

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Richard A. Muench
Vice President Engineering

April 15, 1997

ET 97-0037

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

Reference: 1) Letter ET 96-0097 dated December 3, 1996 from
R. A. Muench, WCNOG, to NRC

2) Letter ET 97-0027 dated March 21, 1997 from
R. A. Muench, WCNOG, to NRC

Subject: Docket No. 50-482: Supplement to the Amendment Request
for Technical Specification 6.8.5.b, Reactor Coolant Pump
Flywheel Inspection Program

Gentlemen:

This letter provides a supplement to the application for amendment to Facility Operating License No. NPF-42 for Wolf Creek Generating Station concerning the Reactor Coolant Pump Flywheel Inspection Program. Reference 1 provided an application for amendment to revise Technical Specification 6.8.5b, Reactor Coolant Pump Flywheel Inspection Program, to provide an exception to the examination requirements in Regulatory Guide 1.14, Revision 1, "Reactor Coolant Pump Flywheel Integrity." Based on telecon between Wolf Creek Nuclear Operating Corporation (WCNOG) and the NRC on March 7, 1997, Reference 2 was submitted and replaced Reference 1 in its entirety. Subsequently, the NRC and WCNOG determined that the proposed amendment request did not adequately address delaying the 10-year volumetric and surface examinations for the "D" Reactor Coolant Pump to the Fall 1997 refueling outage.

This supplement provides a justification for delaying the 10-year complete volumetric and surface examination for the "D" Reactor Coolant Pump to the Fall 1997 refueling outage. Technical Specification 6.8.5.b is modified to provide an exception to allow delaying the 10-year volumetric and surface examinations. The attached pages replace pages in Reference 2.

The proposed amendment request proposes an exception to the examination requirements in Regulatory Guide 1.14, Revision 1, proposes delaying the 10-year volumetric and surface examinations for the "D" Reactor Coolant Pump and corrects a typographical error in Technical Specification 6.8.5.c.



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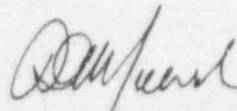
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The conclusions reached in the Safety Evaluation, No Significant Hazards Consideration Determination and Environmental Impact Determination remain valid for the supplemental information.

In accordance with 10 CFR 50.91, a copy of this revision to our original application, with attachments, is being provided to the designated Kansas State Official. This proposed revision to the WCGS Technical Specifications will be implemented within 30 days of formal NRC approval.

If you have any questions concerning this matter, please contact me at (316) 364-8831, extension 4034, or Mr. Richard D. Flannigan, at extension 4500.

Very truly yours,



Richard A. Muench

RAM/jad

Attachments: Revised pages to ET 97-0027

cc: V. L. Cooper (KDHE), w/a
W. D. Johnson (NRC), w/a
E. W. Merschoff (NRC), w/a
J. F. Ringwald (NRC), w/a
J. C. Stone (NRC), w/a

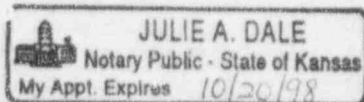
STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Richard A. Muench, of lawful age, being first duly sworn upon oath says that he is Vice President Engineering of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the content thereof; that he has executed that same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By *Richard A. Muench*
Richard A. Muench
Vice President
Engineering

SUBSCRIBED and sworn to before me this 15th day of April, 1997.

Julie A. Dale
Notary Public



Expiration Date 10/20/98

Safety Evaluation

Proposed Change

This license amendment request proposes to revise the Wolf Creek Generating Station (WCGS) Technical Specification 6.8.5b, Reactor Coolant Pump Flywheel Inspection Program to provide an exception to the examination requirements in Regulatory Guide 1.14, Revision 1, "Reactor Coolant Pump Flywheel Integrity." The proposed exception to the recommendations of Regulatory Position C.4.b would allow for an acceptable inspection method of either an ultrasonic volumetric or surface examination. The acceptable inspection method would be conducted at approximately 10-year intervals. The amendment request also proposes delaying the 10-year volumetric and surface examinations for the "D" Reactor Coolant Pump to the Fall 1997 refueling outage.

