UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

May 31, 1995

NRC INFORMATION NOTICE 95-26: DEFECT IN SAFETY-RELATED PUMP PARTS DUE TO INADEQUATE HEAT TREATMENT

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to a potential for pump failure as a result of inadequate heat treatment of pump parts. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On October 19, 1994, Westinghouse issued a written report pursuant to Part 21 of Title 10 of the *Code of Federal Regulations* (Part 21) (Accession No. 9411010251), regarding a defect found in the "JHF" model safety injection pumps that were manufactured by Ingersoll-Dresser Pump (IDP) Company. The defect comprises several axial cracks in the pressure-reducing sleeve locknut, which is made of Type 416 stainless steel. The failure mechanism was attributed to stress corrosion cracking which primarily was caused by a martensite phase hardness of 47 Rc (Rockwell Scale C). It is known that 400 series stainless steel with a hardness in excess of 40 Rc is highly susceptible to intergranular stress corrosion cracking in aqueous environments. The heat treatment for this pump part was specified to be 27-32 Rc.

Although the problem was at first thought to be limited to the locknut on the pressure-reducing sleeve within the IDP pump, Westinghouse and IDP have determined that other pump parts may be affected by the same problem. On February 20, 1995, Westinghouse issued a final Part 21 report which indicated that (1) in addition to the subject locknut, other pump parts could be affected by the same problem and (2) the problem is limited to IDP pump parts that were made of Type 416 stainless steel, processed under heat treatment process "HT 21," and that were taken from heat numbers 15899 and 28144.

The detailed Westinghouse final Part 21 report (Accession No. 9503020053) on this issue is attached (Attachment 1).

PDR I+E Notice 95-026 950531

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updated on 6/2/95

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Discussion

As noted in the attached Westinghouse Part 21 report, the suspect parts are used in intermediate-head safety injection pumps, auxiliary feedwater pumps, and charging/high-head safety injection pumps in various plants. The defect in these pump parts, if not corrected, could result in pump failure. The loss of these pumps during a design-basis accident could affect accident mitigation.

Some of these affected pumps have been in operation for more than 10 years. Because of the importance of these pumps to plant safety, Westinghouse has recommended that the affected pump parts be replaced with the parts currently recommended by IDP.

An IDP safety injection pump (model "JTCH") failed during a post-maintenance test at Indian Point Unit 3 on February 19, 1995. Inspection of the internal components of the pump revealed that the locknut on the outboard shaft had backed off about 6.35 mm [0.25 inch]. The loosened locknut allowed the pump impellers to move axially, and allowed them to rub against the stationary diffusers and the casing, and ultimately resulted in pump failure. Although the root cause of this failure is unrelated to the problem reported by Westinghouse, a similar pump failure could occur if the locknut on the pressure-reducing sleeve, mentioned in the Westinghouse Part 21 report, failed.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Brian K. Grimes, Director
Division of Project Support
Office of Nuclear Reactor Regulation

Technical contacts: James A. Davis, NRR
(301) 415-2713

Peter C. Wen, NRR
(301) 415-2832

Attachments:
1. Westinghouse Part 21 Report, February 20, 1995
2. List of Recently Issued NRC Information Notices

FAXED 2/20/95 301/816-5151

NTD-NRC-95-4403

Westinghouse Electric Corporation Energy Systems

Nuclear Technology Division
Box 355
Pittsburgh Pennsylvania 15230-0355

February 20, 1995

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

9501

Subject: Update to 10CFR21 Report Contained in Westinghouse Letter NTD-NRC-94-4320, dated 10/19/94 and Status Report Contained in Westinghouse Letter NTD-NRC-94-4361, dated 12/21/94

Reference:
1. Letter NTD-NRC-94-4320, N. J. Liparulo to Document Control Desk, 10/19/94
2. Letter NTD-NRC-94-4361, N. J. Liparulo to Document Control Desk, 12/21/94
3. Westinghouse Nuclear Safety Advisory Letter, NSAL-94-023, 10/26/94

The following information is provided as an update to the 10 CFR 21 report that was previously identified to you in References 1 and 2.

