dose rates in work areas were significantly elevated. The EPU application takes credit for an effective NMIP by assuming a net reduction in hydrogen gas injection rate, thereby reducing the resultant N-16 radiation levels during plant operations and in the plant environs.

   What corrective, remedial actions are planned or have been initiated (and what is the estimated time frame) to ensure the NMIP process positively contributes to a reduction in radiation levels? Describe the overall impact on radiation levels (from an occupational and 40 CFR 190 sky shine perspective) given the NMIP poor performance.

4. NUREG-0737, Item II.B.2 states that the occupational dose guidelines in GDC 19, 10 CFR 50, Appendix A shall not be exceeded during the course of the accident. This ensures that operators can access and perform required duties and actions in designated vital areas. In Section 8.5.3, Post-Accident, the applicant notes that the change in post-accident source term and resulting radiation levels due to EPU are

not expected to increase by more than the percentage increase in power level. Additionally, a coincident change to a 24-month fuel cycle also impacts post-accident dose rate levels.

The staff requests that the applicant provide a summary of the vital area gamma dose (whole body, deep dose) estimates for all the identified tasks (missions) in the current licensing basis; and compare these mission doses with the calculated Post-Uprate/24-month fuel cycle doses for the same missions. Some of these missions may include, for example, sample collections for gaseous effluent release points, and PASS sampling and in-lab analysis. Clarify and explain the changes (from the original "conservative" methods) in dose estimate methodology used for the calculation of post-uprate post-accident operator doses resulting from duties and actions in designated vital actions and for dose rates in the technical support center and emergency operations facility.

5. A previous BWR power uprate submittal projected that activation, corrosion and wear product (ACWP) would increase in the reactor coolant by the square of the percentage of the power uprate. This would result in up to 37% and 39% ACWP increases above existing coolant concentration for Dresden and Quad Cities, respectively.

   Provide the impact of the EPU on the ACWP design basis. What is the overall resultant percentage increase of the ACWP design basis? If this squared function was not used, explain the basis that was used to estimate dose rate increases, curie loading for resin waste shipments and other related issues.