



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

ENVIRONMENTAL IMPACT APPRAISAL BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO. 44 TO FACILITY OPERATING LICENSE NO. DPR-39  
AND AMENDMENT NO. 41 TO FACILITY OPERATING LICENSE NO. DPR-48

COMMONWEALTH EDISON COMPANY  
ZION STATION UNITS 1 AND 2  
DOCKET NOS. 50-295 AND 50-304

Description of Proposed Action  
Environmental Impacts of Proposed Action

As required by NEPA and 10 CFR Part 51.7, we have evaluated the potential environmental impacts of the proposed action. Included in our review has been a consideration of our conclusions in the Final Environmental Statement (FES) for Zion Station Units 1 and 2 dated December 1972.

The irradiation of the four Zion 1 spent fuel assemblies to extended burnups in Zion 2, up to about 55,000 MWD/T, will increase the amount of long-lived fission products in the core. The only significant long-lived radionuclide with respect to potential consequences of the postulated design basis accidents is the noble gas Krypton 85. Extending burnups of the core up to about 44,000 MWD/T will not increase the amount of Krypton 85 which was assumed in the fuel at Zion 2 for the postulated design basis accidents. The increase in the amount of Krypton 85 in the four fuel assemblies from 44,000 MWD/T to 55,000 MWD/T is not significant compared to the total amount of fission noble gases in the fuel. Therefore, the environmental impacts of the postulated accidents given in the FES will not significantly change because four fuel assemblies in the core are irradiated to burnups up to 55,000 MWD/T.

As noted in the accompanying Safety Evaluation Report (SER), we expect that operating Zion 2 with additional irradiation of four spent fuel assemblies from Zion 1 could increase the fraction of failed fuel in the core over that previously experienced. This would increase the concentration of activity in the reactor coolant (RC) and the amount of activity released from the plant as compared to releases during operation of the plant in previous cycles. An increase in the concentration of RC activity would be an indication of fuel failures and an indication of later increases in the amount of activity released from the plant. However, we do not expect these increases to be significant because, (1) only four assemblies

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in the core (2.1%) will be irradiated to the extended burnups, (2) due to restrictions in the plant Technical Specifications, these four assemblies will be located in the core where the operating thermal stresses in the cladding are relatively low and where the thermal limits for cladding should not be approached, (3) there are no design changes in these four assemblies from ones previously irradiated at Zion 2, and (4) the licensee will examine the four spent fuel assemblies before their insertion in the Zion 2 core for their fourth cycle and will only irradiate them in a fifth cycle after these assemblies have demonstrated satisfactory fuel performance in the fourth cycle. If there is a significant increase in RC activity it will be detected by monitoring the activity of samples of the reactor coolant, the radwaste treatment system and the plant effluents. This is discussed in Section 9.8, 11.1.2.2 and 11.1.2.3 of the Zion Station FSAR and required in Table 4.11-1 and Specification 4.3.6.A of the plant Technical Specifications. Based on the above, we conclude that the environmental impacts discussed in the FES are still valid for Zion Unit 2 for the proposed extended burnup program.

The plant contains waste treatment systems designed to collect and process the gaseous, liquid and solid waste that might contain radioactive material. The waste treatment systems are evaluated in the FES. There will be no changes in the waste treatment systems described in Section III.D.2 of the FES because of operation of Zion 2 in the extended burnup program.

We have considered the effect of irradiating four spent fuel assemblies to extended burnups in Zion 2 on the environmental impacts from the uranium fuel cycle and from shipping fuel and waste to and from Zion Station. Irradiating these four spent fuel assemblies to extended burnups is not expected to change the number of fissions in Zion 2 over the operating lifetime of the plant, therefore, the amount of fission products generated by Zion 2 over its operating lifetime would not change due to the proposed program.

The licensee has been adding four low burnup spent fuel assemblies from Zion 2 Cycle 1 and sixty new unirradiated fuel assemblies to Zion 2 during each annual refueling. The use of low burnup fuel assemblies from Zion 2 Cycle 1 will be postponed for one and possibly two cycles during the extended burnup program to irradiate the four spent fuel assemblies from Zion 1. After the extended burnup program is completed, the licensee intends to resume adding four low burnup spent fuel assemblies from Zion 2 Cycle 1 during Zion 2 refuelings. Therefore, the licensee could use up to eight fewer new assemblies during the license operating lifetime of

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Zion Unit 2. Eight fuel assemblies are an insignificant fraction (about 0.3%) of all the fuel assemblies that could be expected to be used at Zion Unit 2. Therefore, on the average, each fuel assembly will have the same magnitude of fission products as if the four assemblies were not irradiated to extended burnups. Based on this, we conclude that the proposed extended burnup program will have no significant effect on the environmental impacts associated with the uranium fuel cycle and from shipping fuel and waste to and from Zion Station.

#### Summary

On the basis of the above, we conclude that it is acceptable from a radiological standpoint to operate Zion 2 with four fuel assemblies previously irradiated for 3 cycles in Zion 1 without additional restrictions in the Technical Specifications beyond those proposed by the licensee for the four fuel assemblies.

#### Conclusion and Basis for Negative Declaration

On the basis of our evaluation and information supplied by the licensee it is concluded that the proposed action will have no appreciable impact on the environment due to radiological effluents from the plant and will not affect the cost-benefit balance.

Having reached these conclusions, the Commission has determined that an environmental impact statement need not be prepared for the proposed license amendment and that a Negative Declaration to this effect should be issued.

Date: March 7, 1979