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ComEd

September 12, 1996
JSPLTR #96-0155

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Document Control Desk

Subject: Dresden Nuclear Power Station Unit 3,
Extension of the 18.5 Month Operating Period
Stipulated for Dresden Unit 3 Due to the Core
Shroud Cracking Issue
NRC Docket No. 50-249

References:

(1) J.F. Stang (NRR) to D.L. Farrar letter, Dated July 21, 1994, "Safety Evaluation by The Office of Nuclear Reactor Regulation Related to Core Shroud Cracking, Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company, Dresden Nuclear Power Station, Unit 3, Quad Cities Nuclear Power Station, Unit 1"

(2) ComEd Letter, P. Piet to the U.S. NRC Document Control Desk, Subject- Response to NRC request for additional information concerning Generic Letter 94-03, Dated December 14, 1994, Attachment D -"Final Evaluation of the Core Shroud Flaws at the H5 Horizontal Weld for Dresden Unit 3"

(3) ComEd Letter, P. Piet to the U.S. NRC Document Control Desk, Subject- Response to NRC request for additional information concerning Generic Letter 94-03, Dated December 14, 1994, Attachment B -"Safety Assessment of Horizontal Core Shroud Welds H1 Through H7 for Cycle 14 Operation of Dresden Unit 2"

(4) J.F. Stang (NRR) to D.L. Farrar letter, Dated January 31, 1995, "Safety Evaluation by The Office of Nuclear Reactor Regulation Related to Generic Letter 94-03, Dresden Nuclear Power Station Unit 2, Quad Cities Nuclear Power Station Unit 2"

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(5) ComEd Letter (Bob Rybak) to the U.S. NRC Document Control Desk, "Extension of the Operating Period for Dresden Unit 3 Due to the Core Shroud Cracking Issue", dated November 10, 1995.

(6) J.F. Stang (NRR) to D.L. Farrar letter, Dated February 8, 1996, "Safety Evaluation on Extension of the 15-Month Stipulated Allowable Operating Time for Dresden, Unit 3"

(7) BWRVIP "Core Shroud NDE Uncertainty and Procedure Standard", Dated November 21, 1994.

In April of 1994 ComEd identified cracks in the circumferential welds of the core shroud at Dresden Unit 3. Throughout the Spring of 1994 ComEd performed various inspections, analyses and safety assessments of the identified weld flaws to determine that adequate margin existed to support the decision to restart the Unit and operate until a permanent repair could be installed at the next refueling outage. The NRC performed a review of the initial submittal documents and issued a Safety Evaluation, Reference (1), on July 21, 1994 providing concurrence that the Unit could be returned to operation for 15 months. In this safety evaluation the NRC requested ComEd to provide additional confirmatory analyses. ComEd performed several additional analyses and submitted additional responses to the NRC throughout the summer and fall of 1994. A comprehensive summary report including the latest analysis results was submitted to the NRC on December 14, 1994, References (2) and (3). The NRC reviewed the revised submittal documents and issued a Safety Evaluation on January 31, 1995 indicating that the conclusions of the previous Safety Evaluation for Dresden Unit 3 remained valid, Reference (4).

In the fall of 1995, ComEd prepared a revised flaw evaluation for the critical H5 crack location at Dresden Unit 3 (see Figure 1). The results of this new flaw evaluation were documented in a report, Reference (5), and were submitted to the NRC on November 10, 1995. This assessment requested an extension of the current D3 cycle 14 duration from a maximum of 15 months of operation above cold shutdown to 18.5 months in order to support the rescheduling of the D3R14 refueling outage. This report provided the latest results of the ongoing ComEd efforts to more clearly define the loadings and flaw evaluations associated with the evaluation of the indications identified as part of the core shroud inspections at Dresden Unit 3 in the Spring of 1994. This report also provided a resolution to the uncertainties that were identified during the previous reviews by the NRC staff. This report specifically addressed the structural assessment of the H5 weld location as it was the location with the most significant amount of cracking discovered during the inspections. This report included two methods of evaluating the identified core shroud cracking. The first method was termed the "crack free exclusion zone approach", and was based on evaluating a 1.24" thick remaining ligament. This method was utilized to demonstrate consistency with the initial methodology as outlined in the July 21, 1994 Safety Evaluation, Reference (1). The second method was termed the "UT flaw detection approach" and utilized the qualified UT

examination results as the basis for the evaluation. This method represents a more accurate assessment of the actual conditions of the H5 weld. The NRC performed a review of this submittal and issued a Safety Evaluation, Reference (6), authorizing the requested hot operating cycle extension from 15 months to 18.5 months. In this Safety Evaluation the staff also concluded that the UT flaw detection approach was the appropriate method to evaluate the identified core shroud cracking.

Following NRC approval of the 18.5 month operating period, unplanned events have impacted the Dresden Unit 3 operating cycle. The most significant event was the decision by ComEd to keep Units 2 and 3 shutdown in order to perform a comprehensive review and refurbishment of the safety-related 4KV circuit breakers at Dresden. In addition, ComEd decided to implement modifications to the Unit 3 Low Pressure Coolant Injection corner room structural steel to restore conformance to Dresden's design and licensing basis. These events, in conjunction with others, have resulted in a shutdown of Dresden Unit 3 which began on June 21, 1996. Start-up of Unit 3 is currently planned for mid September. Although these events and ComEd's actions have enhanced the safety and reliability of Unit 3 operations, they have necessitated a review of the planned Dresden Unit 3 operating cycle. ComEd has concluded that, for meeting the ComEd fuel utilization and materiel condition improvement objectives, operation of Dresden Unit 3 for 20.5 months above cold shutdown during the current operating period is warranted. Other issues arising from the requested 20.5 month operating period, which are unrelated to the core shroud issue, will be addressed with the NRC separately from this submittal.

