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June 3, 1985

G01-85-0127

G03-85-0299

Mr. J. B. Martin
Regional Administrator
U. S. Nuclear Regulatory Commission
1450 Maria Lane, Suite 210
Walnut Creek, California 94596

Dear Mr. Martin:

Subject: READINESS REVIEWS
DESIGN REVIEW PROGRAM (ENGINEERING ASSURANCE)

References: 1) Letter, G01-85-0027/G03-85-0057, dated January 31, 1985,
Readiness Review Program
2) Letter, G01-85-0055/G03-85-0153, dated March 20, 1985,
Readiness Reviews
3) Meeting held in NRC Region V Office on May 22, 1985.

References 1 and 2 both discussed the Supply System's proposed actions with regard to Readiness Reviews at our delayed construction projects. As a result of our meeting at Region V (Reference 3), it was agreed the second module of the Readiness Review Program would be the Design Review Program.

Accordingly, we have attached a copy of our Engineering Assurance Program Plan for your review and approval.

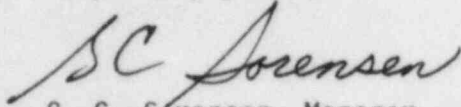
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Mr. J. B. Martin
Regional Administrator
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As also discussed in our May 22, 1985 meeting, we would like to meet with you at the earliest practical time to discuss any comments so that approval can be obtained by approximately July 1, 1985.

Very truly yours,



G. C. Sorensen, Manager
Regulatory Programs

Attachment: Engineering Assurance Program Plan

cc: Mr. J. A. Adams, NESCO
Mr. G. T. Ankrum, Nuclear Regulatory Commission
*Ms. N. Bell, Nuclear Information & Resource Services
Mr. W. L. Bryan, Washington Water Power Company
Mr. H. R. Denton, Nuclear Regulatory Commission
*Mr. R. T. Dodds, Nuclear Regulatory Commission
Mr. C. Eschels, EFSEC Chairman
*Mr. W. M. Hill, Nuclear Regulatory Commission
Mr. G. W. Knighton, Nuclear Regulatory Commission
Mr. J. R. Lewis, Bonneville Power Administration
*Mr. T. S. Michaels, Nuclear Regulatory Commission
Mr. F. J. Miraglia, Nuclear Regulatory Commission
Mr. R. V. Myers, Puget Sound Power & Light Company
Mr. N. S. Reynolds, Bishop, Liberman, Cook, Purcell & Reynolds
*Mr. E. Rosolie, Director of Coalition for Safe Power
Mr. B. K. Singh, Nuclear Regulatory Commission
Mr. J. M. Taylor, Nuclear Regulatory Commission
Mr. L. D. Weislogel, Pacific Power & Light Company
Mr. B. D. Withers, Portland General Electric Company

*With Attachment

ENGINEERING ASSURANCE PROGRAM (EAP)

1.0 PURPOSE

The purpose of the Engineering Assurance Program is to provide additional confidence in the technical adequacy of the engineering and design work performed by the Supply System and/or its contractors for nuclear power generation facilities.

2.0 INTRODUCTION

The Engineering Assurance Program consists of activities specifically directed at assessing the adequacy of the technical aspects, as well as the methods of control, of the engineering and design activities of the Supply System and/or its major contractors in producing a quality engineering product. This is accomplished by independently sampling the design activities and products for confirmation by analytical techniques. Accordingly, the Engineering Assurance Program functions independently of the nuclear Quality Assurance Program and will be monitored by an independent executive Oversight Committee.

3.0 ORGANIZATION

The Engineering Assurance Program is established and implemented by the Corporate Systems Engineering Department. The Manager, Engineering Assurance, reports to the Director of Engineering through the Manager, Engineering Systems Support, to provide an independent overview of the technical activities of the organizations performing engineering and design functions. The Director of Engineering oversees the engineering assurance program to ensure that it is adequately defined and that it is being properly implemented. Engineering Assurance is staffed by personnel having extensive engineering and design experience in their assigned disciplines and documented technical independence from the area of investigation.

4.0 PROGRAM PROCEDURES

The Engineering Assurance Program procedures are approved by the Director of Engineering and Manager, Engineering Assurance. These procedures describe the various Engineering Assurance activities, including assignment of responsibilities, methods of implementation, and methods of coordinating activities with other organizations.