BACKGROUND

Reference 1 identified a defect, as defined under 10CFR21, regarding the pressure reducing sleeve locknut of the JHF Model Safety Injection Pump that was manufactured by Ingersoll Dresser Pump (IDP) Company and supplied to several nuclear power plants by Westinghouse and IDP. Westinghouse also notified the affected licensees about the defect via Reference 3.

Reference 1 indicated that IDP would perform a review of the applicable 400 series stainless steel parts and applicable heat treatments on other safety related pumps it supplied to the nuclear power industry to determine whether this situation could apply to other parts on other safety related pumps. This review was completed on December 15, 1994.

Westinghouse notified the NRC about the results of this review via Reference 2. The results of the review indicated that the failure mechanism appears to be limited to IDP pump parts that consist of 416 SS, processed under IDP heat treatment process "HT 21" and taken from IDP heat numbers #15899 and #28144. Also, the review indicated that additional pump parts may be susceptible to the same failure mechanism. Reference 2 indicated that IDP would determine whether the failure of the additional pump parts would prevent the applicable pump from performing its intended safety function.

This review has been completed and indicates that some of the additional pump parts may also constitute a defect, as defined in 10 CFR 21, which could create a substantial safety hazard. The following report provides more information about these additional pump parts.

9503020053 11pp.

EVALUATION

IDP's evaluation results indicate that all 416 SS parts processed under IDP heat numbers #15899 and #28144 are susceptible to the same failure mechanism as the pressure reducing sleeve locknuts. These parts have been divided into three categories.

The first category includes parts which were supplied with the original pump assembly and whose failure could prevent the pump from performing its intended safety function. These parts and the applicable plants are identified in Table 3. Also, note that these parts include the pressure reducing sleeve locknuts that were the parts originally identified in Reference 1.

The second category includes parts which were supplied with the original pump and whose failure would not prevent the pump from performing its intended safety function. These parts are identified in Table 4. The parts should be replaced as a prudent maintenance activity. It should be emphasized that these parts do not constitute defects pursuant to 10 CFR 21 since the failure of the parts should not prevent the pump from performing its intended safety function. However, they are included in this letter to identify the results of the evaluations that are mentioned in References 1 and 2.

The third category includes the parts which were supplied as replacement pump parts and whose failure could prevent the pump from performing its intended safety function. Most of the replacement parts were supplied directly to the utilities by IDP. These parts and the applicable plants are identified in Table 5. Please note that Table 5 has been divided into two lists. One list ("Parts from Identified Material") includes the replacement parts that are known to have been taken from heat #15899 and #28144. The other list ("Parts from Unidentified Material") includes those parts which could have been manufactured from either heat #15899 or #21844, based on the time of manufacture, original material specification and part size. However, there is no documentation to specifically identify the heat number from which the part was taken. Therefore, it was assumed that the parts were taken from heat #15899 and #21844.

The identification of the parts in Tables 3, 4 and 5 is based on several reported part failures, a failure analysis of failed parts and engineering judgement. Duke Power Company reported two separate failures (cracking) of the pressure reducing sleeve locknuts on JHF model safety injection pumps. Both locknuts consisted of 416 SS and were processed under heat #15899. Duke Power performed a failure analysis on each locknut. The failure analysis indicated that the failure mechanism was stress corrosion cracking. The analysis also indicated that each locknut's susceptibility to stress corrosion cracking was increased by a relatively high martensite phase hardness which allegedly resulted from an insufficient tempering operation. A comparison of the Duke Power Failure analysis report and the IDP heat treatment specification and heat material certification is provided in Table 1.

