

June 01, 1995

CRITICAL ITEMS LIST

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1) CIL ITEM : B400-16  
 2) FREA CODE : B400  
 3) COMPONENT : NPOTP  
 4) PART NUMBER : RS007701  
 5) SYSTEM/SUBSYSTEM : PUMP/BKXX  
 6) FAILURE MODE : EXCESSIVE PRIMARY/SECONDARY TURBINE SEAL LEAKAGE

7) PREPARED : SSM RELIABILITY  
 8) APPROVED :  
 9) DATE : 06-01-95  
 10) REVISION/CHANGE : -002/0  
 11) EFFECTIVITY : -761  
 12) HAZARD REFERENCE : SEE LISTINGS BELOW  
 13) CCID # : *ME3-01-3075*

PHASE	FAILURE DESCRIPTION/EFFECT	CRITICALITY
S	<p>EXCESSIVE HOT-GAS LEAKAGE CAUSES SECONDARY TURBINE SEAL CAVITY PRESSURE REDLINE TO BE EXCEEDED, INITIATING ENGINE SHUTDOWN. MISSION SCREW IF DETECTED BY REDLINE. LOSS OF VEHICLE DUE TO NPOTP FAILURE MAY RESULT IF NOT DETECTED.</p> <p>REDUNDANCY SCREENS: TURBOPUMP SYSTEM - SENSOR SYSTEM: UNLIKE REDUNDANCY</p> <p>A: PASS. REDUNDANT HARDWARE ITEMS ARE CAPABLE OF CHECKOUT DURING NORMAL GROUND TURNAROUND.            B: PASS. LOSS OF A REDUNDANT HARDWARE ITEM IS DETECTABLE DURING FLIGHT.            C: PASS. LOSS OF REDUNDANT HARDWARE ITEMS COULD NOT RESULT FROM A SINGLE CREDIBLE EVENT.</p>	<p>1R            HAZARD REF: ME-C1S,H</p>
M	<p>EXCESSIVE HOT-GAS LEAKAGE CAUSES SECONDARY TURBINE SEAL CAVITY PRESSURE REDLINE TO BE EXCEEDED, INITIATING ENGINE SHUTDOWN. MISSION ABORT IF DETECTED BY REDLINE. LOSS OF VEHICLE DUE TO NPOTP FAILURE MAY RESULT IF NOT DETECTED.</p> <p>REDUNDANCY SCREENS: TURBOPUMP SYSTEM - SENSOR SYSTEM: UNLIKE REDUNDANCY</p> <p>A: PASS. REDUNDANT HARDWARE ITEMS ARE CAPABLE OF CHECKOUT DURING NORMAL GROUND TURNAROUND.            B: PASS. LOSS OF A REDUNDANT HARDWARE ITEM IS DETECTABLE DURING FLIGHT.            C: PASS. LOSS OF REDUNDANT HARDWARE ITEMS COULD NOT RESULT FROM A SINGLE CREDIBLE EVENT.</p>	<p>1R            HAZARD REF: ME-C1S,H</p>

