

November 20, 1981

Docket No. 50-237
LS05-81-11-048



Mr. L. Del George
Director of Nuclear Licensing
Commonwealth Edison Company
Post Office Box 767
Chicago, Illinois 60690

Dear Mr. Del George:

SUBJECT: DRESDEN -2, SEP TOPIC XV-20, RADIOLOGICAL CONSEQUENCES OF
FUEL DAMAGING ACCIDENT

Commonwealth Edison (T. Rausch) letter dated October 15, 1981, transmitted for our review your safety analysis report (SAR) of SEP Topic XV-20. Enclosed you will find our evaluation of this topic. The result of our staff's review indicates that the Dresden 2 plant is acceptably designed for controlling and mitigating the radiological consequences of a fuel handling accident.

This evaluation will be a basic input to the integrated safety assessment for Dresden-2 unless you identify changes needed to reflect the as-built conditions at your facility. The assessment may be revised in the future if your facility design is changed or if the NRC criteria relating to this subject is modified before the integrated assessment is complete.

Sincerely,

Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing

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DS4 USE (IL)
ADD:
P. O'CONNOR

Enclosure:
As stated

cc w/enclosure:
See next page

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Mr. L. DelGeorge

cc

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XV-20 RADIOLOGICAL CONSEQUENCES OF FUEL DAMAGING ACCIDENTS

I. INTRODUCTION

The safety objective of this topic is to assure that the offsite doses from fuel damaging accidents as a result of fuel handling inside and outside containment are well within the guideline values of 10 CFR Part 100.

II. REVIEW CRITERIA

Section 50.34 of 10 CFR Part 50, "Contents of Applications: Technical Information," requires that each applicant for a construction permit or operating license provide an analysis and evaluation of the design and performance of structures, systems, and components of the facility with the objective of assessing the risk to public health and safety resulting from operation of the facility. A fuel handling accident in the fuel handling and storage facility resulting in damage to fuel cladding and subsequent release of radioactive material is one of the postulated accidents used to evaluate the adequacy of these structures, systems, and components with respect to the public health and safety.

In addition, 10 CFR Part 100 provides offsite radiological consequence guidelines for reactor siting against which calculated accident consequences may be compared.

III. RELATED SAFETY TOPICS

Topic II-2.C, "Atmospheric Transport and Diffusion Characteristics for Accident Analysis" provides the meteorological data used for calculating the offsite dose consequences.

The review of the fuel damaging accidents did not consider fuel damage as a result of drops of the spent fuel cask or other heavy objects which can be carried either over an open reactor vessel or the spent fuel pool. Review of the drops of casks and heavy objects is covered in two SEP Topics, IX-2, "Overhead Handling Systems-Cranes" and XV-21, "Spent Fuel Cask Drop Accidents."

IV. REVIEW GUIDELINES

Accidents resulting from the movement of fuel inside secondary containment were reviewed following the assumptions and procedures outlined in Standard Review Plant (SRP) Section 15.7.4 and Regulatory Guide 1.25. The dose to an individual from a postulated fuel handling accident should be "well within" the exposure guidelines of 10 CFR Part 100. (Whole body doses are also examined but are not controlling due to the decay of the short-lived radioisotopes prior to fuel handling.) This is based on the probability of this event relative to other events which are evaluated against 10 CFR Part 100 exposure guidelines. The review considers single failure, seismic design and equipment qualification only when the potential consequences might exceed the guidelines of 10 CFR Part 100 in the absence of containment isolation and effluent filtration. The system design is considered to be acceptable if the limiting doses are well within the 10 CFR 100 guidelines.

V. EVALUATION

The assumptions used in this evaluation are summarized in Table XV-20-1. The fuel handling accident was considered assuming that filters with an efficiency of 90% for elemental iodine were used and that the fuel was damaged 24 hours after shutdown, a limiting thyroid dose at the exclusion area boundary of about 3 Rem was calculated.

The plant's Technical Specifications related to fuel handling in the secondary containment provide for the required filtration of radioiodines. That is, all standby gas treatment system filters in two redundant trains are required to be operable when irradiated fuel is handled in the building. The surveillance requirements are sufficient to provide reasonable assurance that the efficiency will be as high as the 90% assumed in the staff's calculations.

VI. CONCLUSIONS

The limiting dose for the fuel handling accident inside secondary containment indicates that the system is adequately designed to mitigate the consequences of this type of accident.

TABLE XV-20-1
ASSUMPTIONS MADE IN ANALYSIS OF THE FUEL
HANDLING ACCIDENTS INSIDE AND OUTSIDE CONTAINMENT

1. Reactor Power 2527 MW_{thermal}
2. Clad failure of all rods in 2 assemblies. (724 assemblies in core)
3. Release of gap inventory of all failed rods: 10% I
10% Noble Gas
30% 85Kr
4. Peaking Factor 1.2*
5. Meteorological conditions corresponding to a ground level release X/Q of 2.6×10^{-4} sec/m³ at the Exclusion Area Boundary. (See Topic II-2.c).
6. 24 hour irradiated fuel cooldown time.

*Peaking factor of 1.2 used for more than one damaged fuel assembly.