

October 16, 1998

MEMORANDUM TO: Docket File

FROM: Donald S. Brinkman, Senior Project Manager /s/  
Project Directorate I-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NO. 1 - REQUEST FOR  
ADDITIONAL INFORMATION (TAC NO. M69428)

The attached request for additional information (RAI) (Attachment 1) was transmitted by facsimile on October 2, 1998, to Frank Ferri of Duquesne Light Company (DLC) for use in a telephone conference call on October 9, 1998. DLC responded by fascimile on October 9, 1998 (Attachment 2). The RAI and response were discussed in a conference call on October 9, 1998. This memorandum and the attachments do not convey a formal request for information or represent an NRC staff position.

Docket No. 50-334

Attachments: As stated

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

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*Donald S. Brinkman*

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ANSWERS NEEDED FOR CLOSING OUT A-46 ISSUE (SER)

1. On page 1 of your May 16, 1997 response, you stated that "The tank wall analyses for SSEL vertical flat-bottom tanks (QU-TK1 and WT-TK-10) were performed as part of their overall GIP-2 evaluation." Please state your evaluation results. If the result is not satisfactory, have you modified the equipment?
2. On page 2 of your May 16, 1997 response, you stated that "Our SQUG consultant, EQE Inc., is analyzing the flat-bottom tank outliers. The anchorage outlier issues for other tanks are being resolved through more detailed modeling of the tank-support system..." Please state your evaluation results. If the result is not satisfactory, have you modified the tank and anchorage?
3. On page 21 of your January 31, 1996 submittal, you stated that "A total of 230 outliers were identified for BVP-1 SSEL equipment items." Have all the outliers been resolved? If not, provide status for them.
4. On page 34 of your January 31, 1996 submittal, you stated that "Seven (7) outliers were identified during the plant walk-downs and one (1) thru analysis." Have all the 7 outliers and the one thru analysis been resolved? How many were resolved by modification and how many were resolved by analysis?

## Response to NRC RAI Dated October 2, 1998

1. Both of these tanks have been given further analysis by EQE, and found to have seismic capacities that exceed demands. We are presently reviewing their calculations, but expect them to form the basis of outlier resolution for these tanks.

The GIP evaluation that was performed, is a sequential evaluation of the load transfer mechanisms at work in a vertical cylinder, flat-bottom tank undergoing seismic acceleration. For tank overturning assessment, it provides a series of reduction factors related to the various loaded structural elements, e.g., anchor chair plates and welds, tank wall plate, that reduce anchor bolt stresses used to calculate the tank's overall resistance to overturning. The tank wall stresses are, therefore, just one of several factors that are used in the capacity determination.

Both of the subject tanks failed to satisfy the conservative acceptance criteria of the GIP. For the WT-TK-10, Demineralized Water Storage Tank, capacity was controlled by bending in the top plate of the anchor chair; the tank wall stress did not govern. Of the wall compression stress determinations, elephant-foot buckling was controlling over diamond-shape, but not when compared to the chair top plate bending. The QS-TK-1, Refueling Water Storage Tank, capacity was also controlled by anchor chair limits, however, this tank is encircled by a reinforced concrete wall, which embeds the chairs. It was initially ignored as a conservatism, but would effectively eliminate chair overstresses.

2. The refined model analyses were successful. As an example, the diesel air-start tank rack frame reanalysis included more realistic support conditions, response frequency (12 Hz.), and SRSS load combination, which resulted in satisfactory anchorage loads. The Component Cooling Water Heat Exchanger supports use embedded Nelson studs (40 on fixed-end; 26 on sliding end) that were more numerous than the GIP criteria considered (5 max.), therefore, they were outliers. A detailed evaluation of the stud clusters using conventional methods showed the supports to be adequate.
3. The outlier count of 230 given in the Summary Report included those items on the SSEL that were shown in the report as outliers in Tables 5.3 (general equipment) and 6.2 (tanks & heat exchangers). A recount of those tables for this update, resulted in a total of 231 (206 general; 25 tanks & Hx). In addition, there were 7 cable tray outliers (Table 7.3) identified in the report, which includes one that was selected during a walkdown and later failed the GIP analysis. The separate Relay Summary Report (Table 2.1-1), identified 17 contactor outliers requiring resolution, which included 9 relay types that were qualified to IEEE 344-71, but not found in the SQUG database, and 8 fire protection contactors that had no seismic qualification.

The status of the various outliers is as follows:

General SSEL equipment (206) - 133 completed; 73 open. Of the 73 open, 51 are dampers that were outliers because we chose not to use the SQUG Air Handler equipment class guidelines. Instead, a separate damper class was developed for SQUG by EQE, which has been applied along with a second walkdown of the dampers. An analysis is currently being prepared by EQE that will document their acceptability. The remaining 22 open outliers will generally require minor physical modifications to remove potential interactions (rather than the use of analysis), and review of existing calculations. Also included in the open outliers are 3 AOVs for which operator manual actions are being reviewed to assure sufficient procedural guidance in the event air supply is lost, and 3 duct-mounted fans for which floor ARS do not exist.

Tanks & Heat Exchangers (25) - All 25 outliers have been resolved, although as identified in Item 1, EQE analyses are still being reviewed by DLC.

Cable tray & Conduit (7) - 4 have been resolved; 2 by reinstallation of missing attachment clamps, 1 by more accurately modeling floor connection details, and 1 by reviewing existing analysis to resolve an interaction issue. Of the remaining 3, analysis is being used for 2 (the nonsafety-related RCP power supplies, and rod-hung drain piping), and a minor modification may be required for the third (11 conduit support).

Contactors (17) - All 8 fire protection system contactors have been resolved, almost exclusively through replacement with IEEE 344-75 qualified relays. Review of previous modification documentation has resolved 1 of the 9 non-SQUG-qualified relays, while an EQE review of existing qualification documentation (BVPS and industry) has provided a reasonable preliminary basis for concluding that the remaining 8 relays can be considered to be acceptable. Such assessments will be formalized before these relays are considered to be resolved. Additionally, we currently intend to replace the 2 General Electric HGA relays that were bad actors, but which had acceptable SQUG system affects.

4. The response to this question can be found in Item 3.

BVPS commitment for complete resolution of all outliers remains the 13<sup>th</sup> refueling outage, currently scheduled for Spring, 2000.