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CIL ITEM: 8400-16	DESIGN	DOCUMENT REF.
B-302	<p><b>FAILURE CAUSE A: EXCESSIVE CLEARANCE AT THE PRIMARY AND SECONDARY TURBINE SEALING SURFACES, DUE TO RUBBING OR CHIPPING</b></p> <p>THE TURBINE SEAL ASSEMBLY MINIMIZES HOT-GAS LEAKAGE ALONG THE SHAFT JOURNAL. THE SEAL ASSEMBLY CONSISTS OF A HOUSING AND TWO SEAL ELEMENTS. THE HOUSING IS FABRICATED IN THREE PIECES (HOUSING, RETAINER, END PLATE) FROM INCOLOY 903. INCOLOY 903 IS AN IRON BASE ALLOY WHICH WAS SELECTED FOR ITS TENSILE STRENGTH AND RESISTANCE TO STRESS CORROSION CRACKING AND HYDROGEN ENVIRONMENT BRITTLENESS (1). THE ALLOY IS SOLUTION HEAT TREATED AND AGE-HARDENED (2). SIX MAST102E04-16 SCREWS ARE USED TO ASSEMBLE THE HOUSING. THE SCREW THREADS ARE DRY-FILM LUBRICATED FOR EQUAL LOAD DISTRIBUTION AND PRETTING PROTECTION. THE HEADS ARE STAKED TO PREVENT SCREW DISENGAGEMENT (2). DRY-FILM LUBRICATION IS ALSO UTILIZED AT THE SEALING SURFACES WHERE THE NOSE PADS OF THE SEAL ELEMENTS CONTACT THE HOUSING FOR EASE OF SEAL MOVEMENT (2). THE SEALING SURFACE IS GROUND TO ACHIEVE A MICROFINISH SURFACE (2). MULTIPLE RADIAL PASSAGES ARE MACHINED FROM THE PRIMARY AND SECONDARY CAVITIES FOR REDUNDANT PARALLEL DRAIN PATHS TO THE MAIN PUMP HOUSING DRAIN (2). THE HOUSING ASSEMBLY IS RADIALLY AND AXIALLY PILDED TO THE MAIN PUMP HOUSING AND IS SECURED BY 18 BOLTS. THE SEAL ELEMENTS ARE RADIALLY FREE-FLOATING TO ACCOMMODATE SHAFT DYNAMIC DEFLECTIONS AND UTILIZE A DUAL NOSE PAD DESIGN ON THE DOWNSTREAM FACE FOR BYPASS LEAKAGE PREVENTION (2). THE PADS HAVE A MICROFINISH SURFACE (2). THE SEAL ELEMENTS CONTAIN AN OUTER ADAPTER RING MANUFACTURED UTILIZING INCOLOY 903 AND AN INNER RING OF CARBON P-5H. THE ADAPTER RING PROVIDES AN INTERFERENCE FIT TO COMPRESS THE CARBON RING AND HAS ANTI-ROTATION TANGS ON THE OUTER DIAMETER TO LIMIT TANGENTIAL MOVEMENT (2). THE CARBON RINGS ARE MANUFACTURED UTILIZING PURE CARBON GRAPHITE, WHICH IS SINTERED IN A PREFORM SHAPE. THE MATERIAL IS THEN IMPREGNATED WITH LITHIUM-FLUORIDE TO ENHANCE WEAR RESISTANCE (1). THE MATERIAL WAS SELECTED FOR ITS WEAR RESISTANCE, COEFFICIENT OF FRICTION, AND LIGHTWEIGHT RESPONSE ABILITY TO SHAFT MOVEMENT (1). DURING OPERATION, THE SEAL RINGS ARE HYDRODYNAMICALLY CENTERED BY PRESSURE LOADING ON THE CONVERGING TAPER DESIGN OF THE INNER JOURNAL DIAMETER (2).</p>	<p>(1) RSS-8578-11 (2) RS007966</p>
	<p><b>FAILURE CAUSE B: EXCESSIVE LEAKAGE PAST STATIC SEAL ON TURBINE SEAL HOUSING</b></p> <p>THE TURBINE SEAL HOUSING STATIC SEAL (1) PREVENTS BYPASS LEAKAGE OF MIXED COOLANT FROM THE HEAT SHIELD MANIFOLD, USED TO THERMALLY PRECONDITION THE TURBINE SEAL HOT-GAS. THE SEAL IS SECURED IN A RELIEF CAVITY BETWEEN THE TURBINE SEAL HOUSING AND THE MAIN PUMP HOUSING, AND HAS A "W" CONFIGURATION CROSS-SECTION (1). THE SEAL IS SYMMETRIC AND INSENSITIVE TO ORIENTATION DURING INSTALLATION. SEALING IS PROVIDED BY THE COMPRESSION OF THE SEAL LIPS AND ENHANCED BY PRESSURE LOADING DURING OPERATION. THE SEAL IS MANUFACTURED UTILIZING A-286 CRES AND WAS SELECTED FOR ITS STRENGTH, DUCTILITY, AND ELASTIC MODULUS (2). THE ALLOY IS RESISTANT TO CORROSION AND STRESS CORROSION CRACKING (2). HYDROGEN ENVIRONMENT, AT ANY TEMPERATURE, DOES NOT HAVE A SIGNIFICANT EFFECT ON THE PROPERTIES OF THIS ALLOY (2). THE SEAL IS AGE-HARDENED AND SILVER PLATED FOR LUBRICITY, FRICTIONAL WEAR RESISTANCE, AND ANTI-GALLING CHARACTERISTICS (1). THE SEALING SURFACES ARE GROUND TO ACHIEVE A MICROFINISH SURFACE (1). THE SEAL IS ASSESSED TO HAVE INFINITE LIFE (3), AND IS NOT TRACKED BY SERIALIZATION.</p>	<p>(1) RES1138 (2) RSS-8578-11 (3) RL00532, CP120R0003B</p>

