



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO THE APPLICATION OF STABILITY LONG TERM SOLUTION OPTION II

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-220

1.0 INTRODUCTION

By letter dated October 2, 1995, Niagara Mohawk Power Corporation (NMPC or licensee) submitted a topical report by the General Electric Company, GENE-A13-00360-02, "Application of Stability Long Term Solution Option II to Nine Mile Point Nuclear Station Unit 1," dated August 1995, for NRC review and acceptance. For qualifying nuclear facilities (i.e. nuclear power plants with boiling water reactors (BWRs) of type BWR/2), this topical report is intended to serve as a reference for present and future licensing actions associated with NRC Generic Letter 94-02, "Long-Term Solutions and Upgrade of Interim Operating Recommendations for Thermal-Hydraulic Instabilities in Boiling Water Reactors."¹ This licensing topical report presents plant-specific analyses documenting the applicability of Long Term Solution Option II to Nine Mile Point Nuclear Station, Unit 1 (NMP1), a BWR/2.

This safety evaluation represents the NRC staff's evaluation of GENE-A13-00360-02. The NRC staff was assisted in its review by a consultant, Oak Ridge National Laboratory (ORNL), who has produced a technical evaluation report, ORNL/NRC/LTR-96/16, dated May 1996 (Enclosure 2). The NRC staff's review adopts the findings recommended in ORNL's technical evaluation report, and recognizes a subsequent NMPC submittal dated July 31, 1998, addressing the ORNL technical recommendations.