Summary

The attached report demonstrates that, using conservative assumptions regarding material thickness and including the bounding analysis parameters, significant operating margins will remain after a 20.5 month operating cycle. This report and its supporting calculations are based on the design input and methodology that was previously approved in the February 8, 1996 Safety Evaluation, Reference (6), and represents a conservative and technically accurate assessment. This same design input and methodology has been utilized in this flaw evaluation with the only change being the increase in the operating cycle from 18.5 to 20.5 months of hot operation.

This evaluation uses a limit load analysis of the portion of the weld that was demonstrated by UT to be free of flaws. This approach is conservative as all uninspected areas were assumed to have through-wall flaws. This UT Flaw Detection Approach is consistent with the BWRVIP criteria, Reference (7), and thus represents the most current information regarding flaw assessment. Using the bounding conservative crack growth rate of 5×10^{-5} inches per hour and without taking credit for the presence of the fillet weld, sufficient margin exists to support a minimum of 20.5 months of hot operating time, considering all design basis and beyond design basis load combinations. For Design Basis Load combinations, a safety factor of 1.89 (versus the 1.39 ASME Code requirement) exists for a 20.5 month operating cycle. For beyond design basis loading conditions, a 1.83 safety factor exists.

Conclusions

The methodology used to determine the remaining ligament size using the UT Flaw Detection Approach provides the most accurate assessment of the actual conditions. The conservative approach taken to account for near field limitations of the UT examination results and the inspection uncertainty provides a significant margin of safety on the sizing of the ligament. With consideration of this information, and the knowledge that a portion of the weld area was not inspected (i.e., assumed to be fully cracked), ComEd believes that the UT Flaw Detection Approach is an accurate method to define the remaining structural margin. Table 4.3 of the attached report provides a summary of the structural margin assessment for the governing loading cases.

For Design Basis Load combinations, a safety factor of 1.89 (versus the 1.39 ASME Code requirement) exists for a 20.5 month operating cycle. For beyond design basis loading conditions, a 1.83 safety factor exists. Considering these results for the conservative lower bound limits using the most limiting input parameters and analysis approaches, ComEd concludes that safe operation of Dresden Unit 3 for 20.5 months can be achieved while maintaining a significant margin of safety.

Additionally, ComEd is committed to the installation of a comprehensive core shroud repair which will structurally replace the circumferential shroud welds during the upcoming D3R14 refuel outage.

If there are any questions concerning this matter, or need for further clarification, please contact this office.

Sincerely,

J. Stephen Perry
Site Vice President
Dresden Station

Subscribed and Sworn to before me
on this 13 day of
September, 1996.

Sherry Butterfield
Notary Public

OFFICIAL SEAL
SHERRY L BUTTERFIELD
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES:05/23/00

Attachments: Figure 1 - Dresden Unit 3 Core Shroud

Attachment 1 - Evaluation of the Core Shroud Flaws at the H5 Horizontal Weld for Dresden Unit 3 for 20.5 Months of Operation

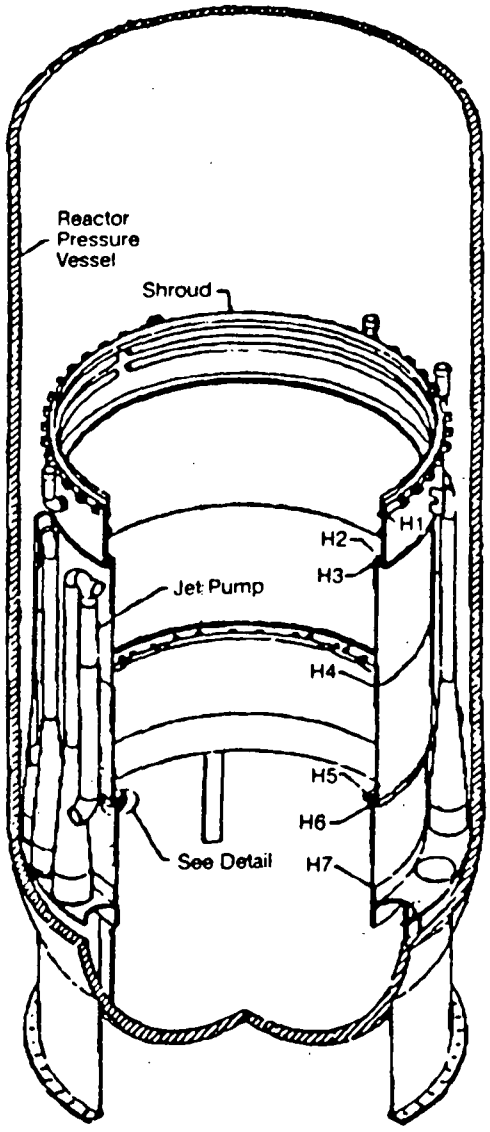
JSP/rmt

cc: A. B. Beach, Regional Administrator - RIII
J. F. Stang, Project Manager - NRR
C.L. Vanderniet, Senior Resident Inspector - Dresden
Office of Nuclear Facility Safety - IDNS

FIGURE 1

Dresden Unit 3 Core Shroud

Core Shroud View



H5 Weld Detail