This license amendment request additionally corrects a typographical error in Technical Specification 6.8.5c, Containment Tendon Surveillance Program. This specification incorrectly references draft Revision 3 of Regulatory Guide 1.35, dated April, 1989. Draft Revision 3 of Regulatory Guide 1.35 was issued in April, 1979. WCNOG submitted a license amendment request on May 24, 1994 (NA 94-0089) and a supplemental letter on April 6, 1995 (CO 95-0032) which proposed to incorporate improvements in scope and content endorsed by the NRC in its Final Policy Statement on Technical Specifications for Improvements for Nuclear Power Reactors. As a result of this request, specification 6.8.5c was proposed with an incorrect issuance date of the draft Regulatory Guide. The Updated Safety Analysis Report, Appendix 3A, correctly references draft Revision 3 of Regulatory Guide 1.35, dated April 1979.

Background

Regulatory Guide 1.14, Revision 1, Regulatory Position C.4.b states "Inservice inspection should be performed for each flywheel as follows: (2) A surface examination of all exposed surfaces and complete ultrasonic volumetric examination at approximately 10-year intervals, during the plant shutdown coinciding with the inservice inspection schedule as required by Section XI of the ASME Code." In February 1995, a change to the Updated Safety Analysis Report (USAR) was implemented to add an exception to the commitments to Regulatory Guide 1.14, Revision 1, to address the frequency of the flywheel inspection. Because of a change to the 10-year reactor coolant pump (RCP) motor refurbishment schedule, examination of the flywheel in the RCP "D" motor was not performed prior to the completion of the 10-year inservice inspection interval, including the extension allowed by ASME Section XI. Subsequently, during an NRC inspection conducted during the period October 7, 1996 through October 25, 1996, the NRC indicated that the proposed exception should have been reviewed and approved by the NRC as a change to the Technical Specifications.

Evaluation

An integral part of the reactor coolant system (RCS) in pressurized water reactor plants is the RCP, a vertical, single stage, single-suction, centrifugal, shaft seal pump. The RCP ensures an adequate cooling flow rate by circulating large volumes of the primary coolant water at high temperature and pressure through the RCS. Following an assumed loss of power to the RCP motor, the flywheel, in conjunction with the impeller and motor assembly,

provide sufficient rotational inertia to assure adequate cooling flow during RCP coastdown. This forced flow and the subsequent natural circulation effect of the RCS results in adequate core cooling.

During normal power operation, the RCP flywheel possesses sufficient kinetic energy to produce high energy missiles in the event of failure. Conditions which may result in overspeed of the RCP increases both the potential for failure and the kinetic energy of the flywheel. This led to issuance of Regulatory Guide 1.14 which provided recommendations of actions to ensure flywheel integrity.

Integrity of the RCP flywheel is assured on the basis of the use of suitable material, adequate design and inspection. The calculated stresses at operating speed are based on stresses due to centrifugal forces. The stress resulting from the interference fit of the flywheel on the shaft is less than 2,000 psi at zero speed, but this stress becomes zero at approximately 600 rpm because of radial expansion of the hub. The RCPs run at approximately 1,190 rpm and may operate briefly at overspeeds of 109 percent during loss of load. For conservatism, however, 125 percent of operating speed was selected as the design speed for the pumps. The flywheels were given a preoperational test of 125 percent of the maximum synchronous speed of the motor. The flywheel consists of two thick plates bolted together. The flywheel material is produced by a process that minimizes flaws in the material and improves its fracture toughness properties, such as vacuum degassing, vacuum melting, or electroslog remelting. Each plate is fabricated from SA-533, Grade B, Class 1 steel.

Previous Examination Results

RCP flywheel examinations are performed in accordance with the WCGS Inservice Inspection Program during refueling outages or motor refurbishment. The results of full volumetric examinations and complete surface examinations, including bore and keyway areas performed by WCNOG during the first inservice inspection interval (see Table 1) met the recommendations of the Regulatory Guide. Additionally, the in-place volumetric examinations of the RCP flywheels at approximately 3-year intervals were performed with no recordable indications detected.