Table 1: Pressure Reducing Sleeve Locknut - Comparison of Duke Power Company Failure Analysis to IDP Heat Treatment Specification and Material Certification

	Hardness (Rc)	
	First Locknut	Second Locknut
Failure Analysis - Bulk Phase	35	32-33
Failure Analysis - Microhardness	45-49	42-44
Heat Treatment "HT21" Specification	27-32	
Heat #15899 Material Certification Bulk Phase Hardness	27	

The existence of two failures and the data in Table 1 provide a basis to conclude that the locknuts are defects as defined in 10 CFR 21. First, it should be noted that 400 series SS with a hardness of greater than 40 Rc is very susceptible to intergranular stress corrosion cracking in aqueous environments. Table 1 indicates that for both locknuts, the microhardness was higher than 40 Rc. Also, Table 1 indicates that for both locknuts, the bulk phase hardness measured in the failure analysis was significantly higher than the bulk phase hardness provided on the material certification sheet. It could not be determined why these bulk phase hardness values are different. Since, the microhardness was greater than 40 Rc, the bulk phase hardness difference could not be attributed to any specific reason. However, since the cracking was observed on each locknut, it was determined that all parts from heat #15899 could be susceptible to the same failure.

In addition to the above, Duke Power Company recently discovered cracking on a spacer sleeve in another JHF model safety injection pump. The spacer sleeve consisted of 416 SS and was processed under IDP heat treatment specification "HT 21". However, the spacer sleeve was taken from a different heat, which was heat #28144. Duke Power performed a failure analysis on the spacer sleeve and determined that the failure mechanism was also stress corrosion cracking. Also, the failure analysis indicated that the spacer sleeve's hardness made the sleeve marginally acceptable for service in aqueous environments. A comparison of the Duke Power Failure analysis report and the IDP heat treatment specification and heat material certification for the spacer sleeve is provided in Table 2.

Table 2: Impeller Spacer Sleeve - Comparison of Duke Power Company Failure Analysis to IDP Heat Treatment Specification and Material Certification

	Hardness (Rc)
Failure Analysis - Bulk Phase	26-30[1]
Failure Analysis - Microhardness	33-39
Heat Treatment "HT21" Specification	27-32
Heat #28144 Material Certification - Bulk Phase Hardness	27

The existence of the cracked spacer sleeve and the data in Table 2 provide a basis to conclude that the spacer sleeve is a defect as defined in 10 CFR 21. First, the measured microhardness of 33-39 Rc is higher than the material certification value of 27 Rc. It is less than 40 Rc, but nonetheless is marginally susceptible to stress corrosion cracking in aqueous environments. The bulk phase hardness range is somewhat higher than the material certification value, but it is still within the heat treatment specification range of 27-32 Rc. Based on this information, it was concluded that all parts used from heat #28144 could be susceptible to the same failure mechanism.

Finally, and as mentioned, Tables 1 and 2 indicate that there is some difference between the bulk phase hardness value and the material certification values. There are no apparent reasons for these differences. Furthermore, Tables 1 and 2 indicate that there are significant differences between the bulk hardness and the microhardness values. There are no apparent reasons for these differences; however, it may be postulated that the differences are attributable to insufficient tempering. IDP has

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[1] This value was determined from the uncracked spacer sleeve on the same pump. Both the uncracked and cracked sleeves were taken from Heat #28144.

not received any additional reports of part failures involving 416 SS under heat treatment specification "HT21". Therefore, it was concluded that the failures should be limited to only those parts that were taken from heats #15899 and #21844.

Table 3 identifies all pump parts that were originally supplied with a pump, taken from heat #15899 and #28144 and whose failure could prevent the applicable pump from performing its intended safety function. Table 4 identifies the parts that were originally supplied with a pump, taken from heat #15899 and #28144 and whose failure would not prevent the pump from performing its intended safety function. However, it is recommended that the parts in Table 4 be replaced as a prudent maintenance practice. Finally, Table 5 identifies the replacement pump parts that were either supplied or believed to have been supplied from heat #15899 and #28144 and whose failure could prevent the applicable pump from performing its intended safety function.