CCL ITEM: 0400-16	DESIGN	DOCUMENT REF.
B - 303	<p>FAILURE CAUSE C: EXCESSIVE LEAKAGE UNDER SHAFT SLEEVE DUE TO DISTORTION FROM RUBBING</p> <p>A SLEEVE MANUFACTURED UTILIZING INCOLOY 903 IS UTILIZED ON THE SHAFT TO ACT AS THE MATING SURFACE FOR THE TURBINE SEAL HOT-GAS RINGS. INCOLOY 903 IS AN IRON BASE ALLOY WHICH WAS SELECTED FOR ITS COEFFICIENT OF EXPANSION, TENSILE STRENGTH, AND RESISTANCE TO STRESS CORROSION CRACKING AND HYDROGEN ENVIRONMENT EMBRITTLEMENT (1). THE ALLOY IS SOLUTION HEAT TREATED AND AGE-HARDENED (2). THE SLEEVE IS FINAL FINISH GROUND ON THE SHAFT TO ACHIEVE CONCENTRICITY AND MICROFINISH SURFACE FINISH REQUIREMENTS (2). THE SLEEVE IS THEN FLAME SPRAY COATED WITH TUNGSTEN CARBIDE TO PROVIDE A HARD FINISH FOR ENHANCED WEAR RESISTANCE. THE SLEEVE IS RADIALY POSITIONED BY TWO INTERFERENCE PILOTS ON THE SHAFT. THE INTERFERENCE FIT BETWEEN THE SLEEVE AND SHAFT PREVENTS LEAKAGE BETWEEN THE PILOT CAVITIES. THERMAL CONDUCTION FROM THE SLEEVE IS PROVIDED BY THE SHAFT PILOTS WHICH MINIMIZE DISTORTION FROM EXCESSIVE HEATING. VENT HOLES ARE INCORPORATED INTO THE SLEEVE TO PREVENT DISTORTION FROM PRESSURE BUILDUP. THE SLEEVE DETAIL IS NOT TRACKED BY SERIALIZATION.</p>	<p>(1) RSS-0576-11 (2) RS007703</p>
	<p>ALL CAUSES:</p> <p>THE HIGH CYCLE AND LOW CYCLE FATIGUE LIFE OF THE TURBINE SEAL, HOUSING SEAL, AND SHAFT SLEEVE MEET CET REQUIREMENTS (1). THE MINIMUM FACTORS OF SAFETY FOR THESE PARTS MEET CET REQUIREMENTS (2). THE TURBINE SEAL, HOUSING SEAL, AND SHAFT SLEEVE PARENT MATERIALS WERE CLEARED FOR FRACTURE MECHANICS/IDE FLAW GROWTH SINCE THEY CONTAIN NO FRACTURE CRITICAL PARTS (3). THE CONTROLLER SOFTWARE IS CONFIGURED TO DETECT AND RESPOND TO THE FAILURES IDENTIFIED AND COMMAND A SAFE ENGINE STATE (4). REUSE OF PARTS DURING OVERHAUL ARE CONTROLLED BY THE REQUIREMENTS OF THE OVERHAUL SPECIFICATION (5).</p>	<p>(1) RL00532, CP320R0003B (2) RSS-0546-16, CP320R0003B (3) NASA TASK 117 (4) CP406R0008 3.2.3:5.2 (5) RL00874</p>

CCL ITEM: 0400-16		INSPECTION AND TEST	DOCUMENT REF.
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
FAILURE CAUSE A:	RS007966 - TURBINE SEAL ASSEMBLY RS007703 - SHAFT (SLEEVE)	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENT.  SHAFT SLEEVE IS ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.  SHAFT SLEEVE TUNGSTEN CARBIDE FLAME-SPRAYING IS VERIFIED PER DRAWING REQUIREMENTS.	RS007966 RS007703
	MATERIAL INTEGRITY		RB0170-186 RB0130-115
	SURFACE INTEGRITY		RA0115-032 RS007703



ECL ITEM: D400-16		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
FAILURE CAUSE C:	SURFACE FINISHES	SEALING SURFACE FINISHES ARE INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007966 RS007729 RES113B RL00814
	RS007703 - SHAFT (SLEEVE)		RS007703
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-102 RB0170-106
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	SLEEVE FLAME SPRAYING IS VERIFIED PER DRAWING REQUIREMENTS.	RS007703
	ASSEMBLY INTEGRITY	CLEARANCE BETWEEN THE SEAL AND SLEEVE IS INSPECTED PER DRAWING REQUIREMENTS.	RS007703
ALL CAUSES:		SLEEVE SEALING SURFACE IS INSPECTED PER DRAWING REQUIREMENTS.	RS007703
	RS007701 - HPOTP	THE PRIMARY AND SECONDARY TURBINE SEALS ARE LEAK TESTED AT ASSEMBLY AND AFTER HOT FIRE PER SPECIFICATION REQUIREMENTS.	RL00814 RL00461
	ASSEMBLY INTEGRITY	THE PUMP SUBASSEMBLIES ARE INSPECTED DURING OVERHAUL PER SPECIFICATION REQUIREMENTS. INSPECTIONS INCLUDE: VISUAL, DIMENSIONAL, PENETRANT, AND REPLACEMENT OF USAGE ITEMS AS APPLICABLE, PER OVERHAUL CLASSIFICATION.	RS007701 RL00874 RAD115-116
		OPERATION/PERFORMANCE IS VERIFIED BY ENGINE HOT FIRE TESTING AND 2ND E & M INSPECTIONS.	RL00050-04 RL00056-06 RL00056-07 RL00461

