ENCLOSURE 1

SAFETY EVALUATION
MAINE YANKEE ATOMIC POWER STATION
DOCKET NO. 50-309
ADEQUACY OF STATION ELECTRIC DISTRIBUTION
SYSTEM VOLTAGES

INTRODUCTION AND SUMMARY

Maine Yankee Atomic Power Company (MYAPCo) was requested by NRC letter dated August 8, 1979 to review the electric power system at Maine Yankee Atomic Power Station. The review was to consist of:

(a) Determining analytically the capacity and capability of the offsite power system and the onsite distribution system to automatically start as well as operate all required loads within their required voltage ratings in the event of (1) an anticipated transient, or (2) an accident (such as LOCA) without manual shedding of any electric loads.

(b) Determining if there are any events or conditions which could result in the simultaneous or consequential loss of both required circuits from the offsite network to the onsite electric distribution system and thus violating the requirements of GDC 17.

The August 8, 1979 letter included staff guidelines for performing the required voltage analysis and the licensee was further required to perform a test in order to verify the validity of the analytical results. MYAPCo responded by letters dated February 29, 1980 and June 30, 1980. The Final Safety Analysis Report (FSAR) and a telephone call on October 1, 1980 were used to clarify provided information. A detailed review and technical evaluation of the submittal was performed by EG&G under contract to NRC, with general

supervision by NRC staff. This work was reported in EG&G's Technical Evaluation Report (TER), "Adequacy of Station Electric Distribution System Voltages, Maine Yankee Atomic Power Station" dated January 1981. We have reviewed this report and concur in the conclusions that the offsite power system and onsite distribution system are capable of providing acceptable voltages at the terminals of the Class 1E equipment for worst case station electric load and grid voltages.

EVALUATION CRITERIA

The criteria used by EG&G in this technical evaluation of the analysis includes GDC 5 ("Sharing of Structures, Systems and Components"), GDC 13 ("Instrumentation and Control"), and GDC 17 ("Electric Power Systems") of Appendix A to 10 CFR 50; IEEE Standard 308-1974 ("Class 1E Power Systems for Nuclear Power Generating Stations"); ANSI C84.1-1977 ("Voltage Ratings for Electric Power Systems and Equipment - 60 Hz"); and the staff positions and guidelines in NRC letter to MYAPCo dated August 8, 1979.

ANALYSIS AND TEST FEATURES

The analyses were performed using the reserve station service transformer and unit station service transformer with maximum and minimum switchyard (grid) voltages (120 kv and 116.5 kv for reserve station service transformer and 362 kv and 345 kv for unit station service transformer). MAYPCo did not analyze bus 5 receiving power from the tertiary windings of transformer X16. Use of this power source requires manual operator action and is controlled by Plant Procedure No. 1-22-3. This is a third source of offsite power that is not required by GDC-17 and the FSAR takes no credit for this as a source of offsite power. It has been establisned that the emergency 4 kv loads would

operate within allowable limits for the worst cases noted above. Given the minimum voltage case, a brief condition exists while starting a large non- Class 1E motor with the unit buses fully loaded that would momentarily prevent contactor pickup for 480 volt MCC loads until the voltage recovers. No contactor drop out or spurious shedding of load will occur. This momentary inability to start 480 volt loads is not significant due to the very short time of concern and the fact that it only becomes a concern if concurrently the grid is at its lowest allowable level and there becomes a need to automatically start an emergency load during the initial phase of the starting transient of a large non-Class 1E load.

The voltage analysis was verified by measuring the grid, generator and selected bus voltages with the transformers loaded at greater than 58% load. The comparison showed that calculated voltages for the Class 1E buses are within +1.30 and -2.42% of the measured voltages. This close correlation verifies the accuracy of the analysis submitted.

CONCLUSIONS

We have reviewed the EG&G Technical Evaluation Report and concur in the findings that:

(1) MYAPCo has provided verified voltage analyses to demonstrate that the Class 1E equipment voltages remain within acceptable operating limits for the postulated worst case conditions.

(2) The tests used to verify the analysis were valid and showed the analysis to be accurate.

(3) MYAPCos reaffirmation of compliance with GDC 17 requirements is acceptable.

