

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

SESSION NBR: 8908290086 DOC. DATE: 89/08/15 NOTARIZED: NO DOCKET #
 FACIL: 50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
 AUTH. NAME AUTHOR AFFILIATION
 BOUCHEY, G.D. Washington Public Power Supply System
 RECIP. NAME RECIPIENT AFFILIATION
 FAULKENBERRY, B. Region 5, Ofc of the Director

SUBJECT: Responds to NRC 890703 request for addl info re use of five items indentified in Insp Rept. 50-397/89-21.

DISTRIBUTION CODE: IE01D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 11
 TITLE: General (50 Dkt)-Insp Rept/Notice of Violation Response

NOTES:

	RECIPIENT		COPIES			RECIPIENT		COPIES		
	ID CODE/NAME		LTTR	ENCL		ID CODE/NAME		LTTR	ENCL	
	PD5 PD		1	1		SAMWORTH, R		1	1	
INTERNAL:	ACRS		2	2		AEOD		1	1	
	AEOD/DEIIB		1	1		AEOD/TPAD		1	1	
	DEDRO		1	1		LOIS, ERASMIA		1	1	
	NRR SHANKMAN, S		1	1		NRR/DEST DIR		1	1	
	NRR/DLPQ/PEB		1	1		NRR/DOEA DIR 11		1	1	
	NRR/DREP/EPB 10		1	1		NRR/DREP/RPB 10		2	2	
	NRR/PMAS/ILRB12		1	1		NUDOCS-ABSTRACT		1	1	
	OE-HIEBERMAN, J		1	1		OGC/HDS2		1	1	
	REG FILE 02		1	1		RES MORISSEAU, D		1	1	
	RGN5 FILE 01		1	1						
EXTERNAL:	LPDR		1	1		NRC PDR		1	1	
	NSIC		1	1						

TOTAL NUMBER OF COPIES REQUIRED: LTTR 26 ENCL 26





WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

August 15, 1989
G02-89-138

890821 12:51

Mr. B. H. Faulkenberry
Deputy Regional Administrator
U. S. Nuclear Regulatory Commission
Region V
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596

Dear Mr. Faulkenberry:

Subject: NUCLEAR PLANT NO. 2
LICENSE NO. NPF-21
NRC INSPECTION REPORT 89-21
ADDITIONAL INFORMATION

Reference: 1) Letter, B. H. Faulkenberry (NRC) to D. W. Mazur,
dated July 3, 1989
2) Letter, B. H. Faulkenberry (NRC) to D. W. Mazur,
dated July 14, 1989
3) Letter, G02-89-120, G. D. Bouchey to B. H. Faulkenberry,
same subject, dated July 20, 1989

This response provides justification as requested by reference 1), for the use of the remaining five items identified in the referenced inspection report (items six through ten). Items one through five have been previously addressed in reference 3). The details of the Supply System's reevaluation of inspection report 89-21, items six through ten, are contained in Attachment 1 to this letter. The Supply System has concluded that the items are acceptable for use.

As stated in our previous submittals, the Supply System has found instances where the documentation and the basis of the original evaluation could be improved. In addition the Supply System hired an engineering consultant to perform a review of 50 randomly selected items which had been dedicated by the Supply System. The finding of the review is that the Supply System's dedication program and the implementation of the program are sound, but in some cases our documentation could be improved. The Supply System concludes that we are not in violation of any NRC regulation regarding the use of commercial grade equipment.

Very truly yours,


G. D. Bouchey, Director
Licensing & Assurance

cc: JB Martin - NRC RV
NS Reynolds - BCP&R
RB Samworth - NRC
Document Control Desk - NRC
DL Williams - BPA/399
NRC Site Inspector - 901A

8908290086 890815
PDR ADDCK 05000327
Q PDC

15-01

ITEM NO. 6 - EMD Diesel Engine Parts

ITEM DESCRIPTION 6-1

Gear assembly, spring drive for left-hand rotating engines with high capacity gear train turbochargers. EMD part number: 9515331.

CRITICAL CHARACTERISTICS DETERMINATION 6-1Function of Item

This gear transfers rotational energy from the camshaft gear train to drive the engine's turbocharger during engine startup and low-load operation. The spring assembly (part of the spring-drive gear assembly) is there to absorb any torsional vibration which might be transmitted through the gear assembly to the turbocharger.

A second function of the assembly is to act as the No. 2 idler gear, which is a part of the gear train transmitting energy from the crankshaft to the camshafts and auxiliary drives and accessories.

This assembly directly supports the operation of the emergency diesel engines. The engines function to provide emergency power to plant safety systems.

