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UTILITY LICENSING OF VENDOR METHODS

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Table of Contents

1.0 Introduction

1.1 Background

This report presents a simplified approach to utility licensing of vendor methods which will reduce time and manpower required for re-review of methods which have been previously reviewed and approved for application by the vendor.

In generic letter 83–11, the NRC staff encouraged utilities to perform their own safety analyses in support of such licensing actions as reload applications and Technical Specification amendments. This same generic letter stated that licensees who intended to use a safety analysis computer code to support licensing actions should demonstrate their proficiency in using the code by submitting to the NRC the code verification performed by the licensee, even if the code and associated methods were previously approved. This qualification process has been time-consuming and expensive for both the NRC and the utility.

At a Fuel Cycle Forum in March of 1993, the NRC indicated that they were examining ways to reduce the time and expenditures required to qualify licensees, including guidelines for licensees on what is needed in order for approval to be obtained as quickly as possible. At this same meeting, it was stated that, "Significantly less information would be needed to qualify a licensee in the use of codes previously approved for use by the fuel vendor, particularly in cases where the vendor has provided training to the licensee." Also, in May of 1993, a Regulatory Review Group Summary and Overview stated that "Licensees ... can also simplify the process by using NRC–approved generic methodologies ... A complete staff review is not performed in these cases. Usually benchmarking or an audit is performed."

1.2 Purpose

Consistent with the NRC initiative above, the following approach to licensing would reduce NRC resources required to review utility requests for licensing of vendor's core nuclear methods. Additionally, it would allow utilities to more easily become "vendor independent" by eliminating the need for submittal of detailed Licensing Topical Reports for NRC review prior to approval of utilities' license to use vendor methodology.

2.0 Licensing Approach

A generic set of vendor methods licensing acceptance criteria have been developed for evaluating a utility's proficiency in utilizing vendor codes and methods for fuel licensing activities. Once approved, the utility will institute a program (training, procedures, etc.) that complies with the criteria and will provide notification to the NRC that it has done so. The NRC could then, at their option, audit the utility's program to ensure compliance.

This approach is very similar to the approach used for licensing of fuel per Amendment 22 to NEDE–24011, GESTAR II. This is, therefore, a proven approach and, once approved, speeds up and simplifies the licensing process for all parties involved.

3.0 Criteria:

As stated in Reference 1, NRC approval is required for a utility to use a vendor's NRC–approved analytical methodology to perform safety–related evaluations in support of actions which require prior approval by the NRC or involve the determination of limits included in the Core Operating Limits Report (COLR). Compliance with the following five criteria demonstrates a utility's qualification to use a vendor's codes and methods and constitutes inherent NRC approval to use them for these applications. To document its qualification, the utility must send the NRC a notification of its compliance with the criteria and the date of its intended first licensing application. Any voluntary limitations or restrictions on the utility's application of the methods must also be addressed in the notification.

3.1 Criterion 1: Eligibility

Only vendor codes and methods which have received prior NRC review and approval are eligible for application of this process.

Discussion:

The NRC has reviewed and approved vendor application of lattice physics, steady–state and reload transient codes and methods for safety–related licensing analyses, such as updating the COLR. NRC reviews ensure that vendor codes were developed under a qualified QA program and were properly benchmarked and verified by the vendor. As documented in NRC safety evaluations, these reviews also considered and approved the applicability of each methodology for specific types of analyses. Therefore, since these codes and methods have already been reviewed and approved by the NRC, it is not necessary for this review to be repeated when a utility proposes to use them for in–house analyses. Rather, the focus of utility qualification is on the ability of the utility personnel to understand the capabilities and limitations of the codes and methods and to demonstrate its technical competence to use them under a qualified QA program. As discussed above, a utility may choose to voluntarily limit its scope of application of the methods.

3.2 Criterion 2: Application Procedures

In a manner consistent with vendor procedures, utility analyses shall be performed in conformance with in–house application procedures which ensure that the use of vendor methods is consistent with the code qualification and approved application of the methodology.

Discussion:

The purpose of utility procedures is to ensure that in–house analyses are in complete compliance with the NRC–approved application of the vendor code. Although vendor codes and methods may be used for other (non–licensing) analyses, their use in licensing evaluations must be consistent with their approved application.