SAFETY SIGNIFICANCE

The safety significance for the failure of each part identified in Tables 3, 4 and 5 is provided as follows. The failure of the parts in Tables 3 and 5 could prevent the pump from operating. For Table 4, the part failure should not prevent the pump from operating. More detailed information for the parts identified in Tables 3, 4 and 5 will be provided directly to each utility.

The pumps identified in Table 3 are all JHF model safety injection pumps. These pumps are used in the intermediate head safety injection system for the applicable plants. The loss of these pumps during the short term mitigation period of a loss of coolant accident (LOCA) would impair the plant's ability to mitigate the consequences of the LOCA. The loss of the pump (or pumps) would reduce the overall flow to the core, which could create a condition that is a substantial safety hazard.

The pumps identified in Table 5 include the intermediate head safety injection, auxiliary feedwater, and charging/safety injection pumps. The intermediate head pumps are discussed above. The auxiliary feedwater pumps are used to provide feedwater to the steam generators during certain accident conditions. The loss of these pumps during a feedwater line break accident would impair the plant's ability to recover from the break. The loss of the pump (or pumps) would reduce the available secondary side cooling, which could create a condition that is a substantial safety hazard.

The charging/safety injection pumps are used in the high head safety injection system for the applicable plants. The loss of these pumps during the short term mitigation phase of a LOCA would impair the plant's ability to mitigate the consequences of the LOCA, especially for a small break LOCA. The loss of the pump (or pumps) would reduce the overall flow to the core, which could create a condition that is a substantial safety hazard.

RECOMMENDATIONS

The following recommendations are provided for this issue.

1. Review Tables 3, 4 and 5 to determine whether the plant has any parts that could be affected by this failure mechanism. The parts identified in Table 3 and 5 are considered defects as defined in 10 CFR 21. Although the parts in Table 4 are not considered defects pursuant to 10 CFR 21, the parts in Table 4 should eventually be replaced as a prudent maintenance practice since these parts are susceptible to the same failure mechanism.

2. Compare the information for the part in Tables 3, 4 and 5 to determine whether the part is currently installed on the pump. In some cases, this part may have been changed after the part was supplied.

3. For parts in Table 3 and 5, if it is determined that the pump part is currently installed on the pump, then the following should be considered. First, as indicated in Table 5, if the affected part is a shaft sleeve compression nut or a shaft sleeve collar, the part can be inspected for cracking without disassembly of the pump.

   Alternatively, if the affected part can not be inspected without disassembly of the pump and it is not practical to immediately disassemble the pump, then the pump operating history should be reviewed relative to the mechanism for stress corrosion cracking. The mechanism for stress corrosion cracking is dependent upon several factors including, but not limited to, the amount of stress placed on the part, the time the part is exposed to that stress, the time exposed to an aqueous environment and the physical dimensions of the part. By reviewing these factors, it may be possible to demonstrate that the part failure is not imminent and/or that the part will not fail in a manner that will prevent the pump from performing its intended safety function. However, it is ultimately recommended that the part be replaced with the part currently recommended by IDP.

The above information is being concurrently transmitted to affected utilities via supplement to Westinghouse letter NSAL-94-023.

If you have any questions regarding this transmittal, please contact H. A. Sepp of my staff on 412/374-5282.

Very truly yours,

N. J. Liparulo, Manager
Nuclear Safety Regulatory and Licensing Activities

JWF/p

cc: R. E. Joines/IDP
G. Morrissey/IDP

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TABLE 3
ORIGINAL CONSTRUCTION PUMP PARTS FROM HEAT #15899 AND #28144

Utility	Units	Pump Model/Serial #	Part	Year Shipped
Kansai	Obi 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49347 49348 49349 49350	Impeller Locknut Pressure Reducing Sleeve Locknut Spacer Sleeves	1975
TVA	Watts Bar 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49351 49352 49353 49354	Impeller Locknut Pressure Reducing Sleeve Locknut Spacer Sleeves	1975
Duke Power	McGuire 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49355 49356 49357 49358	Impeller Locknut Pressure Reducing Sleeve Locknut Spacer Sleeves	1975
Duke Power	Catawba 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49359 49360 49361 49362	Impeller Locknut Pressure Reducing Sleeve Locknut Spacer Sleeves	1976
Commonwealth Edison	Braidwood 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49762 49763 49764 49765	Impeller Locknut Pressure Reducing Sleeve Locknut Spacer Sleeves	1978