Failure Modes/Effects

- 1) Failure of gear-to-spider attaching bolts: The camshafts would continue to be driven but the turbocharger possibly would not. The result would be poor engine performance, possibly a failure of the engine to start or to supply adequate emergency electrical power.
- 2) Failed spring assembly bolts: The camshafts and turbocharger would continue to be driven, but the coupling to the turbocharger would be loose causing poor turbocharger operation and possibly turbocharger damage. The result would be poor engine performance and possibly a failure of the engine to start or to supply adequate emergency electrical power.
- 3) Failed or broken idler gear teeth: Gears could slip causing incorrect valve timing. The result would be poor engine performance or engine damage, depending on severity.
- 4) Failed or broken teeth on turbocharger drive gear: This could cause an inability to drive the turbocharger, possibly resulting in turbocharger damage, resulting in poor engine performance or engine damage, depending on severity.

Critical Characteristics and Verification Methods

See Critical Characteristics 6-1 and 6-2 and Verification Methods 6-1 and 6-2.



ITEM DESCRIPTION 6-2

Shaft, governor drive gear, EMD part number: 8196728.

CRITICAL CHARACTERISTICS DETERMINATION 6-2Function of Item

This gear transfers rotational energy from the accessory drive gear train to the engine's governor oil pump and centrifugal governor during engine operation. The governor oil pump supplies the hydraulic pressure modulated by the electric control signal to control the throttle mechanism. The centrifugal governor is a backup method of control should the electric control signal be lost.

This assembly directly supports the operation of the emergency diesel engines. The engine functions to provide emergency power to plant safety systems.

Failure Modes/Effects

Breakage or galling: The shaft could break completely or it could crack or chip to cause binding in the bushing. The result of the failure would be shaft breakage or stripped splines resulting in the loss of ability to transmit motive power to the governor. A loss of governor drive would result in a loss of control oil pressure resulting in an inability to control engine speed or load. The mechanical centrifugal governor also is driven by this shaft, but its loss is inconsequential since there would be no control oil pressure for it to modulate.

CRITICAL CHARACTERISTICS 6-1 & 6-2

- 1) Dimensions/fit: Dimensions must be correct for proper fit.
- 2) Material/workmanship quality: The material comprising the assembly must be free of cracks or flaws that could propagate to cause failure during normal use. The assembly must be properly assembled in order to provide smooth transfer of energy.
- 3) Seismic capability: The assembly must remain fully functional during and after a design basis seismic event.

VERIFICATION METHODS 6-1 & 6-2

- 1) Dimensions/fit: This attribute will be verified by installation and post-installation test as required by PPM 1.5.7. Operability is further verified by regular periodic surveillance testing.



- 2) Material quality: Verified by visual examination during standard receipt inspection.

Workmanship quality: The configuration of this item is such that any workmanship related discrepancies likely to adversely affect its functions would be immediately visible during a standard receipt inspection.

- 3) Seismic Capability: QID 118001 uses Stewart and Stevenson report "Diesel Generator Set W.O. 67649" dated Dec. 1978 and titled "Seismic Analysis for WPPSS Nuclear Project Hanford #2 Specification 2808-53" plus addenda. The addenda contain an engineering report by Electro-Motive Division of General Motors Corporation, number E77-1 dated 3-14-77, Engine Design section, titled "SEISMIC ANALYSIS OF EMD ENGINE," by J. Chen and approved by R. F. Hart. In general, the report analyzes the WNP-2 diesel engine to determine that it is rigid and then compares the WNP-2 engines to one tested for the U.S. military to the requirements of MIL-S-901C. Also included in the addenda is a report on the effects of the Hawaiian earthquake of April 26, 1973 upon EMD diesel engines. The report qualifies the diesel engines to horizontal accelerations of 3 g's and vertical accelerations of 1 g at frequencies between 1/3 and 33 Hz. The acceleration required for design basis is 0.4 g's in all dimensions. Therefore, there is a safety margin of over two times in the qualification. Per the report on the Hawaiian earthquake, none of the standard design diesel engines were damaged. QID 118003 uses GE report number PED-128-12 Rev. 0 titled "Hanford 2 HPCS Diesel Generator SQRT Qualification Phase I Report." This report uses data collected from a "hard start" in-situstest of the DG set. This test confirms the Stuart and Stevenson report as to the seismic rigidity of the engine. It qualifies the engine to minimum seismic accelerations of 1.37 g's in all dimensions, or a safety factor of more than 3.4 times the required acceleration.

This indicates that the manufacturing and design of the engines is of sufficient quality and proper materials selection to assure seismic ruggedness.

- 4) The Supply System has audits of EMD by Tennessee Valley Authority (dated January 20-21, 1987) and Wisconsin Electric Power (dated July 22, 1986). Our review of these audits indicates that the manufacturer has established controls on the design, manufacturing, and testing which provide reasonable assurance that the products shipped are of adequate design, material and construction for use in our application.