WCNOG shares a spare RCP motor with Union Electric's Callaway Plant. This allows RCP motor refurbishment to be performed with each motor transported offsite. WCNOG performs the required 10-year inservice inspections during this refurbishment because accessibility for flywheel inspection is better and the work environment is improved, e.g., not restricted to examination within the bioshield or other locations within the Containment structure.

RCP motor "D" is not represented in Table 1 because the 10-year inservice inspection was not performed. The flywheel to the refurbished RCP motor scheduled for change out in the Spring 1993 refueling outage had its 10-year examination performed in 1992. However, changes to the RCP motor refurbishment schedule resulted in not replacing the motor in the sixth refueling outage. This resulted in an additional refueling outage necessary to complete the examination of all RCPs motor flywheels and exceeding the 10-year inspection interval. Although the 10-year examination had not been performed as required by Regulatory Guide 1.14, the 3-year examination was

successfully completed as scheduled with no indications identified. The three year examination was a volumetric examination of the higher stress areas and was performed from the gage holes to the bore and keyways. The radius of the flywheel is 37.5 inches and the gage holes are 14.5 inches from the center of the flywheel. Therefore, the 3-year examination covered slightly less (approximately 4 inches) than the circle of one-half the outer radius.

WCAP-14535, "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination," was submitted to eliminate examinations of the flywheels. Based on the evaluation provided in the WCAP, the NRC approved (Safety Evaluation Report dated September 12, 1996) a reduction in the flywheel examination requirements. Licensees may now perform an ultrasonic examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination of all exposed surfaces on an approximate 10-year frequency in lieu of the current examination schedule established by Regulatory Guide 1.14, Revision 1.

Since the previously performed 3-year examination conducted by WCNOG does not completely satisfy the reduced flywheel examination requirements, an exception to the Technical Specification 6.8.5.b examination requirements is necessary. The evaluation provided by the NRC SER, the low probability of RCP motor flywheel failure as documented in WCAP-14535, and performance of the 3-year examination on RCP motor "D" performed in September 1994 provides an acceptable level of safety for delaying the 10-year volumetric and surface examination to the Fall 1997 refueling outage. The 10-year volumetric and surface examination will be completed prior to startup from the Fall 1997 refueling outage

Table 1
Full 10-Year Surface and Volumetric Examinations

Year	RCP ID	Examination	Results
1991	B	Complete MT (PT of bore/keyway) and UT of high stress regions and 0° UT of full volume.	No indications
1994	C	Complete MT (PT of bore/keyway) and UT of high stress regions and 0° UT of full volume.	No indications
1995	A	Complete MT (PT of bore/keyway) and UT of high stress regions and 0° UT of full volume.	Circular spacer wear marks on bottom surface within area of seal ring.

WCAP-14535 "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination"

WCAP-14535 documents the results of flywheel inspections from approximately 57 nuclear stations covering approximately 217 flywheels and 729 examinations. The results show that there were no indications found that would affect the integrity of the flywheels. A number of recordable indications found were in the form of nicks and gashes in the keyway area created as a result of the disassembly and subsequent reassembly required to perform the flywheel inspections.

The results of flywheel inspections presented in WCAP-14535 show that flywheel integrity and plant safety are increased by eliminating flywheel inspections. Detailed stress and fracture analyses as well as risk analysis have been completed with the results indicating that there would be no change in the probability of failure for RCP flywheels if all inspections were eliminated.

The NRC documented in their SER (letter dated September 12, 1996) to Duquesne Light Company that it was acceptable to reference WCAP-14535 in license applications to the extent specified and under the limitation delineated in the report and the associated NRC SER. The SER concluded that inspections should not be completely eliminated and should be conducted during scheduled inservice inspections or RCP motor maintenance at approximately 10-year intervals. WCNOG has confirmed that the flywheels are made of SA-533 B material (as discussed above) and that the items specified for accepting this amendment request in the conclusions section of the SER are met.

Based on the above discussions and the no significant hazards consideration determination presented in Attachment II, the proposed changes do not increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report; or create a possibility for an accident or malfunction of a different type than any previously evaluated in the safety analysis report; or reduce the margin of safety as defined in the basis for any technical specification. Therefore, the proposed changes do not adversely affect or endanger the health or safety of the general public or involve a significant safety hazard.