5.0 PROGRAM ACTIVITIES

The activities of the Engineering Assurance Program include design process reviews, independent technical assessments, and third-party design assessments described below. Engineering Assurance, in effect, will verify that plant systems, structures, and components assessed will perform to design criteria and performance requirements established for the plant. Efforts will be made to identify modifications or improvements to the design process if deficiencies are identified, but recommendations for improving design products will not be made, unless the design will not perform its intended function or satisfy the design criteria. The technical subjects and design features will be evaluated against good engineering practice and the commitments contained in the FSAR. As a minimum, the specific elements of the design process, as listed in the Appendix, will be verified.

Selection of review/assessment topics is based on the following general guidelines:

- Select areas of review that represent known technical problem areas in the industry, in particular, those that have experienced a large number of changes from original design.
- Select areas that represent known or suspected Supply System and/or contractor difficulties.
- Select representative samples from systems, the design and engineering of which are essentially complete, to determine that design of these systems from conception to final acceptance has been carried out in a controlled manner and that the system design meets its intended purpose.
- Select activities that require significant interface with the NSSS supplier and other major vendors.
- Select topics for design process review in a manner that addresses the various aspects of the design process (i.e., design input, interface, process, output, and changes) and provides a reasonable data base by which to judge the adequacy of the design process.
- Select any other topics of management concern.

5.1 Design Process Reviews

Design process reviews are performed by personnel under the cognizance of Engineering Assurance. The objective of these reviews is to develop information by which to judge the adequacy of design controls on the basis of whether the results of the design activities are correct and consistent with licensing commitments and represent good engineering practice. These reviews are conducted on a sampling basis and are

directed at the technical substance of the design process, in contrast to quality assurance audits, which examine procedural compliance. Design process reviews are conducted by experienced engineers who, by examining the technical aspects of the design, can evaluate whether design activities are being properly conducted. For example, such reviews can evaluate whether correct and current design inputs are used by affected design organizations and whether design changes are properly evaluated and incorporated into the design. As a result of these reviews, judgments can be made as to how well the design activities are controlled by the organizations involved. The Assistant Program Director, Engineering (APDE) at the project, coordinates any necessary corrective action related to concerns identified as a result of these reviews.

5.2 Design Product Reviews

Design product reviews consist of either Independent Design Assessments by personnel assigned to and under the direction of Engineering Assurance, or third-party design assessments performed by a third party organization with coordination provided by Engineering Assurance. These reviews focus on the output of the design process which was evaluated per paragraph 5.1 above.

5.2a Independent Design Assessments

Independent design assessments are performed by personnel assigned to Engineering Assurance. These assessments are designed to be independent verifications of designs. They do not take the place of normal design verification activities performed by the organizations responsible for the design, but are done to provide additional confidence in the technical adequacy of the design. Independent design assessments are conducted on a sampling basis and are directed at critical and complex design features as well as areas of known or suspected Supply System, contractor, or industry problems. These assessments are conducted by experienced engineers who evaluate and verify the design through a review of the design, using alternate analyses as needed. Where additional manpower is required to perform a comprehensive design assessment, additional engineering personnel will be contracted from outside the Supply System to work under the supervision and direction of the Supply System Engineering Assurance discipline leader(s). The APDE will verify that appropriate corrective action related to concerns identified as a result of these assessments is undertaken in a timely fashion by the project.

5.2b Third-Party Design Assessments

Third-party design assessments are coordinated by personnel assigned to engineering but are actually performed by an independent outside engineering organization. These assessments are designed to provide a completely independent assessment of the adequacy of design work performed by the Supply System and its major engineering and design contractors. Topics for third-party design assessment are designated by the Manager, Engineering Assurance, and approved for implementation by the Director of Engineering. The design assessment approach (i.e., sampling or complete verification) and the specific design features that are reviewed are jointly selected by the Supply System and the third-party engineering organization. The design assessment methods used (e.g., use of alternate calculations) are determined by the third-party engineering organization.

Credit may be taken for third-party assessments performed prior to, or in parallel with, the implementation of this program if those assessments are applicable and can be qualified as to their independence and general adequacy by the Engineering Assurance Program.

