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TOPICAL REPORT

TO:	FROM:	DATE OF DOCUMENT
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DESCRIPTION

Ref. Amendment 3 to NEDO-20566, Effect of Steam Environment on Core Spray Distribution... Furnishing information regarding NRC's proposal to perform some additional test in a core spray facility owned by Consumers Power Corp...

3p

ENCLOSURE

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BWR PROJECTS DEPARTMENT

MFN-403-77

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October 24, 1977

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U.S. NUCLEAR REGULATORY COMMISSION
Mail Section

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Victor Stello, Jr., Director
Division of Operating Reactors

Gentlemen:

SUBJECT: AMENDMENT 3 TO NEDO-20566, EFFECT OF STEAM ENVIRONMENT ON CORE SPRAY DISTRIBUTION

Reference: 1) Letter, V. Stello (NRC) to G. G. Sherwood (GE) dated August 5, 1977, same subject
2) Letter, O. D. Parr (NRC) to G. G. Sherwood (GE) dated September 6, 1977, same subject

Reference 1 states that the NRC staff is reviewing the subject Amendment and notes a concern with regards to an apparent lack of experimental spray distribution data in a steam environment for multi-nozzle, sparger spray systems. The letter also notes the testing performed by GE with single nozzles in a steam environment and the full scale multiple nozzle tests performed in air, and proposes that it would be useful for GE to perform some additional tests in a core spray facility owned by Consumers Power Corporation (CPC). GE has reviewed this request and offers the following:

1. The CPC test facility was designed and built to provide data on a core spray configuration of the Big Rock Point station. This configuration is not representative of the later, larger BWR plants. Although Reference 1 indicated that it may be feasible to design a more representative sparger, our review indicates that there would be a significant technical effort required and based on the present test schedule it would not be possible to accomplish such a change in the time frame requested in Reference 1. Such an effort would significantly dilute our efforts to complete the new larger test facility described in the next paragraph in an appropriate time frame.

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2. Since the submittal of the subject Amendment, GE has put in place a program to build a full scale test facility which is representative of the design of larger BWR plants. This facility will consist of a 30° sector of the reactor with core spray spargers and non-heated bundles. The facility will have the capability to provide a steam environment and will be constructed at a GE site in Lynn, Massachusetts where a sufficient steam source is available. This facility will provide the information to resolve item 3 of Table 1-2 of the NRC Staff Safety Evaluation Report (SER) for the 251 and 238 NSSS GESSAR, and item VII of Table 1-2 of the 238 NI GESSAR SER. The results of the tests from this facility will be much more applicable to the core spray configuration of the larger, later design BWR.

Therefore, it would be more efficient and productive to direct the resources of GE and the staff toward the completion of testing in the new full scale facility. Toward this end, GE has been discussing the test facility and test programs with the Division of Reactor Safety Research (RSR) of the Office of Nuclear Regulatory Research (NRR) and the Electrical Power Research Institute (EPRI) to determine the extent of their participation in this program. As presently foreseen, the facility will be started up in late 1978 with significant results expected by the middle of 1979. This effort is also supported by other programs presently underway and planned on single and multiple nozzle tests in smaller scale facilities. Single full scale heated bundle tests will also be performed which will provide supportive information for the full scale test program.

GE agrees that it is appropriate to acquire additional experimental information about this phenomenon. However, there should be no urgency associated with any such effort. It is important to note that the presently approved Loss Of Coolant Accident (LOCA) Evaluation Model requires that the Counter Current Flow Limiting (CCFL) phenomenon be accounted for. Our current approved model shows that subsequent to actuation of the Emergency Core Cooling Systems (ECCS) the flow to the top of the fuel bundles is limited by CCFL resulting in a buildup of water inventory above the top of the core and any concerns about the effects of core spray distribution become moot. If in consideration of this concern, one were to assume that CCFL does not occur, or breaks down shortly after the ECCS are actuated, the spray water then rapidly passes through the core to the lower plenum. For the case where calculated peak cladding temperature is limited by reflooding, the criteria of 10CFR50.46 are satisfied even without taking credit for any core spray heat transfer during that time. Again, any concerns about the effects of core spray distribution become moot.

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Based on the information presented herein, there should be no immediate safety concern with regard to core spray distribution. It would also appear that as a result of the test programs described herein, that more directly applicable data can be expected in the near future. To keep the staff continually apprised on this subject, it is proposed that a series of meetings be scheduled with GE personnel on an appropriate schedule. Formal reports to the staff would be provided as soon as the data from the new facility are available. Progress reports would be made in routine fashion as a result of RSR and EPRI participation in the operation of the new facility. Therefore, it is more appropriate and significant to respond to Reference 2 at a later date when data from the new facility is available. A schedule for response is to be at some mutually agreeable time.

If you require any further information, please contact A. J. Levine, (408) 925-3217 of my staff.

Sincerely,

Glenn Sherwood

Glenn G. Sherwood, Manager
Safety and Licensing Operation

GGS:csc/1C

cc: L. S. Gifford (GE-Bethesda)
O. D. Parr (NRC)
R. Woods (NRC)