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May 29, 1997
NG-97-0901

Mr. Samuel Collins, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
DAEC Commitment for Continuing Design Basis Documentation Review and Issue Resolution

Reference: 1) NG-97-0245, "Response to NRC 10 CFR 50.54(f) letter, Request for Information Pursuant to 10 CFR 50.54(f) Regarding Adequacy and Availability of Design Basis Information", dated February 11, 1997, from John F. Franz to Office of Nuclear Reactor Regulation
2) NG-97-0514, "DAEC Continuing FSAR Improvement Plan", dated March 21, 1997, from Kenneth E. Peveler to Office of Nuclear Reactor Regulation

File: A-17d, A-105

Dear Mr. Collins:

In Reference 1 DAEC committed to complete re-evaluation of the existing Design Basis Document (DBD) Program and the status of design basis reconstitution and provide results to the NRC by June 1, 1997. DAEC has completed the re-evaluation and the results are described in the attachment to this letter.

DAEC has decided to perform additional reviews of the traceability from selected statements in the DAEC Updated Final Safety Analysis Report (UFSAR) to the supporting design basis documentation. This effort will be conducted concurrently with the continuing UFSAR reviews for accuracy described in Reference 2.

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The DAEC developed Design Basis Documents (DBDs) in accordance with the methodology of NUMARC 90-12 "Design Basis Program Guidelines." These documents will be indicated throughout this cover letter and the attachment in upper case (i.e. Design Basis Document or DBD). Other design basis documentation including specifications, calculations, drawings, and analyses will be referenced as design basis information using lower case.

This letter makes the following new commitment:

As part of the UFSAR Improvement Plan described in Reference 2, perform reviews of the traceability from selected statements in the DAEC UFSAR to the supporting design basis documentation. The reviews will be completed by October 18, 1998.

Should you have any questions regarding this matter, please contact this office.

Sincerely,

Gary D. Van Middlesworth for JFF

John F. Franz
Vice President, Nuclear

Attachment: Continuing Design Basis Information Reviews at the DAEC

cc: C. Nelson
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G. Kelly (NRC-NRR)
A. B. Beach (Region III)
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Continuing Design Basis Information Reviews at the DAEC

Introduction

DAEC has re-evaluated its Design Basis Document (DBD) program and the status of design basis reconstitution to determine the scope of any further efforts to enhance existing DBDs, develop additional DBDs and reconstitute other design basis information. In this review, we evaluated the aspects of our programs, policies, and procedures that support our commitment to the availability and retrievability of design basis information. This information is organized as follows:

1. Review the status of the DBD Program.
2. Describe the issues identified during the process of creating the existing DBDs.
3. Discuss the conclusions reached concerning the benefits of DBDs based on review of work done with, and without, DBDs at DAEC.
4. Discuss the status and plans for validation of existing DBDs.
5. Review the current status and plans for DAEC efforts to verify and improve the accuracy of the Updated Final Safety Analysis Report (UFSAR).
6. Explain the plan to tie further DBD work to the UFSAR verification.
7. Describe continuing efforts and future Design Basis Document plans.

1. DBDs

DAEC has developed System DBDs, Topical DBDs, and has also issued a special set of "Top Level" DBDs. The System and Topical DBDs utilize the NUMARC 90-12 "Design Basis Program Guidelines" format for "pointer" DBDs. This type of DBD provides references or pointers to original design basis documents (e.g., specifications, calculations, topical reports, analysis, drawings, test reports, etc.). The DBD does not attempt to duplicate all the design and licensing information, but provides a simple starting point where an individual can find a listing and brief description of the documentation of plant design and licensing documents for a system or topical area.

The five "Top Level" DBDs were described in NG-97-0245, "Response to NRC 10 CFR 50.54(f) letter, Request for Information Pursuant to 10 CFR 50.54(f) Regarding Adequacy and Availability of Design Basis Information", dated February 11, 1997, from John F. Franz to Office of Nuclear Reactor Regulation. Briefly, these DBDs provide the "Top Level" design standards and safety criteria used to design the DAEC and identify systems, structures, and components required to satisfy these standards and criteria.

To date, the DAEC DBD development effort has produced five Top Level DBDs, twenty five System DBDs, and seven Topical DBDs.

DBDs have been found to be useful in performance of operability evaluations, safety evaluations, disposition of non-conformances, and development of modifications. Having a DBD (i.e., pointer document) simplifies the process of locating the applicable documentation that applies to a system, structure, or component. It is not a prerequisite to the capability to locate design bases or to perform quality work on safety-related systems, structures and components. Even though a significant amount of information is available within the DBD, an individual must still make direct use of the design documentation referenced by the DBD. In the absence of a DBD, this effort is more difficult, but our experience demonstrates that the required design information can be located and that the work still can be done correctly and safely.