5.3 Results of Reviews and Assessments

The results of these reviews and assessments are reported directly to the Manager, Construction Quality Assurance, APDE and Manager, Engineering Assurance, and include all concerns identified, and assessment of the significance of the concerns, and specific recommendations for further assessment of any concern judged to have potentially significant implications. The review reports are approved by the Director of Engineering and are made available to the NRC through the office of the Director of Licensing and Assurance.

5.4 Oversight Committee

An executive Oversight Committee will be retained by the Supply System to monitor the Engineering Assurance Program. Committee members will be chosen from the business, academic and/or technical communities based on their demonstrated and documented independence from the organization under review and for their qualifications to assess the program's fidelity, candidness and effectiveness.

6.0 PROGRAM IMPLEMENTATION

Engineering, in conjunction with the APDE, plans and develops schedules for design process reviews, and design product reviews. As stated above, design product reviews may take the form of either independent design assessments or third-party design assessments

6.1 Design Process Reviews

Design process reviews assess the adequacy of design processes in deference to a specific design feature or product. They assess control criteria, procedural effectiveness, organizational interface protocol, information exchange, etc., and they are implemented as follows:

- A review plan is prepared that defines the purpose, scope, special concerns, checklist to be utilized, and any other information pertinent to conducting the review.
- Personnel and organizations to be assessed are notified of the schedule and scope of the review a reasonable time in advance of the review.
- Review checklists are prepared, approved by Manager, Engineering Assurance, and utilized, that identify the procedures governing the activities being assessed and the specific attributes to be evaluated for those activities.
- A pre-review meeting is held with the management of the organization being reviewed to identify key personnel contacts, discuss the scope of the review, and determine the level of activity in the areas to be reviewed.
- A post-review meeting is held with the management and personnel of the reviewed organization to present and clarify review results.
- A formal review report is prepared, which includes the purpose and scope of the review, results, identification of review participants, and specific observations. Any necessary corrective action is requested from the reviewed organization. The report is approved by the Manager, Engineering Assurance prior to transmittal to the reviewed organization by the APDE.
- Responses to review observations describing the extent of problems noted and corrective action are submitted to the Manager, Engineering Assurance and APDE, by the reviewed organization. Engineering Assurance evaluates each response to ascertain whether the committed actions are commensurate with the review results. If the response is considered unsatisfactory, it is returned to the reviewed organization through the APDE for revision.
- Engineering Assurance reviews committed action to verify that such action has been taken.

6.2 Independent Design Assessments

Independent design assessments verify the adequacy of specific designs or design features in deference to the overall design process. They determine that the correct criteria, materials, calculation and analytical methods were applied correctly to achieve a specific result or performance objective.

Independent design assessments are implemented as follows:

- An assessment plan is prepared defining the purpose, scope, special concerns, and areas to be covered in the assessment.
- Check lists are prepared, and approved by the Manager, Engineering Assurance.
- The project team is notified of the schedule and scope in advance of the assessment time and provides current design information and documentation to the assessment team.
- A pre-assessment meeting is held to identify key personnel contacts, discuss the scope of the assessment, and determine the level of activity in the areas to be assessed.
- Clarification of design philosophies, misunderstandings, system operational philosophy, questions, etc., between assessment and project teams may take place as the design assessment proceeds.
- A post-assessment meeting is held between the assessment team and project team (and contractor as necessary) to discuss results of the review.
- A formal report is prepared, which includes the purpose and scope of the assessment and results and identification of observations. Also, the report includes a list of documents reviewed and alternate calculations performed in addition to the elements outlined above.
- The Manager, Engineering Assurance reports the need for further evaluation to the APDE. The Manager, Engineering Assurance recommends any necessary corrective action (i.e., design changes) and monitors the actions taken by the APDE.
- The Manager, Engineering Assurance reassesses the design when the corrective action has been completed.

