

May 1, 1996

Mr. J. E. Cross
Senior Vice President and
Chief Nuclear Officer
Nuclear Power Division
Duquesne Light Company
Post Office Box 4
Shippingport, PA 15077

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING ELIMINATION OF
INSPECTION OF REACTOR COOLANT PUMP FLYWHEELS (WCAP-14535) - BEAVER
VALLEY POWER STATION, UNIT NOS. 1 AND 2 (TAC NOS. M94550 AND M94551)

Dear Mr. Cross:

By letter dated January 24, 1996, Duquesne Light Company (DLC) submitted
topical report WCAP-14535, "Topical Report on Reactor Coolant Pump Flywheel
Inspection Elimination," for NRC review and approval. DLC submitted this
report on the Beaver Valley Power Station dockets as the two lead plants for
certain Westinghouse Owners Group plants, and intended to demonstrate through
fracture mechanics analysis that the inspection and surveillance requirements
of Regulatory Guide 1.14 for the reactor coolant pump flywheels can be
eliminated.

The NRC staff has performed a preliminary review of the January 24, 1996,
submittal. However, we have determined that additional information is
required for us to complete our review of this submittal. The additional
information that is required is described in our attached RAI. DLC is
requested to provide its response to this RAI within 45 days of receipt of
this letter for us to complete our review within a timely manner.

Should you have any questions on this matter, please contact me at (301)-415-
1409.

Sincerely,
/s/

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

Docket Nos. 50-334/50-412

Enclosure: Request for Additional
Information

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cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

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Dear Mr. Cross:

By letter dated January 24, 1996, Duquesne Light Company (DLC) submitted topical report WCAP-14535, "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination," for NRC review and approval. DLC submitted this report on the Beaver Valley Power Station dockets as the two lead plants for certain Westinghouse Owners Group plants, and intended to demonstrate through fracture mechanics analysis that the inspection and surveillance requirements of Regulatory Guide 1.14 for the reactor coolant pump flywheels can be eliminated.

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Information

cc w/encls: See next page

J. E. Cross
Duquesne Light Company

Beaver Valley Power Station
Units 1 & 2

cc:

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REQUEST FOR ADDITIONAL INFORMATION
REGARDING ELIMINATION OF INSPECTION OF REACTOR
COOLANT PUMP FLYWHEELS (WCAP-14535)
BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2
DOCKET NOS. 50-334 AND 50-412

- (1) **Section 1.1 Previous Flywheel Integrity Evaluations, Page 1-3** - It was stated, "Since shrink fit forces would retard the growth of radial cracks in the keyway area, they were omitted from the analysis of the keyway crack." Physically, the shrink fit forces can be considered as internal pressure acting on the inner bore of the reactor coolant pump (RCP) flywheel. Thus, it would accelerate, not retard, the growth of radial cracks in the keyway area. Provide sufficient finite element modelling details and results to validate your claim or revise your results by taking into account the effect due to shrink fit forces, which was shown by the Combustion Engineering Owners Group in report SIR-94-080, "Relaxation of Reactor Coolant Pump Flywheel Inspection Requirements," which was submitted to the NRC on April 4, 1995, on dockets 50-313 and 50-368. These shrink fit forces were shown in that report to be capable of producing stresses of comparable magnitude to those produced by the centrifugal force when the flywheel was running at the normal operational speed.
- (2) **Section 1.1 Previous Flywheel Integrity Evaluations, Page 1-3** - The fatigue analysis is dependent on the premise that UT equipment used for examinations of RCP flywheels at these facilities is capable of accurately detecting and sizing a 0.24 inch long near surface flaw. Provide your basis supporting the probability of detection (POD) for the examinations performed. Provide details on how the POD values were determined, qualified, and used in concluding the assumed size of the initial flaw.
- (3) **Section 3 Inspection, Page 3-1 to 3-6** - Provide additional information regarding whether the UT examinations at Beaver Valley Power Station, Unit Nos. 1 and 2 were qualified relative to inspection of RCP flywheels. Regardless of whether a formal qualification was performed, please include in your response the following:
 - a. Any information supporting qualification of the examinations of RCP flywheels.
 - b. Any information supporting qualification of the personnel performing the examinations of RCP flywheels.
 - c. Any information regarding the degree of uncertainty in UT measurements based on the procedures and personnel qualification basis.

- (4) **Section 4.3 Nonductile Failure Analysis** - It was stated, "It was shown that cracks emanating from the center of the keyway yielded higher stress intensity factors than cracks emanating from the keyway corner, and" Provide the detailed stress plot around the keyway area from your finite element method analysis and provide an estimation of the stress intensity factors for the case when the perturbed stress distribution due to the keyway is used instead of the closed form solution used in this report.
- (5) **Section 4.4 Excessive Deformation Analysis** - Table 4-5 listed the change in bore radius at the speed of 1500 rpm for flywheels in various flywheel groups. Provide the amount of original shrink-fit and the percentage of shrink-fit lost at 1500 rpm for the typical flywheel in each flywheel group of the table.