(4) Upon the review and approval of the degraded grid voltage protection modifications proposed by MYAPCo and currently being reviewed by EG&G, there will be acceptable assurance that spurious tripping of offsite power to Class 1E equipment will not take place upon starting a large non-Class 1E load.

ENCLOSURE 2

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ADEQUACY OF STATION ELECTRIC DISTRIBUTION SYSTEM VOLTAGES, MAINE YANKEE ATOMIC POWER STATION, DOCKET NO. 50-309, TAC No. 12774

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U.S. Department of Energy
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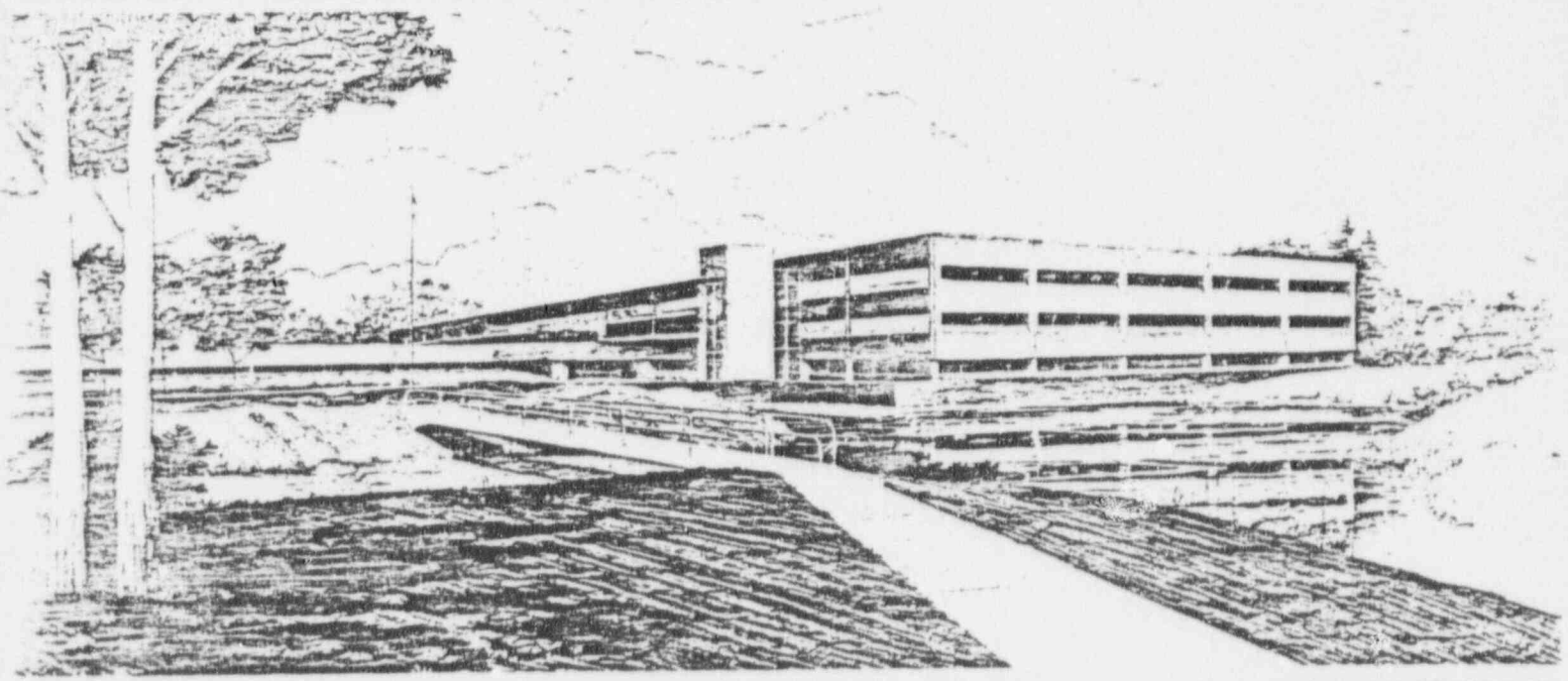

This is an informal report intended for use as a preliminary or working document

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EG&G Idaho