6.3 Third-party Design Assessments

Third-party design assessments are implemented as follows:

- The Manager, Engineering Assurance selects and obtains the services of an outside engineering organization to perform a particular assessment. Approval of the organization selected is obtained from the Director of Engineering.
- The Manager, Engineering Assurance provides a description of the topic to be assessed and defines the purpose of the assessment.
- The Manager, Engineering Assurance selects and obtains copies of the specific design documents needed to perform the assessment. In conjunction with Engineering Assurance, the outside organization determines the design features to be assessed, based on the complexity of the design, importance to safety, degree of standardization and similarity to previously proven designs, and degree of design completion shown by the documents being reviewed.
- The outside organization selects the specific design assessment methods (e.g., design review, use of alternate calculations) to be used and prepares an assessment plan defining the scope, methods to be used, special concerns, and other information pertinent to the assessment. A copy of the assessment plan is sent to Engineering Assurance for approval.
- A pre-assessment meeting is held to identify key personnel contacts, discuss the scope of the assessment, and determine the level of activity in the areas to be assessed.
- The outside organization performs the design assessment and documents the results.
- A post-assessment meeting of Engineering Assurance, Project Engineering, the outside organization performing the assessment, and any other organizations as determined by the Supply System or the Oversight Committee.
- The outside organization prepares and transmits an assessment report to the Manager, Engineering Assurance, which includes the purpose and scope of the assessment, results, including comments as appropriate on the significance of the results, identification of assessment participants, and a list of documents reviewed and alternate calculations performed.
- The Manager, Engineering Assurance reviews the report, determines if corrective action is necessary, and reports the results to the APDE and Director of Engineering.

- The Manager, Engineering Assurance includes in the report topics requiring further evaluation to the APDE. The Manager, Engineering Assurance may recommend corrective action (i.e., design changes).
- The Manager, Engineering Assurance reviews corrective actions for adequacy and performs a reassessment of the design upon completion of the corrective action to close out the review topic.

7.0 RECORDS

The Manager, Engineering Assurance maintains sufficient records to demonstrate compliance with this program. In this regard, the following records will be retained:

- Review checklists, review reports, and corrective action recommendations and follow-ups,
- Correspondence pertaining to reviews and assessments performed,
- Procurement-related correspondence and documents and invoices for engineering services provided by others,
- Assessment reports, documents reviewed, corrective action reports, and reassessment records,
- Calculations, analyses, and other technical documents used or derived during the performance of an assessment that contributed substantially to conclusions reached,
- Assessments by the Oversight Committee,
- NRC comments, correspondence, meeting minutes, etc.

8.0 APPENDIX

Criteria for Engineering Assurance evaluations are as follows:

8.1 Design Commitment Control

Periodic reviews shall be conducted to ensure consistency between design activities and commitments made in technical specifications, licensing documents, or other regulatory requirements. Also, Engineering Assurance shall verify that an effective system exists for updating design commitments as changes occur due to design evolution, management decisions, as-built conditions, or regulatory changes.

8.2 Design Inputs

Measures shall be established to verify the basis, use, and reasonableness of design inputs. Emphasis shall be placed on confirming the validity and applicability of input information for selected design features. Sources of the input data shall be identified. Calculations that produce results to be utilized as input data shall be verified. Engineering Assurance shall confirm that design input assumptions are technically valid and reasonable.

8.3 Design Methods

Measures shall be established to verify that the analytical methods used for design calculations are consistent with sound engineering practice and industry codes and standards identified in project licensing commitments. Confirmation shall be made that computer programs, including subroutines, have been verified as acceptable, prior to their use. Analytical modeling techniques shall be examined for reasonableness.

8.4 Design Control

Measures shall be established to verify that plant system interfaces and interactions have been properly addressed in the design process. Technical review shall verify that the system and components are designed to perform in normal, transient, and accident modes in accordance with the design criteria. Review of the flow and documentation of selected design information shall be performed to assure that output-to-input between organizations is consistent with applicable design control requirements.

8.5 Design Verification

Measures shall be established to verify that design and design verification performed by others are technically adequate. Particular attention shall be given to assessing the adequacy of methods used for design verification and the qualifications of personnel performing design verification.

8.6 Design Changes

Measures shall be established for verifying the basis and implementation of design changes. Particular emphasis will be placed on evaluating the system for control of design changes, proper coordination by affected disciplines, incorporation into affected design documents, and feedback from the as-installed configuration.

8.7 Design Records

Measures shall be established to verify the adequacy of the system for identifying, collecting, storing, and retrieving design records. Consideration shall be given to ensuring that the design record system provides both adequate documentation and the ability to store and retrieve documentation during design activities. Careful attention shall be given to verifying that a system exists for creating an appropriate and accurate record of the as-built design configuration.