



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO REFERENCE OF RETRAN
FOR PERFORMING TRANSIENT ANALYSIS IN LICENSING APPLICATIONS
FOR THREE MILE ISLAND UNIT NO. 1
DOCKET NO. 50-289
OPERATING LICENSE DPR-50
GPU NUCLEAR, INC.
(TAC NO. M92167)

1.0 INTRODUCTION

On March 17, 1995, the GPU Nuclear Corporation (GPUN) submitted for NRC review and approval the GPUN topical report TR-078, Revision 0, "TMI-1 Transient Analyses Using the Retran Computer Code," which describes the transient analysis methodology it intends to use to perform licensing basis non-loss-of-coolant-accident (non-LOCA) transient and accident analyses for the Three Mile Island Unit No. 1 (TMI-1) plant. The information in TR-078 was supplemented in submittals of August 22 and November 6, 1996, and at a meeting/audit on September 24 and 25, 1996 (meeting summary dated October 21, 1996) at GPUN headquarters. GPUN plans to use RETRAN in conjunction with VIPRE and the GPUN reactor physics methodology which were separately evaluated and approved by the NRC.

2.0 STAFF EVALUATION

In its review, the staff considered the technical adequacy of the RETRAN code, the technical adequacy of the adaptation of RETRAN in the transient analysis methodology proposed in TR-078 as demonstrated in comparisons with empirical and analytical data, the consistency of input assumptions and options in applying the methodology with the TMI-1 current licensing basis, and GPUN programmatic support to assure continued quality of analyses using the methodology.

2.1 RETRAN ADEQUACY

RETRAN is a computer code developed by the Electric Power Research Institute to perform analyses of non-LOCA analyses. This code has been approved generically, subject to the requirement that its application be justified on a plant-specific basis. We conclude that, with justification of the code

options used, the RETRAN code is technically adequate for non-LOCA licensing applications to TMI-1, and therefore acceptable for reference in TMI licensing documentation.

2.2 ADAPTATION OF RETRAN FOR TMI-1 APPLICATION AND CONSISTENCY WITH TMI-1 LICENSING BASIS

GPUN already is approved to use RETRAN in licensing applications for its Oyster Creek plant and proposes to use RETRAN to perform licensing analyses of non-LOCA transients and accidents for TMI-1. In the documentation cited above and at the meeting on September 24 and 25, 1996, GPUN presented a list of events it intends to analyze using RETRAN, and its plan for using RETRAN in future power upgrades.

GPUN presented nodding diagrams, in which the steam generator and core nodding are judged to be adequate for the events.

To demonstrate its capability to perform analyses for TMI-1 with RETRAN, GPUN presented comparisons of its RETRAN analyses of a variety of accidents and transients representative of the intended use of the code with plant data, and comparisons with Updated Final Safety Analysis Report (UFSAR) analyses. The comparisons showed good agreement between the RETRAN results and the reference results. GPUN explained discrepancies, which were generally small.

In discussing code inputs and assumptions, GPUN clarified that the current qualification analyses and intended licensing analyses apply current licensing basis assumptions, which limit the scope of the current review. The current TMI-1 analytical licensing basis does not include loss of offsite power in the scenarios for several transients and accidents, including such significant events as steamline break, steam generator tube rupture (SGTR), and locked rotor. For steamline break analyses, GPUN provided additional information in the November 6, 1996, submittal to clarify and justify assumptions and techniques to be used. Feedwater line break analyses are not included in the present licensing basis, though GPUN does use RETRAN to perform non-licensing analyses of this event. The entire scenario selection and analysis methods for boron dilution and SGTR events may differ from what would be included in the design basis for a newly licensed plant. GPUN does not expect to perform primary system safety valve sizing/overpressure protection analyses, per Standard Review Plan 5.2.2, using RETRAN at this time, because the existing design bases continue to apply under present operation. GPUN does intend to use RETRAN to address secondary side safety valve setpoint tolerance considerations.

Based on our review and its considerations as discussed in this section, we conclude that GPUN has demonstrated acceptable adaptation of RETRAN for TMI-1 application and consistency with the present TMI-1 licensing basis.

Because the scope of this review is limited to the present TMI-1 licensing basis, the review would have to be updated if and when the TMI-1 licensing basis changes, which could possibly be the case with a power uprate.

2.3 PROGRAMMATIC CONSIDERATIONS

GPUN presented information describing that quality assurance, code maintenance, configuration control, design verification, reload activities, and associated reports and documentation are covered by provisions of the approved GPUN quality assurance program. GPUN indicated that it cross-checks analyses performed with RETRAN versus calculations it performs using a variety of other recognized thermal/hydraulic systems codes, including TRAC and RELAP. Reload procedures address interfaces between the methodologies and calculations with plant operational controls.

The GPUN engineer qualification and training program, covering current and newly acquired staff and technology, assures that the qualification of the GPUN engineering staff is maintained at a high level. These programmatic provisions which support the licensing methodologies are essentially the same as those implemented by GPUN for its approved Oyster Creek plant licensing methodologies.

The staff has reviewed the programmatic provisions supporting the GPUN use of RETRAN in TMI-1 licensing applications and finds these provisions acceptable.

3.0 CONCLUSIONS

From its review, as discussed in Section 2, the staff concludes that GPUN use of its RETRAN transient analysis methodology, interfaced with VIPRE and the GPUN reactor physics methodology, in TMI-1 licensing applications is acceptable under the present licensing basis for events covered in this review, and is suitable for reference in TMI-1 licensing documentation, including technical specifications and the TMI-1 Core Operating Limits Report. If there is a change in the TMI-1 licensing basis in the future, the review must be updated.

Dated: February 10, 1997