EXXON NUCLEAR COMPANY, Inc.

2101 Horn Rapids Road
P. O. Box 130, Richland, Washington 99352
Phone: (509) 943-8100 Telex: 32-6353

November 16, 1979

Mr. Darrell G. Eisenhut, Acting Director
Division of Operating Reactors
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Reference (1): ENC letter from G. F. Owsley to D. G. Eisenhut dated November 4, 1979.

Dear Mr. Eisenhut:

As requested by your staff on November 13, 1979, ENC has completed an additional review of the licensing impact of the proposed NRC rupture/blockage model with particular emphasis on the impact of the NRC temperature-ramp-dependent rupture temperature curves. This review supports the conclusion of ENC's earlier analyses (Reference 1) that there is no adverse impact on licensing limits for plants analyzed by ENC models from use of the NRC rupture/blockage model.

The DC Cook analyses reported in Reference (1) used the complete proposed NRC rupture/blockage model including the temperature-ramp-dependent rupture temperature, rupture strain and flow blockage correlations. Thus, the temperature ramp rate effects had been included. The temperature ramp rate dependence in the NRC model is such that the difference between the predicted rupture temperature of the NRC and ENC models is greatest for the slowest ramp rate. Results of this additional review are summarized below:

- All PWR plants licensed with ENC models have temperature ramp rates in the slow range (<10°C/sec for a period of more than 10 seconds prior to rupture.)

- For the category of plants where the PCT occurs downstream of the ruptured node (in steam cooling) the DC Cook plant is the most sensitive to the NRC rupture/blockage model because it has the slowest temperature ramp rate prior to rupture.

Application of the NRC rupture/blockage model to the plant with the slowest ramp rate (DC Cook) shows that the current ENC ECCS model is conservative as discussed in Reference (1). Thus, it is concluded that the current ENC ECCS analyses for plants which fall in this category are conservative. These plants are Palisades, Kewaunee and Prairie Island 1 and 2.

1406 337

XO501,10

- For one ENC analyzed plant (RE Ginna) the PCT occurs at the ruptured node and early in the reflood period. The impact of the NRC rupture/blockage model to RE Ginna has been calculated; the corresponding PCT change was found to be less than a 20°F increase with the resulting PCT still more than 200°F below the 2200°F limit.

- The remaining ENC analyzed PWR plant (HB Robinson) does not have a steam cooling period nor does the PCT occur at the ruptured node. For this plant the rupture strain calculated by the NRC rupture strain model (considering the ramp rate effect on rupture temperature) is greater than the rupture strain calculated by the ENC model. Thus, the NRC rupture/blockage model would yield a lower PCT since the resulting higher clad strain on the non-ruptured PCT node would improve clad cooling.

In summary, it is concluded that application of the NRC rupture/blockage model in the ENC ECCS model would not affect licensing limits on ENC plants because:

- PCT's would be reduced by using the NRC rupture/blockage model in all plants in which PCT does not occur on the ruptured node.

- In the one plant where PCT does occur on the ruptured node (RE Ginna) the impact of the NRC rupture/blockage model on PCT is less than 20°F with more than a 200°F margin to the 2200°F limit remaining.

Sincerely,

G. F. Owsley, Manager
Reload Fuel Licensing
Exxon Nuclear Company

GFO/mar