3.3 Criterion 3: Training and Qualification of Utility Personnel

Utilities shall establish and implement a training program to ensure that each qualified user of a vendor methodology has a good working knowledge of the codes and methods, including the ability to set up input decks, understand and interpret output results, understand its applications and limitations, and to perform analyses in compliance with the application procedures.

Discussion:

One of the most important aspects of utility qualification is the utility's program to train personnel to proficiently use vendor methodology to perform safety–related analyses. Training must include on–the–job experience such as performing analyses which are verified and documented in a formal design review. For each NRC approved vendor methodology, documentation of each individual's qualifications must be approved by their immediate supervisor and retained as part of the QA records. Periodically, the utility must provide evidence of continued qualification of the individuals.

Utilities are encouraged to make use of vendor expertise and resources to facilitate personnel training, especially in the early stages of developing the capability to use a new methodology and qualifying to use it for the first licensing application.

3.4 Criterion 4: Comparison Calculations

Prior to the first application requiring NRC approval, the utility will demonstrate its ability to use the vendor methods by comparing its calculated results of its analyses to an appropriate set of benchmark data. These comparisons must be documented in a report which is part of the utility's QA records. Any significant differences between the calculations and the comparison data must be discussed in the report.

Discussion:

It is essential that a utility demonstrate its technical ability to understand and use a vendor methodology by comparing the results of its analyses with an independent set of data. The type of data selected must be appropriate for the intended application; however, it does not have to include data which is unrelated to the application since it is not the purpose of these comparisons to re-qualify the methodology.

The most direct comparison is with vendor results using the same codes, methods, initial conditions, and plant model. Vendor calculations will be performed under vendor procedures, while utility calculations will be conducted in compliance with their own procedures. Since both will use vendor methodology, the results should be similar. Utilities may also choose to compare their calculations to other meaningful sources of data such as measured TIP data during an operating cycle, cold shutdown margin demonstrations, end-of-cycle bundle gamma scans, and startup tests such as an initial cycle turbine trip.

In order to demonstrate the utility's ability to correctly interpret the results and make necessary corrections in the plant model and input deck and to understand the output results, the utility must provide an explanation of the differences between its calculational results and the comparison data. As a minimum, the following parameters should be compared to vendor calculations, and should agree within the given acceptable deviation:

	Parameter	Acceptable Deviation
3D Analysis:	– critical eigenvalue / reactivity margin	$\Delta k = \pm 0.001$
	– thermal margins / power distribution	±2%
Transient analyses	– ΔCPR	±0.01
	– vessel pressure peak	±5 psi
	– power peak	±1% heat flux
		±20% neutron flux

3.5 Criterion 5: Quality Assurance and Change Control

All safety–related licensing calculations performed by a utility using vendor methodology shall be conducted under the control of a quality assurance program which meets the requirements of 10 CFR 50, Appendix B. The utility QA program will also include the following:

A. A provision for implementing changes in vendor codes, methods, and procedures (if applicable).

B. A provision for informing the vendor of any problems or errors discovered while using their codes, methods, or procedures.

C. A criteria for deciding when additional personnel training is required and under what circumstances a utility must apply these five criteria in order to qualify to use a new or revised vendor methodology for licensing applications.

Discussion:

Appendix B requirements are applicable to all safety–related calculations associated with commercial nuclear reactors. Of particular concern to the use of vendor methods is the information transfer, to and from the vendor, of errors or problems, as well as revisions of codes and methods, including application procedures, if applicable. The utility's QA program must define the procedure for receiving notification of changes made by the vendor and a description of its response, such as how soon revisions will be implemented, under what circumstances old versions may be used for licensing analyses, how revisions will be validated and verified, and what documentation is required to delay or decline implementation of a revision. The QA program must also describe the procedure for notifying the vendor of any problems or errors it discovers while using the methodology. For example, this might include a method for categorizing problems and errors and different types of responses for each category. It might also include restrictions on correcting the error or problem prior to official notification by the vendor. The utility QA program must also establish criteria for identifying the need for additional personnel training and under what circumstances they must use this procedure to qualify their use of a new or revised methodology.

Under no circumstances may a utility make a revision to a methodology which has not already been made or is not planned to be made by the vendor.

4.0 References

1. Larry Phillips, NRC, Reactor Systems Branch, Panel Discussion, *Fuel Cycle 1993 — USCEA*, Dallas, Texas, March 21–24, 1993.