

EVALUATION OF USI A-46 ISSUES RELATING
TO CRYSTAL RIVER UNIT 3 RESTART FROM
REFUELING OUTAGE 10

INTRODUCTION

In a letter from M. W. Rencheck of Florida Power Corporation (FPC) to the NRC Document Control Desk, dated December 16, 1997, FPC provided a supplemental response for the resolution of Unresolved Safety Issue (USI) A-46 for Crystal River Unit 3 (CR-3). The letter included, among other USI A-46 issues, the licensee's assessment of outlier issues related to CR-3 plant restart from Refueling Outage (RFO) 10. The staff's evaluation contained in this attachment are limited only to the review of outlier resolutions which the licensee had committed to complete prior to the restart from RFO 10, and are related to the operability of the safe shutdown equipment identified in FPC's December 16, 1997 letter.

The licensee's USI A-46 seismic walkdown, conducted in accordance with Plant-Specific Procedure (PSP), resulted in the identification of a total of 113 outlier items. At the request of the NRC staff, FPC has prepared an action plan for resolving these USI A-46 outlier items. In the action plan, FPC committed to resolve a number of outliers prior to restart from RFO 10. These 113 outliers were categorized as either Restart or Post-Restart. The categorizing of outliers was based on their association with plant systems that were assessed for readiness in accordance with the methodology of the CR-3 System Readiness Review Plan. The System Readiness Review Plan was implemented for 105 plant systems using a graded approach methodology. Each of these 105 systems was classified into one of three levels of classification. The level classification was determined by a safety significance process relying on three aspects: 1) a fission product barrier approach; 2) analytical approach such as PSA model importance, safety classification, etc.; and 3) configuration changes in the system. Based on this plan, FPC made the following commitments prior to restart: 1) complete the resolution of seventy (70) restart outliers; 2) complete the resolution or the operability assessment of the remaining forty-three (43) post-restart outliers; and 3) perform a confirmatory study of selected safe shutdown equipment to ensure equipment anchorage adequacy.

ATTACHMENT 3

FPC also committed to address the staff's findings in the May 2, 1996, SER regarding the criteria and procedure in the PSP, as part of the Post-Restart review activities and the final resolution of USI A-46 at CR-3.

EVALUATION

1. Resolution of 70 Restart Outliers

The 70 Restart Outliers are listed in Enclosure 3 of FPC's December 16, 1997 letter. In a transmittal dated January 21, 1998, FPC confirmed that these 70 Restart Outliers have been resolved. The staff randomly selected 10 items for review and found all 10 items to be acceptable for restart.

2. Resolution or Operability Assessment of 43 Post-Restart Outliers

FPC's December 16, 1997, letter, indicated that, of the 43 Post-Restart Outlier items, it has completed seventeen (17) items during the current RFO 10. In a correspondence dated January 8, 1998, FPC indicated that it has dispositioned a total of twenty-eight (28) items and performed operability evaluations for the remaining fifteen (15) items.

3. Confirmatory Study of Selected Safe Shutdown Equipment Anchorage Adequacy

The licensee's original position for anchorage evaluation as described in its PSP for USI A-46 program was that the preferred method to determine the adequacy of the anchorage is through the inspection and judgement of the seismic capability engineers (SCE) who were assigned to perform the walkdown of the CR-3 plant for the USI A-46 program. In its evaluation of FPC's PSP, dated May 2, 1996, the NRC staff disagreed with the licensee's position and stated that analyses and hardware verification using the procedures in Appendix C of the GIP-2, combined with the inspection and engineering judgement is an acceptable approach for the resolution of equipment anchorage issues for CR-3.

The anchorage verification process consists of three major steps 1) verify that equipment is anchored, 2) verify that field installation followed standard construction practice, and 3) verify that the as-installed anchorage configuration is capable of withstanding and transmitting the seismic load.

During the NRC audit of the USI A-46 seismic implementation program, the staff audit team found that, in general, FPC had followed its PSP in performing the anchorage evaluation which encompassed the first two steps described above. However, the staff audit team identified some instances of anchor installation deficiencies and conditions involving unverified anchorage strength in accordance with GIP-2 guidelines. The staff audit team acknowledged that, given the low seismic demand at CR-3, experienced structural/seismic engineers may be able to judge anchorage adequacy for properly anchored equipment without performing detailed calculations. For inadequate anchorage (e.g., poor or missing welds and/or bolts) or improper/unconventional anchorage installations, it is questionable whether the review engineers were able to judge anchorage adequacy for the seismic demand without performing some calculations (e.g., following the GIP-2 guidelines).

As a result of the staff audit team's finding regarding the absence of equipment anchorage capacity verification for the majority of equipment, the licensee was requested to submit additional information to address the operability assessment of the anchorage issue before the restart of CR-3 from RFO 10.

By Attachment A to the FPC letter to the NRC, dated December 16, 1997, FPC submitted, among the responses to other USI A-46 issues, 17 component anchorage evaluations including analytical calculations. The staff has reviewed the 17 anchorage evaluations from an operability perspective, and found them acceptable. In Enclosure 5 of FPC's December 16, 1997, letter, FPC made a commitment to perform GIP anchorage calculations for approximately 50% (100 items) of electrical components identified on the SSEL prior to startup from RFO 11. FPC may expand the scope of the calculations depending on the findings from the original sample.

Based on the results from the staff's audit, the review of several component anchorage operability assessments, and the ensuing regulatory commitments in Enclosure 5 of FPC's December 16, 1997, letter, the staff concluded that FPC's action provides a reasonable basis for the acceptable resolution of CR-3 restart issues related to the USI A-46 program.

CABLE TRAY SUPPORT CALCULATION

As a followup to our recent audit of your implementation of the seismic qualification of mechanical and electrical equipment (USI A-46) program, you recently forwarded certain cable tray support calculations that appear to have been performed in 1971. Our review of these calculations is in progress. Our initial review has identified certain concerns relating to the suspended ladder-type (trapeze) calculations which are discussed below.

1. The calculations do not contain a comprehensive discussion of the allowable stresses used, including the basis for their use and reference to the industry code criteria. We requested this information during our audit. Additionally, it appears that the calculations have not been independently reviewed and verified.
2. Assumptions used for obtaining the moment at the ceiling attachment point do not appear to be valid. It appears that the load from the cables, which in certain cases are as much as 22 feet from the support, were transferred to 5 feet assuming rigid body load transfer and guided cantilever deformation for the vertical member. Based on our conservative calculations, we estimate that the stresses at the vertical member would be significantly higher.

Enclosure 2