UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 30, 1981

Docket No. 50-245
LS05-81-09-079

Mr. W. G. Counsil, Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
Post Office Box 270
Hartford, Connecticut 06101

Dear Mr. Counsil:

SUBJECT: SEP TOPIC VIII-2, ONSITE EMERGENCY POWER SYSTEMS - DIESEL GENERATOR, SAFETY EVALUATION FOR MILLSTONE UNIT 1

The enclosed staff safety evaluation is based on contractor's documents that have been made available to you previously. This document supports the findings of the staff safety evaluation of Topic VIII-2 and recommends modifications to the gas turbine generator protective interlocks. We also propose modifications to the turbine annunciator system.

The need to actually implement these changes will be determined during the integrated safety assessment. This topic assessment may be revised in the future if your facility design is changed or if NRC criteria relating to this topic are modified before the integrated assessment is completed.

Sincerely,

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

Enclosure:
As stated

cc w/enclosure:
See next page

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TOPIC: VIII-2, ONSITE EMERGENCY POWER SYSTEMS - DIESEL GENERATOR

I. Introduction

Diesel generators, which provide emergency standby power for safe reactor shutdown in the event of total loss of offsite power, have experienced a significant number of failures. The failures to date have been attributed to a variety of causes, including failure of the air startup, fuel oil, and combustion air systems. In some instances, the malfunctions were due to lockout. The information available to the control room operator to indicate the operational status of the diesel generator was imprecise and could lead to misinterpretation. This was caused by the sharing of a single annunciator station by alarms that indicate conditions that render a diesel generator unable to respond to an automatic emergency start signal and alarms that only indicate a warning of abnormal, but no disabling, conditions. Another cause was the wording on an annunciator window which did not specifically say that the diesel generator was inoperable (i.e., unable at the time to respond to an automatic emergency start signal) when in fact it was inoperable for that purpose. The review included the reliability, protective interlocks, fuel oil quality, and testing of diesel generators to assure that the diesel generator meets the availability requirements for providing emergency standby power to the engineered safety features.

II. Review Criteria

The review criteria are presented for Section 8.3.1 in Table 8-1 of the Standard Review Plan.

III. Related Safety Topics and Interfaces

The scope of review for this topic was limited to avoid duplication of effort since some aspects of the review were performed under related topics. Related topics and the subject matter are identified below. Each of the related topic reports contain the acceptance criteria and review guidance for its subject matter.

III-12	Environmental Qualification
VI-7.C.1	Independence of Onsite Power
VIII-1.A	Degraded Grid
XVII	Fuel Oil Quality Assurance

There are no safety topics that are dependent in the present topic information for their completion.

IV. Review Guidelines

The review guidelines are presented in Section 8.3.1 of the Standard Review Plan.

V. Evaluation

The concern with regard to annunciators was pursued as a generic issue. The staff safety evaluation for Millstone 1 concluded that in order to provide the operator with accurate, complete and timely information pertinent to the status of the diesel generators, as required by IEEE Std. 279-1971, the following corrective actions are required:

1. Disabling and non-disabling conditions, currently alarmed at a common annunciator station, should be separated and annunciated at separate annunciator points.

2. The wording on the annunciator for disabling conditions should sepcifically state that the diesel generator is unavailable for an automatic emergency start.

by letter dated May 12, 1978, the licensee agreed to make suitable modifications to the annunciator. The gas turbine was not considered in this earlier review.

Also, as a result of the work done by the University of Dayton, a generic program for implementing most of the recommendations for reliability enhancement that are contained in the University of Dayton report is being conducted by NRC. This latter program will also determine the adequacy of the diesel generator testing program on a case-by-case basis and institute any necessary changes.

The question of fuel oil quality was addressed on a generic basis in January 1980, by letters to all licensees. The letters required that licensees include fuel oil in their Quality Assurance program. The Quality Assurance program is addressed in Topic XVII. Until completion of Topic XVII, the periodic testing of the diesels is considered to be an adequate interim method for assuring acceptable quality in the fuel oil stored on site.

Beyond these efforts, EG&G Report 0111J, "Emergency Generators" presents a technical evaluation of the diesel generator protective interlocks and load capability at Millstone 1 against present licensing criteria. The report notes that the diesel-generator protective trips are in agreement with current NRC guidelines. The report also points out that the gas generator protective trips do not appear to comply with the intent of current licensing criteria.

In discussions with the staff and our contractor, the licensee has stated that the turbine and its controls are aircraft equipment of proven reliability and, therefore, it was not wise to change the interlock systems. The staff, noting that failure to start incidents in aircraft that are sitting on the ground are seldom of any consequence, is not satisfied by the degree to which such quality may reduce the likelihood of a failure to re-start in flight (and the widely different compressor conditions present in flight) nor the consequences of a failure to provide emergency power when required.

VI. Conclusion

The staff concludes that the diesel generator protective interlocks are in conformance with the Branch Technical Position ICSB-17 (PSB).

The staff proposes that the gas turbine generator protective interlocks be brought into conformance with the Branch Technical Position ICSB-17 and that the turbine annunciator be modified to satisfy the requirements of Paragraph 4.20 of IEEE-Std. 279-1971.