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

MAY 31 1986

Mr. J. A. Blaisdell, Chairman
UGRA Executive Committee
Northeast Utilities Service Co.
P. O. Box 270
Hartford, CT 06141-0270

Dear Mr. Blaisdell:

SUBJECT: ACCEPTANCE FOR REFERENCING OF LICENSING TOPICAL REPORT, EPRI NP-2511-CCM, "VIPRE-01: A THERMAL-HYDRAULIC ANALYSIS CODE FOR REACTOR CORES", VOLUMES 1, 2, 3 AND 4

We have completed our review of the subject topical report submitted by the Utility Group for Regulatory Applications (UGRA) by letter dated December 1[illegible], 1984. We find the report to be acceptable for referencing in license applications to the extent specified and under the limitations delineated in the report and the associated NRC evaluation, which is enclosed. The evaluation defines the basis for acceptance of the report.

We do not intend to repeat our review of the matters described in the report and found acceptable when the report appears as a reference in license applications, except to assure that the material presented is applicable to the specific plant involved. Our acceptance applies only to the matters described in the report.

In accordance with procedures established in NUREG-0390, it is requested that UGRA publish accepted versions of this report, proprietary and non-proprietary, within three months of receipt of this letter. The accepted versions shall incorporate this letter and the enclosed evaluation between the title page and the abstract. The accepted versions shall include an -A (designating accepted) following the report identification symbol.

Should our criteria or regulations change such that our conclusions as to the acceptability of the report are invalidated, UGRA and/or the applicants referencing the topical report will be expected to revise and resubmit their respective documentation, or submit justification for the continued effective applicability of the topical report without revision of their respective documentation.

Sincerely,

Charles F. Rossi

Charles F. Rossi, Assistant Director
for PWR Licensing-A
Division of PWR Licensing-A

Enclosure:
As stated

Enclosure 1

1985). UCCEL then creates copies of the tapes, and distributes them to licensed users."

We find this quality assurance procedure to be acceptable.

3.0 Summary and Conclusion

The staff has reviewed the VIPRE-01 topical report submitted by UGRA. The review was limited to PWR applications with heat transfer regimes up to critical heat flux. The review consisted primarily of an evaluation of the internal program including the governing conservation equations and constitutive equations, the two-phase flow and heat transfer models, and the numerical solutions techniques. We have also reviewed the VIPRE-01 verification and qualification calculations, sensitivity studies on the user's input options and code defaults. In addition, an audit calculation was performed with a locked rotor transient using COBRA-IV to compare with the VIPRE-01 calculation using the RECIRC solution. Based on this review effort we conclude that the VIPRE-01 computer code is acceptable for PWR licensing calculations subject to the following conditions:

(1) The application of VIPRE-01 is limited to PWR licensing calculations with heat transfer regime up to CHF. Any use of VIPRE-01 in BWR calculations or post CHF calculations will require prior NRC review and approval.

(2) Use of a steady state CHF correlation with VIPRE-01 is acceptable for reactor transient analysis provided that the CHF correlation and its DNBR limit have been reviewed and approved by NRC and that the application is within the range of applicability of the correlation including fuel assembly geometry, spacer grid design, pressure, coolant mass velocity, quality, etc. Use of any CHF correlation which has not been approved will require the submittal of a separate topical report for staff review and approval. The use of a CHF correlation which has been previously approved for application in connection with another thermal hydraulic code other than VIPRE-01 will require an analysis showing that, given the correlation

data base, VIPRE-01 gives the same or a conservative safety limit, or a new higher DNBR limit must be used, based on the analysis results.

(3) Each organization using VIPRE-01 for licensing calculations should submit separate documentation describing how they intend to use VIPRE-01 and providing justification for their specific modeling assumptions, choice of particular two-phase flow models and correlations, heat transfer correlations, CHF correlation and DNBR limit, input values of plant specific data such as turbulent mixing coefficient, slip ratio, grid loss coefficient, etc., including defaults.

(4) If a profile fit subcooled boiling model (such as Levy and EPRI models) which was developed based on steady state data is used in boiling transients, care should be taken in the time step size used for transient analysis to avoid the Courant number less than 1.

(5) The VIPRE-01 user should abide by the quality assurance procedures described in Section 2.6 of this report.