TABLE 3 - continued
ORIGINAL CONSTRUCTION PUMP PARTS FROM HEAT #15899 AND #28144

Utility	Units	Pump Model/Serial #	Part	Year Shipped
Commonwealth Edison	Byron 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49758 49759 49760 49761	Impeller Locknut Pressure Reducing Sleeve Locknut Spacer Sleeves	1978
Public Service of Indiana	Marble Hill 1 & 2	JHF 10 Stage (Service Unknown) 49754 49755 49756 52079	Impeller Locknut Pressure Reducing Sleeve Locknut Spacer Sleeves	1978
Wolf Creek Nuclear Operating Company	Wolf Creek	JHF 11 Stage (Intermediate Head Safety Injection) 51647 51648	Spacer Sleeves	1977
Aerojet Nuclear	Bettis Atomic Power Lab	JHF 10 Stage (Service Unknown) 49756	Impeller Locknut Spacer Sleeves	1976

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TABLE 4
ORIGINAL CONSTRUCTION PUMP PARTS FROM HEAT #15899 AND #28144,
REPLACEMENT OF PART IS NOT MANDATORY

Utility	Units	Pump Model/Serial #	Part	Year Shipped
Kansai	Ohi 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49347 49348 49349 49350	Split Rings	1975
TVA	Watts Bar 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49351 49352 49353 49354	Split Rings	1975
Duke Power	McGuire 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49355 49356 49357 49358	Split Rings	1975
Duke Power	Catawba 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49359 49360 49361 49362	Split Rings	1976

TABLE 4 - continued
ORIGINAL CONSTRUCTION PUMP PARTS FROM HEAT #15899 AND #28144, REPLACEMENT OF PART IS NOT MANDATORY

Utility	Units	Pump Model/Serial #	Part	Year Shipped
Commonwealth Edison	Braidwood 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49762 49763 49764 49765	Split Rings	1978
Commonwealth Edison	Byron 1 & 2	JHF 10 Stage (Intermediate Head Safety Injection) 49758 49759 49760 49761	Split Rings	1978
Public Service of Indiana	Marble Hill 1 & 2	JHF 10 Stage (Service Unknown) 49754 49755 49756 52079	Split Rings	1978
Wolf Creek Nuclear Operating Company	Wolf Creek 1	JHF 11 Stage (Intermediate Head Safety Injection) 51647 51648	Split Rings	1977
Aerojet Nuclear	Bettis Atomic Power Lab	JHF 10 Stage (Service Unknown) 49756	Split Rings	1976

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TABLE 5
REPLACEMENT PUMP PARTS FROM HEAT #15899 AND #28144

Utility	Units	Pump Model/Serial #	Part	Year Shipped
Parts from Heat 15899 and 28144 (See Note 1)				
Commonwealth Edison	Zion 1	JTCH 10 Stage (Auxiliary Feedwater) 45796	Impeller Locknut Shaft Sleeve Compression Nut Rad Shaft Sleeve Compression Nut Thr	11/18/75
Parts from Unidentified Material (See Note 1)				
Alabama Power	Farley 2	IJ 11 Stage (Charging/Safety Injection) 47669	Shaft Sleeve Collar	10/13/78
Commonwealth Edison	Zion 1	JTCH 10 Stage (Auxiliary Feedwater) 45796	Impeller Locknut Rad	4/29/75
Commonwealth Edison	Zion 1	JTCH 10 Stage (Auxiliary Feedwater) 45796 45797	Impeller Locknut Rad	9/16/77
Consolidated Edison	Indian Point	JTCH 10 Stage (Safety Injection) 43461 43466	Impeller Locknut Rad Shaft Sleeve Compression Nut	8/11/76
Duquesne Light	Beaver Valley 1	IJ (Charging/Safety Injection) 46351	Shaft Sleeve Collar	9/3/76
Indiana Michigan Power	Cook 2	IJ (Charging/Safety Injection) 45607	Shaft Sleeve Collar	9/3/76