ITEM NO. 7 - HPCS-P-1 Pump Shaft

Note: The NRC identified Item 7 as procured from Baxter Air Engineering. This is in error. PO 70808 was to Ingersoll-Rand Company (IR). IR is the original equipment manufacture for the HPCS pump. Baxter Air Engineering had no involvement in the procurement of item listed on PO 70808.

ITEM DESCRIPTION

Shaft, pump 5.375 X 192.56 material ASTM A276 TY 410 Cond. T; IR Ref. No. 10; P/N 12X20KD10X3A. Includes:

- 1 each journal sleeve key P/N 11A9-X-77
- 1 each impeller key P/N 11A9-X-140
- 1 each throttling sleeve key P/N 4HT291X4A
- 1 each allen cap screw P/N 8-32 x 3/8"
- 1 each coupling key R A P/N 11A9X519
- 1 each impeller key 1/2 x 1/2 x 3 1/2, 1st stg. P/N 11A9-X-203

The above are spare parts for IR pump type 12X20KD-8, Dwg. F-12X20KD500X3A, serial number 0473-126.

CRITICAL CHARACTERISTICS DETERMINATION**Function Of Item**

This shaft is a part of the HPCS pump, one of the ECCS pumps. This pump is a Quality Class I, ASME III Class 2 pump. It provides high pressure coolant to the reactor as required during an accident.

The shaft transmits the motor torque to the impellers mounted on the shaft to provide the pressure necessary for coolant flow. It also positions the impellers relative to the pump body.

Failure Modes/Effects

1. Shaft fracture: Loss of HPCS function.
2. Key or keyway failure: Loss of HPCS function.
3. Failure of shaft threads: Loss of HPCS function.
4. Excessive shaft surface wear: Loss of HPCS function.
5. Incorrect shaft dimensions causing bearing failure: Loss of HPCS function.

Loss of the HPCS pump would require the use of the ADS function and the LPCS system to maintain reactor coolant flow.

CRITICAL CHARACTERISTICS

- 1) Material type/hardness
- 2) Dimensions/tolerance

VERIFICATION METHODS

Item was procured from the original equipment manufacturer (OEM). The OEM is listed on the Evaluated Suppliers List as being acceptable for procurement of safety related equipment. (At the time of procurement, engineering determined that this part is not part of the pressure boundary of the pump. They concluded from this that there were no nuclear specific standards which applied and therefore 10CFR21 need not be imposed on the supplier.)

A source surveillance was performed on items supplied by IR on PO 70808 among other PO's. It was determined to be unnecessary to inspect the hold points on the shaft and such rights were waived. Determination was based on good performance of the OEM during the surveillance period.

A certification was given by the OEM that the supplied items conform to requirements of the order. All the information required by the manufacturer to supply correct parts for the pump were stated on the PO (Dwg. No., Serial No., pump type).

Installation checks give a verification of dimensions and tolerance. Post maintenance testing (as required by PPM 1.5.7) includes vibration analysis, which gives added assurance of dimensions and tolerance. A required one hour run (at load) gives added assurance that there are no major flaws in the material.

Note: The original receipt inspection noted no problems, however, further inspections have disclosed problems with the shaft keyway and key. These problems are being addressed with the vendor.



ITEM NO. 8 - Various GE Protective Relays

ITEM DESCRIPTION

- 8-1 Relay, timing, DC operated, GE Part Number (P/N) 12SAM11A22A.
- 8-2 Relay, undervoltage, instantaneous, DC, GE P/N 12PJV11BD2.
- 8-3 Relay, time-overcurrent, GE P/N 12IAC57A2A
- 8-4 Relay, time-overcurrent, GE P/N 12IFC51BD1A.
- 8-5 Relay, voltage, time delay, GE P/N 12IAV51A2A.
- 8-6 Relay, voltage, time delay, GE P/N 12IAV51K1A
- 8-7 Relay, undervoltage, GE P/N 12NGV13B21A
- 8-8 Relay, undervoltage, GE P/N 12NGV18A1A.
- 8-9 Relay, power directional, time delay, GE P/N 12ICW51A2A.

CRITICAL CHARACTERISTICS DETERMINATIONFunction of Item

In general these relays are used to protect safety related equipment from electrical transient events such as overcurrent undervoltage, loss of field, and reverse power. Some are used for indication and have passive electrical functions only.

Failure Modes/Effects

For the purpose of this report all relays will be considered as critical for the safe operation/shutdown of the Plant. They must operate as required during a DBE and within the Design Parameters as set forth in the Design Basis Documents.

