

SOUTH CAROLINA ELECTRIC & GAS COMPANY

POST OFFICE 764

COLUMBIA, SOUTH CAROLINA 29218

August 8, 1984

O. W. DIXON, JR.
VICE PRESIDENT
NUCLEAR OPERATIONS

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Virgil C. Summer Nuclear Station
Docket No. 50/395
Operating License No. NPF-12
Spent Fuel Pool Modification
Accident Evaluation

Dear Mr. Denton:

The NRC Staff, while reviewing South Carolina Electric and Gas Company's (SCE&G) January 23, 1984 submittal on proposed spent fuel pool rerack modifications, raised questions concerning the effect of increased fuel burnup on the fuel handling accident described in Chapter 15 of the Virgil C. Summer Nuclear Station Final Safety Analysis Report (FSAR). A letter from O. W. Dixon, Jr. to H. R. Denton, dated July 31, 1984, responded to those concerns. Subsequently, Staff reviewers requested additional numerical analysis be provided to support responses contained in the July 31, 1984 letter. This submittal is provided in response to that request.

FSAR Chapter 15, Section 15A lists assumptions used to model the gamma, beta, and thyroid doses due to inhalation of radioactivity produced as a result of the fuel handling accident described in Section 15.4.5.4. In conjunction with the assumptions and results found in Westinghouse topical report, "Extended Burnup Evaluation of Westinghouse Fuel," July 1982, WCAP 10125, and the information provided in the FSAR, additional analyses were performed to estimate the activities which could be released to the environment as a result of the postulated fuel handling accident utilizing more highly enriched fuels and higher fuel burnups. While the WCAP assumes an initial enrichment of 4.1% U-235, the effect on the analysis results of increasing the enrichment to 4.3% U-235 (as stated in the January 23, 1984 submittal) would be negligible. Attachment 1 lists the estimated activity increase as a result of increased burnup in the highest rated fuel assembly at the time of reactor shutdown. Attachment 2 lists the amount, in curies, of isotopic activities postulated to be released to the environment. Attachment 3 lists the doses which could be received by an adult at the site boundary after the postulated accident. Collectively, these tables indicate increasing the fuel burnup and enrichment has an insignificant effect on the overall activity released to the

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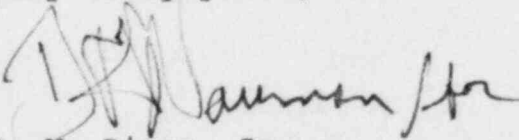
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environment as a result of the Chapter 15 postulated fuel handling accident, and that offsite doses are still well within the limits prescribed in Title 10 of the Code of Federal Regulations.

The Virgil C. Summer Nuclear Station is scheduled to begin its first refueling outage in September 1984. To meet this schedule, an expeditious resolution by the Staff on the reracking modification is necessary. Your cooperation in this matter is appreciated.

Very truly yours,



O. W. Dixon, Jr.

OWD/gj

| | |
|-------------------------------------|--------------------|
| cc: V. C. Summer | C. A. Price |
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ATTACHMENT 1

ESTIMATED ACTIVITY AS A RESULT OF INCREASED BURNUP
(48,000 MWD/MTU)

| <u>Isotope</u> | <u>Curies in Assembly</u> <u>(x 10⁵)</u> |
|----------------|--|
| I-131 | 7.04 |
| I-133 | 14.9 |
| I-135 | 13.5 |
| Xe-131m | .0588 |
| Xe-133m | .396 |
| Xe-133 | 15.6 |
| Xe-135m | 4.13 |
| Xe-135 | 4.26 |
| Kr-85 | .133 |

ATTACHMENT 2

FUEL HANDLING ACCIDENT

| <u>ISOTOPE</u> | <u>ACTIVITY RELEASED TO ENVIRONMENT (Ci)*</u> | <u>INCREASE DUE TO HIGHER BURNUP (%)**</u> | <u>ACTIVITY RELEASED TO ENVIRONMENT (Ci)***</u> |
|----------------|---|--|---|
| I-131 | 7.56×10^1 | +4.2 | 7.88×10^1 |
| I-133 | 7.98 | -1.3 | 7.9 |
| I-135 | 6.6×10^{-3} | -2 | 6.5×10^{-3} |
| Xe-131m | 5.02×10^2 | +15 | 5.77×10^2 |
| Xe-133m | 1.74×10^2 | no change | 1.74×10^2 |
| Xe-133 | 1.14×10^5 | no change | 1.14×10^5 |
| Xe-135m | 1.39 | -1.3 | 1.37 |
| Xe-135 | 2.26×10^2 | no change | 2.26×10^2 |
| Kr-85 | 3.24×10^3 | +32 | 4.28×10^3 |

* From Virgil C. Summer FSAR Table 15.4-38

** Derived from WCAP 10125, Table 2.4

*** As a result of increased burnup (48,000 MWD/MTU)

ATTACHMENT 3

DOSES (Rem)
(exclusion area boundary)

| | <u>Reg. Guide 1.25 case*</u> | <u>% Increase Due to Extended Burnup</u> | <u>48,000 MWD/MTU **</u> |
|---------|------------------------------|--|--------------------------|
| Thyroid | 1.63×10^1 | +4 | 16.96 |
| Gamma | 9.47×10^{-1} | +.2 | .95 |
| Beta | 1.3 | +2 | 1.33 |

- * From Virgil C. Summer FSAR Table 15.4-41
** Calculated using information from FSAR Chapter 15A