TABLE 5 - continued
REPLACEMENT PUMP PARTS FROM HEAT #15899 AND #28144

Utility	Units	Pump Model/Serial #	Part	Year Shipped
Kansai Electric	Ctr. 1 & 2	IJ (Charging/Safety Injection) 48566 48569	Shaft Sleeve Collar	5/31/78
Northern States Power	Prairo Island 1 & 2	UNI 11 Stage (Auxiliary Feedwater) 46578 46581	Impeller Locknut Pressure Reducing Sleeve Locknut	12/29/76
Portland General Electric	Trojan	IJ (Charging/Safety Injection) 45603	Shaft Sleeve Collar	10/4/77
Pacific Gas & Electric	Diablo Canyon #2	JTCH 10 Stage (Safety Injection) 45489	Shaft Sleeve Compression Nut	12/30/77
Public Service Electric and Gas	Salem 1	JTCH 10 Stage (Safety Injection) 45493	Shaft Sleeve Compression Nut	11/14/79
Public Service Electric and Gas	Salem 2	IJ 11 Stage (Charging/Safety Injection) 45613	Shaft Sleeve Collar	9/6/77
Public Service Electric and Gas	Salem	IJ 11 Stage (Charging/Safety Injection) 45603	Shaft Sleeve Collar	1977
Public Service Electric and Gas	Salem 1	JTCH 10 Stage 45493 45494	Shaft Sleeve Compression Nut	2/2/78

Notes:
1. This Table is divided into two sections. The first section titled "PARTS FROM HEATS 15899 OR 28144" are those parts identified in the record search as having come from material heat 15899 or 28144. The second section titled "PARTS FROM UNIDENTIFIED MATERIAL" are those parts which could have been manufactured from either heat based on time of manufacture, original material specification, part size, etc., but for which there is no documentation on the material used.

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LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
94-61, Supp. 1	Corrosion of William Power Gate Valve Disc Holders	05/25/95	All holders of OLs or CPs for nuclear power reactors.
95-25	Valve Failure during Patient Treatment with Gamma Stereotactic Radiosurgery Unit	05/11/95	All U.S. Nuclear Regulatory Commission Medical Licensees.
95-24	Summary of Licensed Operator Requalification Inspection Program Findings	04/25/95	All holders of OLs or CPs for nuclear power reactors.
95-23	Control Room Staffing Below Minimum Regulatory Requirements	04/24/95	All holders of OLs or CPs for nuclear power reactors and all licensed operators and senior operators at those reactors.
95-22	Hardened or Contaminated Lubricants Cause Metal Clad Circuit Breaker Failures	04/21/95	All holders of OLs or CPs for nuclear power reactors.
95-21	Unexpected Degradation of Lead Storage Batteries	04/20/95	All holders of OLs or CPs for nuclear power reactors.
94-64, Supp. 1	Reactivity Insertion Transient and Accident Limits for High Burnup Fuel	04/06/95	All holders of OLs or CPs for nuclear power reactors.
95-18, Supp. 1	Potential Pressure-Locking of Safety-Related Power-Operated Gate Valves	03/31/95	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

Discussion

As noted in the attached Westinghouse Part 21 report, the suspect parts are used in intermediate-head safety injection pumps, auxiliary feedwater pumps, and charging/high-head safety injection pumps in various plants. The defect in these pump parts, if not corrected, could result in pump failure. The loss of these pumps during a design-basis accident could affect accident mitigation.

Some of these affected pumps have been in operation for more than 10 years. Because of the importance of these pumps to plant safety, Westinghouse has recommended that the affected pump parts be replaced with the parts currently recommended by IDP.

