SAFETY EVALUATION REPORT

EDWIN I. HATCH NUCLEAR POWER PLANT UNITS 1 AND 2

EFFECT OF A DC POWER SUPPLY FAILURE ON ECCS PERFORMANCE

INTRODUCTION

In 1978 General Electric (GE) performed a study of the effects of a loss of various Direct Current (DC) power supplies upon Emergency Core Cooling Systems (ECCS) ability to mitigate the effects of large and small break Loss of Coolant Accident (LOCA). An analysis of reduced Automatic Depressurization System (ADS) capability was also considered.

This generic BWR 3/4 analysis was submitted to the NRC by letter dated November 1, 1978. The conclusion was that, for small break LOCA peak cladding temperature (PCT) would increase, but not result in a PCT in excess of 2200°F for large break LOCA, and the MAPLHGR values were not affected by a DC power failure. For a reduced ADS capability, an increase of 155°F in PCT to 1924°F was calculated when 20% of the ADS valves were assumed to be inoperable (1 of 5 valves).

In a letter dated April 25, 1980 the NRC requested that Georgia Power Company (GPC) confirm the conclusion of the GE generic analysis as applicable to Hatch Units 1 and 2. Also to be included with the response was a list of ECCS equipment available for large and small break LOCA on recirculation loop suction and discharge piping breaks. This listing was to take into account the DC power supply failures and, in addition, to consider the loss of ECCS equipment function due to water spillage out the postulated break.

By letter dated June 3, 1980, GPC responded to the request for plant specific confirmation of the effects of loss of a DC power source on ECCS performance described in the GE generic analysis.

EVALUATION

A detailed review of the GPC response shows that, in all cases of DC power loss, the Hatch Units 1 and 2 ECCS system equipment availability is equal to or greater than the availability of ECCS equipment as described in the GE generic analysis. For small break LOCA, the Hatch units ECCS limiting configurations with loss of Station Battery B and Diesel Battery A or C are respectively 2CS + ADS and 1CS + 1LPCI + HPCI + ADS. These ECCS configurations provide more ECCS equipment than the GE basis of 1CS + 1LPCI + ADS. For large break LOCA, the limiting configuration with loss of Station Battery A or B and a break in the recirculation loop discharge would result in a 2CS + ADS combination, which is also the GE basis. Other large break LOCA combinations for the break location and for the DC Power Source loss provide more ECCS equipment than the GE design basis.

CONCLUSIONS

As discussed above, we find that the 1978 GE generic analysis assumptions concerning the availability of ECCS equipment following loss of a single DC power source are equal to or conservative with respect to the availability of ECCS equipment expected for Hatch Units 1 and 2 under these loss of DC power conditions. On this basis, we conclude that the GE generic analysis bounds the effects of loss of a DC power source on LOCA PCTs for Hatch Units 1 and 2.

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The following personnel have contributed to this Safety Evaluation: Peter Holmes-Ray and George Rivenbark.