2. Issues identified through DBD Development

During DBD preparation, review, and validation various issues were identified. Those issues remaining open have been entered into the DAEC corrective action program through Action Requests (ARs). These open items include a list of missing support documentation and information and issues raised during the process.

DBD Open Items can generally be classified as one of the following:

- clarity of the documentation
- consistency between documents
- accuracy of the documentation
- availability of the supporting documentation

DBD Open Items are being tracked through the AR (corrective action) system. Multiple reviews have been made of these open items and have revealed no operability issues, unreviewed safety questions, o. afety significant items.

3. Use of Design/Licensing Bases Information With/Without a DBD

DAEC design and licensing bases documentation are indexed, searched and retrieved using a number of tools. The equipment database contains fields that list references to drawings, specifications, vendor manuals, calculations, and maintenance procedures for each component. The design documentation and licensing correspondence for the plant is indexed and searchable by key words through a computerized document database. Design drawings and calculations can be viewed electronically through a digital imaging system. The complete text of the UFSAR and docketed correspondence can be searched and retrieved electronically through another system. Each of these tools has simplified locating and retrieving design and licensing basis information and lessened the need to have a "pointer" DBD.

Recent DAEC experience has been that using available tools, design basis information can be readily retrieved with or without the assistance of "pointer" DBDs. During the recent NRC Safety System Operational Performance Inspection (SSOPI) at the DAEC the inspection focused on the Residual Heat Removal (RHR) System. This system has several functional modes including low pressure coolant injection (LPCI), containment spray for the drywell and suppression chamber, suppression pool cooling, and shutdown cooling. Only the LPCI mode is covered by a DBD. DAEC was called upon to retrieve design basis information for the LPCI mode and the other modes that are not covered by a DBD. This information was identified and retrieved, even where not covered by a DBD.

4. DBD Validation

In accordance with the recommendation in NUMARC 90-12, DAEC initiated the validation of System DBDs to provide "reasonable assurance that the design basis information is consistently reflected in the physical plant and those controlled documents used to support plant operation." The formal post-development validation reviews of issued System DBDs completed to date (15 of the 25 System DBDs) did not identify significant issues. Most issues and open items against the DBDs were generated during DBD development and subsequent use of the DBDs. DBDs have received substantial validation during development through the process of retrieving documentation to be referenced in the DBD. In addition, "pointer" type DBDs receive significant validation through use in the normal course of work. As a result, the objective of DBD validation has been fulfilled by other means. This view is consistent with NUMARC 90-12, which states that it would be acceptable to use "any other method that establishes that the information within the DBD is consistent with the plant configuration."

Recognizing that the individual using a DBD must use the actual references rather than relying on the DBD itself, our experience shows that formal validation of the DBDs, as described in the NUMARC 90-12 guidelines, has not been useful. Accordingly, we have elected to suspend further formal validation efforts. However, most systems for which DBD validation has not been completed will be subject to further reviews of UFSAR accuracy and consistency with design basis as described below. If these reviews identify significant problems or open issues for a system, additional reviews or validation will be initiated as appropriate.

5. UFSAR Verification

DAEC participated in the industry initiative sponsored by the Nuclear Energy Institute (NEI) as described in NEI-96-05, "Guidelines for Assessing Programs for Maintaining the Licensing Basis," dated October 7, 1996. This effort was designed to review the implementation and accuracy of the DAEC UFSAR for a sampling of risk significant systems. The four systems selected were:

- Offsite Power: Non-Safety-Related, No DBD
- Feedwater: Non-Safety-Related, DBD issued for the Control System Only
- 125 VDC: Safety Related, System DBD Issued
- CRD Hydraulic System: Safety-Related, No DBD

Thirty three issues were identified in the process of this evaluation. Fifteen were classified as related to the accuracy of the description of the plant in the UFSAR, and eighteen others were classified as opportunities to improve the clarity of the UFSAR. None of the identified issues were found to be significant to safety. These issues were entered into the DAEC Action Request (AR) system, which is our 10 CFR 50 Appendix B Corrective Action system, or processed through UFSAR Change Requests.

DAEC found that this review methodology provides an excellent tool to review the accuracy of the UFSAR and the conformance of the plant to the UFSAR. As performed, however, this methodology did not establish a link from the descriptions and statements in the UFSAR back to the design basis documentation for the plant.