An IDP safety injection pump (model "JTCH") failed during a post-maintenance test at Indian Point Unit 3 on February 19, 1995. Inspection of the internal components of the pump revealed that the locknut on the outboard shaft had backed off about 6.35 mm [0.25 inch]. The loosened locknut allowed the pump impellers to move axially, and allowed them to rub against the stationary diffusers and the casing, and ultimately resulted in pump failure. Although the root cause of this failure is unrelated to the problem reported by Westinghouse, a similar pump failure could occur if the locknut on the pressure-reducing sleeve, mentioned in the Westinghouse Part 21 report, failed.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

orig /s/'d by B K Grimes

Brian K. Grimes, Director
Division of Project Support
Office of Nuclear Reactor Regulation

Technical contacts: James A. Davis, NRR
(301) 415-2713

Peter C. Wen, NRR
(301) 415-2832

Attachments:
1. Westinghouse Part 21 Report, February 20, 1995
2. List of Recently Issued NRC Information Notices

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DATE	04/17/95		04/19/95		05/10/95		05/15/95		05/24/95	

Note: In the 4/12/95 letter from AE Chaffee to J. Fasnacht, Westinghouse was informed of the development of this IN. On 4/20/95, Mr. Fasnacht phoned P. Wen and he indicates that Westinghouse has no technical comments.

Peter Wen 4/20/95

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Brian K. Grimes, Director
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DATE	04/17/95		04/19/95		05/10/95		5/15/95		/ /95	

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Peter Wen 4/20/95

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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Attachments:
1. Westinghouse Part 21 Report, February 20, 1995
2. List of Recently Issued NRC Information Notices

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DATE	03/27/95		04/11/95		04/10/95		04/10/95		04/13/95	

OFFICE	D:DE	N	SC:OECB/DOPS	N	OECB/DOPS		C:OECB/DOPS		D:DOPS/NRR	
NAME	BWSheron*		EFGoodwin*		RJKiessel		AEChaffee		BKGrimes	
DATE	04/17/95		04/19/95		5/10/95		/ /95		/ /95	

Note: In the 4/12/95 letter from AE Chaffee to J. Fasnacht, Westinghouse was informed of the development of this IN. On 4/20/95, Mr. Fasnacht phoned P. Wen and he indicates that Westinghouse has no technical comments.

Peter Wen 4/20/95

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Brian K. Grimes, Director
Division of Project Support
Office of Nuclear Reactor Regulation

Technical contacts: Merilee Banic, NRR
(301) 415-2771

Peter C. Wen, NRR
(301) 415-2832

Attachments:
1. Westinghouse Part 21 Report, February 20, 1995
2. List of Recently Issued NRC Information Notices

*SEE PREVIOUS CONCURRENCE

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#2 thru 5 ok

OFFICE	OECB/DOPS	C	TECH ED	N	C:DE/EMCB	C	DE/EMCB	E	C:DE/EMCB
NAME	PCWen*		RFSanders		MBanic*		RAHermann*		JRStrosnider
DATE	03/27/95		4/11/95		04/10/95		04/10/95		4/13/95

OFFICE	D:DE	N	SC:OECB/DOPS		OECB/DOPS		C:OECB/DOPS		D:DOPS/NRR
NAME	BWSheron		EFGoodwin		RJKiessel		AEChaffee		BKGrimes
DATE	4/17/95		4/19/95		/ /95		/ /95		/ /95

#3-4/14 aap

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OFFICE	OECB/DOPS	C	TECH ED		C:DE/EMCB		DE/EMCB	E	C:DE/EMCB
NAME	PCWen PCW		RFSanders		MBanic		RAHermann		JStrosnider
DATE	3/27/95		/95		4/10/95		4/10/95		/95
OFFICE	D:DE		SC:OECB/DOPS		OECB/DOPS		C:OECB/DOPS		D:DOPS/NRR
NAME	BWSheron		EFGoodwin		RJKiessel		AEChaffee		BKGrimes
DATE	/95		/95		/95		/95		/95