CRITICAL CHARACTERISTICS

- 1) Part Number
- 2) Contact Configuration
- 3) Operating Setpoints
- 4) Seismic Capability



VERIFICATION METHODS

Seismic capability is verified by seismic testing performed on site before relays are approved for use in Plant (lot test). Contact configuration is verified at installation as required by PPM 1.5.7. Part Number is verified at receipt by inspection under receipt inspection procedure QAI-10-3. Operating setpoints are verified at installation by testing per Plant procedures. Plant procedures have been reviewed to assure they require proper testing to demonstrate that the relays meet the minimum set of critical operational setpoints/tolerances for each application. For example, IAC and IFC relays (time-over-current) are checked to assure their time versus current curves are acceptable. These curves are checked by testing per PPM 10.25.20. The test requires that two points (specified by design engineering) be verified. Various other checks and inspection of the relay are also required by the PPM.

ITEM NO. 9 - Chiller Shaft

ITEM DESCRIPTION

Main shaft, P/N 064-16380, Dwg. No. 076-03358D st. 4 of 4 item 58

CRITICAL CHARACTERISTICS DETERMINATION

Function of Item - The shaft is used to transmit motive force to the impeller of the Emergency Control Room Chiller. The chiller is used to keep the control room at $75 \pm 3^{\circ}\text{F}$ when the normal cooling system is inoperable.

Failure Modes/Effects

- 1) Shaft fracture: Loss of chiller function
- 2) Excessive shaft surface wear: Loss of chiller function.

Loss of the chiller function could cause the control room temperature to exceed the 78°F Technical Specification maximum temperature limit. This scenario would require the loss of both normal coolers and both emergency coolers.

CRITICAL CHARACTERISTICS

- 1) Material/hardness
- 2) Dimensions/tolerances

VERIFICATION METHODS

The parts were ordered from the OEM (York International) by specifying original contract number, York order number, drawing and item number and the part number. This information is sufficient to properly and completely specify the item to York.

The Supply System has performed a Commercial Grade survey of York International, and has concluded that they maintain sufficient control of dimensional tolerances and materials.

Dimensions/tolerances are to be verified by a visual inspection and fit-up at the time the shaft is installed. Technical direction is obtained from a York International Technical Representative and the craft work by Supply System personnel previously trained by York International for maintenance of the unit.

Additional assurance that the supplied item is correct is given by post maintenance testing required by PPM 1.5.7.

ITEM NO. 10 - Ashcroft Pressure Gauge

ITEM DESCRIPTION

Gauge pressure range 0-60 psig 4½" dial size ½" male NPT back connection, bourdon tube, tip, and socket material AISI 316 stainless steel, aluminum case, steel ring hinged at top, clamp screw retained at bottom, case and ring black epoxy coated, flush mounted. Ashcroft P/N 45-1377SS-02B-60.

CRITICAL CHARACTERISTICS DETERMINATIONFunction of Item

These pressure indicators are connected to downstream process flow piping from associated engine driven scavenging oil pumps for emergency diesel generators. These indicators measure the scavenging oil pump outlet process fluid pressure. This indication is local and is not applicable to any safety function. Indication failure will not affect the functioning of this system. The only safety function of these indicators is one of passive mechanical integrity.

Failure Modes/Effects

Failure of the mechanical integrity of these pressure indicators will cause a gradual loss of lube oil from the associated engines main oil sump. Scavenging lube oil flow will be reduced to the lube oil strainer sump. This sump supplies lube oil to the piston cooling oil pump and the main lube oil pump. Eventually if a leak is not detected inlet lube oil will be lost to these associated pumps. When lube oil pressure drops the associated engine diesel lube oil low pressure sensing pressure switch will actuate tripping the engine on low lube oil pressure. These particular trip signals are bypassed in the event of a reactor loss of coolant accident. In the event of loss of lube oil the associated engine may fail in the performance of its safety function.

CRITICAL CHARACTERISTICS

- 1) Configuration: Flush mounting, 4½ inch diameter dial face, back of case process connection. Bourdon tube and tip material: AISI 316 stainless steel. Process connection socket material: AISI 316 stainless steel. Process connection: ½ inch male NPT.
- 2) Manufacturer part number.
- 3) Pressure integrity to 40 psig.

Verification Methods

The Supply System has a Portland General Electric audit of Ashcroft dated 2/8/89. Our review of this audit indicates that the manufacturer does have controls on his material procurement and his manufacturing process which are sufficient to assure that his part number is an acceptable method of verification of material and configuration as defined in the manufacturers catalog.

The following characteristics were verified by receipt inspection:

- o Flush mounting 4½ inch diameter dial face, ½ inch male NPT, back of case process connection, and part number.

The following characteristics were verified by receipt inspection verification of part number and reliance on the reputation of the manufacture and his catalog description:

- o Bourdon tube, tip and process connection socket material.

The following characteristics are to be reverified at installation:

- o Flush mounting, 4½ inch diameter dial face, ½ inch male NPT back of case process connection.

Pressure integrity to 40 psig is verified by calibration/bench test to 60 psig.