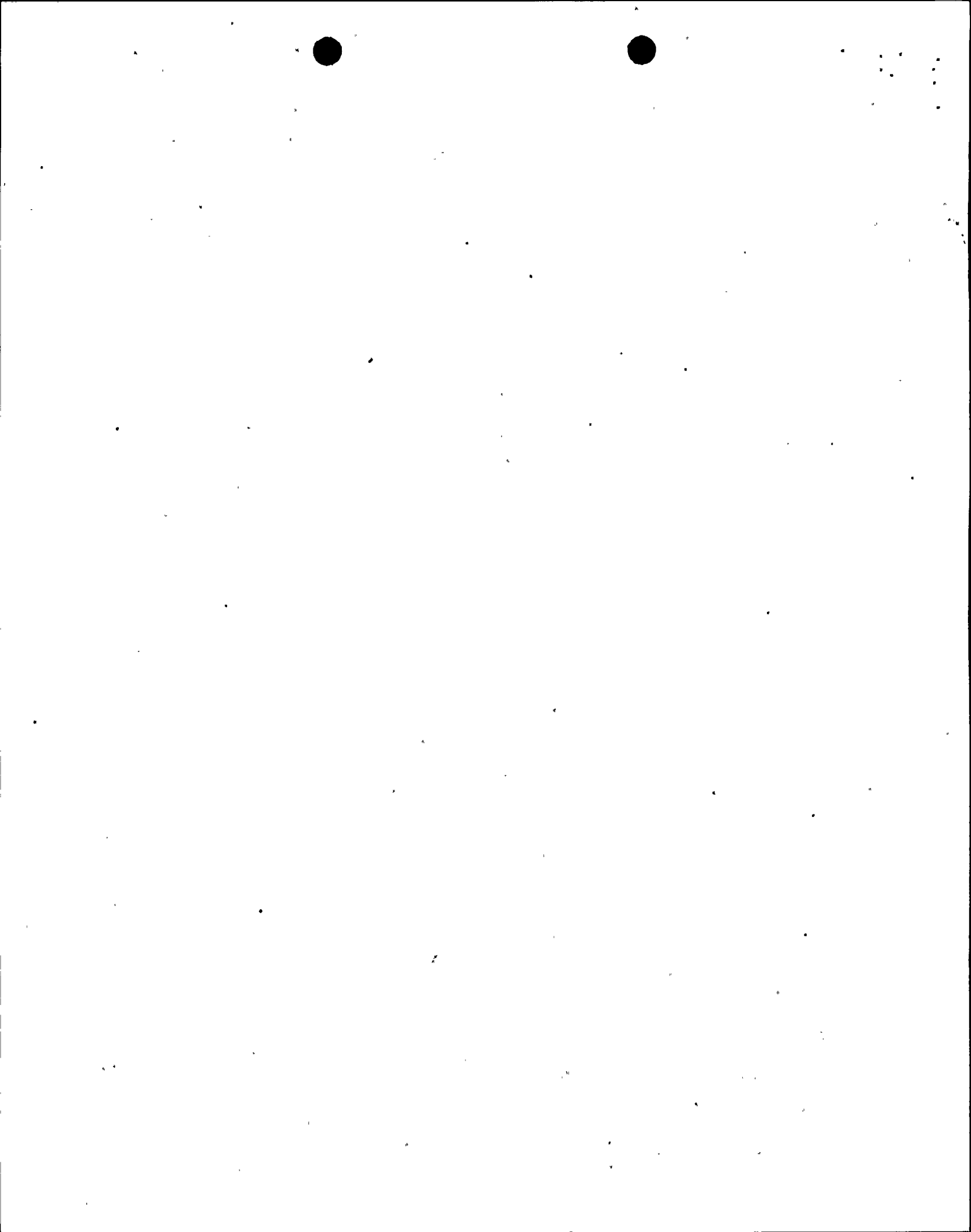
2.0 BACKGROUND

The reactor protection system in BWR/2s is based upon an Average Power Range Monitor (APRM) system with quadrant symmetry. All other BWRs have an APRM system that averages neutron flux measurements throughout the core. Because of quadrant symmetry, the APRM signal in BWR/2s does not "average out" the oscillations in out-of-phase instabilities, and automatic protection for this type of instability is possible. Long Term Solution Option II takes advantage of this special configuration as analysis shows that the existing reactor protection system in BWR/2s provides protection against all expected instability modes.

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¹ Only two BWR/2s are in operation in the U. S.: Oyster Creek Nuclear Generating Station and NMP1. Oyster Creek implemented Solution II in late 1994. As such, GENE-A13-00360-02 is considered to be a "sole-user" (namely, NMP1) topical report.

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NMP1 has been operating under the BWR Owners Group (BWROG) Interim Stability Corrective Actions (see Attachment 1 to NRC Bulletin No. 88-07, Supplement 1, "Power Oscillations in Boiling Water Reactors (BWRs)," dated December 30, 1988). NMPC plans to implement Option II at NMP1 based upon the calculations presented in GENE-A13-00360-02 and a pending license amendment request to revise the NMP1 Technical Specifications (TSs).

3.0 EVALUATION

Topical Report GENE-A13-00360-02 documents a detailed evaluation of the applicability of Solution II to NMP1. Section 7 of GENE-A13-00360-02 documents the reload confirmation evaluations that the licensee is to perform for each cycle to confirm that the generic results in the topical report remain applicable. Because Solution II is, in essence, a "Detect and Suppress" option, the evaluation in GENE-A13-00360-02 follows a procedure similar to that of other Detect and Suppress options (e.g., Solution III and I-D).

In Enclosure 2, ORNL identifies three steps required for implementation of Detect and Suppress options and concludes that these three steps are adequately applied in the NMP1 application. The NRC staff agrees with, and adopts, ORNL's evaluation. The NRC staff also recognizes a subsequent response by NMPC, dated July 31, 1998, addressing ORNL's technical recommendations. In this submittal, NMPC states that (1) a license amendment, needed to implement Option II by revising the NMP1 TSs to reflect the flow-biased APRM flux trip, will be requested in the near future; (2) the "Restricted Region" (defined in GENE-A13-00360-02 based upon NMP1 Operating Cycle 12 inputs) will be maintained once the amendment becomes effective; and (3) the validity of the Restricted Region will be either confirmed each subsequent reload or a new region calculated.

On the basis of its own review, in conjunction with ORNL's technical evaluation, and subject to the conditions to which NMPC has agreed in its letter dated July 31, 1998, the NRC staff concludes that:

1. Long-Term Solution Option II is applicable to NMP1 because of its flow biased, unfiltered scram system, and the quadrant symmetry of its APRM system;
2. The proposed NMP1 Option II implementation satisfies the main criteria of a Long-Term Solution by providing a viable "Detect and Suppress" function that will ensure, in the case of an instability, a very small likelihood of core damage without the need of operator intervention. Full implementation, defined in NMPC's letters of October 2, 1995, July 31, 1998, and GENE-A13-00360-02, will also include a modification of the flow-biased scram hardware and a TS change to revise the setpoint in a manner consistent with the calculation assumptions;
3. A Restricted Region will be administratively-controlled by the licensee as required to minimize the probability of startup instability and to satisfy the 100%-rod-line initial-condition assumption in the analysis; and
4. The reload confirmation procedures defined in Section 7 of GENE-A13-00360-02 are consistent with other reviewed and approved long-term solutions, and are technically acceptable for NMP1 implementation.



Accordingly, the NRC staff concludes that NMPC's letter dated October 2, 1995, with accompanying GENE-A13-00360-02, as supplemented July 31, 1998, constitute an acceptable reference source for NMP1, for the purpose of requesting a TS change to implement Option II and implementing associated hardware changes after NRC staff approval of related TS changes.

Principal Contributors: T. Huang
D. Hood

Date: August 19, 1998