6. Future Efforts

As a result of this assessment, as well as other recent indicators, DAEC is proceeding with a plan to continue systematic UFSAR reviews for additional risk significant systems using the NEI guidelines. This effort was the subject of a formal commitment to the NRC docketed in NG-97-0514 dated March 21, 1997. This effort is scheduled to be performed through October, 1998.

DAEC believes that this process offers an opportunity to incorporate an additional review of design basis documentation that supports the statements and descriptions in the UFSAR. This process will serve to identify missing, incomplete, or contradictory design basis documentation. This process will also satisfy the definition of an alternate validation for DBDs as stated in NUMARC 90-12. The synergy between UFSAR validation and review of Design Basis Documentation is an opportunity for efficiency. Focusing the reviews on risk-significant systems will reflect the appropriate priorities for application of our resources for maximum benefit. Design basis issues discovered in this effort will be entered into the DAEC AR (i.e., corrective action) system to document and track resolution.

7. Continuing Efforts

During review of the use of design basis documentation, DAEC concluded that it would be useful to develop more focused DBDs covering specific operating modes of systems (e.g., Shutdown Cooling mode or Torus Cooling mode for the RHR system), topics applying to multiple systems (e.g., Net Positive Suction Head requirements and calculations), or issue specific topics (e.g., Gate Valve Pressure Locking and Thermal

Binding). Such focused DBDs will provide most of the benefit of broad scope DBDs while avoiding the high level of effort and expense required to develop full system and topical DBDs covering all aspects of a system or topical subject. While a broad scope may be needed for some DBDs, it is difficult to justify in other cases since it produces much information that will rarely, if ever, be needed. Where there is a need for information beyond the scope of a more focused DBD, the absence of a DBD does not restrict our ability to perform adequate work. While the DBD makes it easier to locate applicable documentation, it is not essential to the completion of quality work on safety-related systems, structures and components.

The benefits of this new type of DBD include:

- Application of resources to develop and reconstitute design bases where the need is greatest.

- More flexibility in scheduling and better utilization of staffing resources due to reduced development times for a more limited scope DBD.

- Recognition that multiple systems may have common design basis aspects.

- Capability to "capture" output of normal work or investigation of emergent issues as documentation of design bases.

Examples of design basis research efforts currently underway include:

The post-accident radiological source terms used in calculations of doses to personnel and equipment have been reviewed as a result of questions about the consistency of assumptions used in calculations and whether UFSAR descriptions completely reflect the assumptions used. The UFSAR descriptions of the analyses will be revised. A set of guidelines was developed for assumptions to be used in future calculations and assessments. The results of this review are documented and are currently retrievable through the closure documentation of the AR (corrective action) system. Further efforts, including considerations of applying the NUREG 1465 revised source term to the DAEC, are underway. Upon completion, appropriate design bases information will be incorporated into the Master Document List (MDL). The MDL is the controlled document system that includes DBDs, specifications, calculations, drawings, and other design data. This is an example of how the results of ongoing work can be "captured" for future use.

Operating experience at other plants, the recent Safety System Operational Performance Inspection at the DAEC, and on-going industry issues about the performance of suppression pool suction strainers for Emergency Core Cooling Systems (ECCS) and net positive suction head have resulted in systematic reviews of design and licensing bases on this subject. The information is being validated against plant configuration and operation

and will support development of planned modifications. The design work product for modifications to ECCS strainers will be retrievable through the modification package documentation. The topic of net positive suction head calculations applies to other systems that are not directly involved in the modifications. DAEC is considering developing a "focused" DBD to include a discussion of the results of NPSH calculations, a list of applicable references, and general guidelines and methodologies for performing net positive suction head calculations.

Conclusions

This document described the DAEC DBD program as developed to date. Issues identified through this effort are being addressed through the DAEC corrective action program. Although the DBDs developed to date are useful, our experience indicates that design and licensing basis documentation and information can be identified and retrieved without a DBD. Formal validation of DBDs has not been found to add value to the accuracy or utility of our DBDs. Instead, the process of developing and using DBDs is considered to fulfill the need for validation. The DAEC UFSAR Improvement Plan will continue systematic reviews of additional risk significant systems to assure the accuracy of UFSAR descriptions and that the statements in the UFSAR are properly implemented in the plant. To this process we intend to add a review to trace the link between statements and descriptions in the UFSAR to the supporting design and licensing basis documentation. Finally, the DAEC plans to implement more flexible forms for preparing "focused" DBDs.