March 2, 2006

Mr. Gary Van Middlesworth
Vice President
Duane Arnold Energy Center
3277 DAEC Road
Palo, Iowa 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER - REQUEST FOR ADDITIONAL INFORMATION RELATED TO THREE RELIEF REQUESTS ASSOCIATED WITH THE INSERVICE TESTING PROGRAM FOURTH 10-YEAR INTERVAL (TAC NOS. MC8713, MC8784 AND MC8785)

Dear Mr. Van Middlesworth:

Your letter of August 1, 2005, as supplemented by letter dated January 4, 2006, submitted three relief requests designated as relief request VR-01, PR-01, and PR-02, associated with the inservice testing program fourth 10-year interval. We are reviewing this information, and find that we need additional information as shown in the enclosed request for additional information (RAI). I discussed this RAI with Clara Rushworth of your organization on February 1, 2006, and she agreed to respond within 60 days of receipt of this RAI. Please contact me at (301) 415-2928 if you have questions.

Sincerely,

/RA/

Deirdre W. Spaulding, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
RAI

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

RELATED TO THREE RELIEF REQUESTS ASSOCIATED WITH

THE INSERVICE TESTING PROGRAM FOURTH 10-YEAR INTERVAL

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

Relief Request VR-01

1. Section 4.1 of NEDO-32977-A speculates that most excess flow check valve (EFCVs) fail to close due to sticking and Attachment A testing data identifies 21 failures on Browns Ferry Nuclear (BFN) Plant, Unit 2, and 5 failures on BFN, Unit 3, due to crud buildup and sticking after extended outages. Table 4-1 of NEDO-32977-A shows that both BFN and Duane Arnold Energy Center (DAEC) use the same make of EFCV. Considering that NEDO-32977-A indicates DAEC has included the EFCVs as a subset within the Maintenance Rule, please clarify the type of preventive maintenance, if any, performed on the EFCVs to prevent sticking and, if no maintenance is performed, please explain why such failures reported with similar make valves are not expected in the future when the valves are not exercised as frequently.

Please indicate if there is any preventive maintenance performed to preclude sticking or why failures with similar valves are not expected when the valves are not exercised as frequently.

2. Attachment B to NEDO-32977-A includes the radiological analysis of the consequences of an unisolable instrument line break. The consequences of several EFCVs sticking open following potential damage to multiple instrument lines caused by postulated high-energy line breaks outside containment have not been evaluated in the relief request. Please discuss the consequences of such postulated failures on multiple instrument lines that depend upon closure of excess flow check valves for isolation.

Please discuss the consequences of a common mode failure of several valves to close caused by sticking, in the event of a postulated high-energy line break outside containment. Please clarify if postulated high-energy line breaks outside containment do not impact these instrument lines.

Relief Request PR-01

1. The relief request does not identify an industry consensus standard as a technical basis for deviating from the acceptance criteria identified in Table ISTB-5100-1 for this pump. NUREG-1482, Revision 1, identifies that the acceptance criteria identified in the Operations & Maintenance (O&M) Code is based on an evaluation of empirical data and various acceptance criteria for pump vibration velocity established by U.S. industries, academia, international industry and foreign agencies. Please identify if an industry consensus standard exists that

ENCLOSURE

includes a technical basis for applying a relaxation in acceptance criteria from the O&M Code (industry standards such as the Hydraulics Institute, the International Standardization Organization (ISO), or manufacturer's recommendations, vibration analysis, Electric Power Research Institute (EPRI)).

Please address acceptance criteria in other industry standards which support an alternative technical basis. If other industry standards do not support alternative acceptance criteria, then please confirm and clarify that the technical basis relies on other sources such as manufacturer's evaluation, vibration analysis or EPRI.

2. The information included with the basis for relief identifies that DAEC has many years of inservice test data showing that baseline vibrations of 0.4 in/sec represent acceptable pump operation and that vibration levels have not trended upward. The licensee states that DAEC has had these vibration levels analyzed by an engineering consultant that specialized in vibration analysis and their analysis shows that this pump can operate at vibration levels up to 0.700 in/sec. Please identify the details of this vibration analysis and test data trends from when the pump was new or reference values, including the basis for the acceptance criteria. Please clarify if spectral analysis has been applied and if the vibration analysis has been reviewed and accepted by the pump manufacturer as an alternative to recommended modifications.

Please provide sufficient details of the vibration analysis. Although mention is made of the spectral/waveform analysis, the information does not include sufficient details of the analyses, including the evaluation criteria and pump manufacturer's evaluation.

3. No compensatory actions have been identified to justify accepting a higher level of vibration. Please explain how potential degradation in components will be detected. For example, please clarify if an oil analysis or inspections will be performed to detect degradation in bearings.

Please discuss any compensatory actions and discuss how bearing degradation will be detected.

4. Based on a review of manufacturer's information and other licensee relief requests, it appears that high vibration levels are common to this type of pump. Please identify the results of any industry technical inquiries with the American Society of Mechanical Engineers Code Committee on vibration acceptance criteria and please clarify why a code case is not more appropriate to evaluate a generic deviation from the O&M Code acceptance criteria. For example, complex configurations may require special guidance.

5. The licensee has not demonstrated that compliance would result in hardship or unusual difficulty. Please identify specific alternatives considered to lower the vibration level and their estimated costs. For example, the pump manufacturer has recommended that the most cost-effective solution is to replace the impeller if the alert limits are exceeded. Please address the results of any industry experience where other licensees have performed such modifications or other corrective actions should be addressed.

6. If other techniques, such as displacement monitoring, acceleration monitoring or acoustic detection, have been applied to monitor vibration levels, please submit the results of such monitoring.

7. To completely understand the nature of the vibration levels and the impact on operational readiness of the high-pressure coolant injection pump, please provide information regarding the pump operating history, bearing analysis, root cause analysis, wear rates, water temperature effects, fatigue considerations, maintenance practices and planned activities to reduce vibration levels within the Code acceptance criteria.

Relief Request PR-02

1. In the section entitled Basis for Relief, the licensee states that meeting the procurement and calibration requirements for these instruments to cover the range to the lower extreme (1.3 Hz) is impractical due to the limited number of vendors supplying such equipment and the level of sophistication and cost of the equipment. The availability of these instruments might have been impractical a decade ago. However, it appears that these instruments are readily available from several vendors today at reasonable cost. Please discuss your reasons for determining the impracticality of meeting this Code requirement today.

Duane Arnold Energy Center

cc:

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