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CIL ITEM: 8400-16		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
		OXIDIZER SYSTEM IS PURGED PER SPECIFICATION REQUIREMENTS.	OMRSD 800FB0.300 OMRSD 800FM0.250 OMRSD V41CB0.080 OMRSD V41CB0.081
		TORQUE CHECKS ARE PERFORMED PRIOR TO EACH FLIGHT.	OMRSD V41B50.040
		DATA FROM PREVIOUS FLIGHT OR HOT FIRE IS REVIEWED FOR PROPER TURBOPUMP OPERATION/PERFORMANCE. (LAST TEST)	MSFC PLN 1228
FAILURE HISTORY: COMPREHENSIVE FAILURE HISTORY DATA IS MAINTAINED IN THE PROBLEM REPORTING DATABASE (PRAHS/PACA). REFERENCE: NASA LETTER 8421/88/309 AND ROCKETDYNE LETTER 88RC09761.			

OPERATIONAL USE: NOT APPLICABLE.

TABLE B400. HIGH PRESSURE OXIDIZER TURBOPUMP  
FREA/CIL WELD JOINTS

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT SIDE NOT ACCESS	CRITICAL INITIAL		COMMENTS
						FLAW SIZE NOT HCF	DETECTABLE LCF	
MAIN HOUSING	RS007729	1,2	EBW	I	X	X		
MAIN HOUSING	RS007729	3	EBW	I		X		
MAIN HOUSING	RS007729	9,10	GTAW	II	X	X	X	
MAIN HOUSING	RS007729	11,12	GTAW	I		X		
MAIN HOUSING	RS007729	13	EBW	I	X	X		
MAIN HOUSING	RS007729	14-17,16	GTAW	II	X			
MAIN HOUSING	RS007729	18,19	GTAW	II	X	I	X	
MAIN HOUSING	RS007729	21,23	GTAW	II	X			
MAIN HOUSING	RS007729	22,24	GTAW	II	X			
MAIN HOUSING	RS007729	44,53-59	GTAW	I	X			
MAIN HOUSING	RS007729	45	GTAW	I	X			
MAIN HOUSING	RS007729	48	GTAW	I	X	X		X
MAIN HOUSING	RS007729	49	GTAW	I	X			
MAIN HOUSING	RS007729	50	GTAW	I				
MAIN HOUSING	RS007729	51,52	GTAW	I	X			
MAIN HOUSING	RS007729	54	GTAW	I	X			
MAIN HOUSING	RS007729	55,56	GTAW	I	X			
MAIN HOUSING	RS007729	61	GTAW	I				
MAIN HOUSING	RS007729	62	GTAW	I	X			
MAIN HOUSING	RS007729	63	GTAW	I				
MAIN HOUSING	RS007729	64	GTAW	I	X	X		
MAIN HOUSING	RS007729	65	GTAW	I	X			
MAIN HOUSING	RS007729	66-70	GTAW	II	X			
INLET HOUSING	RS007732	4	GTAW	I			I	
INLET HOUSING	RS007732	8,9	GTAW	I			I	
VOLUTE	RS007732	10,15	GTAW	I	X	I		
VOLUTE	RS007732	20,21	GTAW	I				
VOLUTE	RS007732	22,23	GTAW	I				
VOLUTE	RS007732	24,27	GTAW	I		X		X
VOLUTE	RS007732	25,26	GTAW	I				
FLANGE	RS007736	1,2	GTAW	II	X			
FLANGE	RS007736	3,26	GTAW	II	X			

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TABLE 1400. HIGH PRESSURE OXIDIZER TURBOPUMP  
FREA/CIL WELD JOINTS

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT	CRITICAL INITIAL		COMMENTS
					SIDE NOT ACCESS	FLAW SIZE NOT HCF	DETECTABLE LCF	
FLANGE	RS007736	6,7	GTAW	II	X			
FLANGE	RS007736	9-12,17	GTAW	II	X			
FLANGE	RS007736	13-16	GTAW	II	X			
FLANGE	RS007736	18,20	GTAW	I	X			
FLANGE	RS007736	19,21	GTAW	II	X			
FLANGE	RS007736	22	EBW	I	X			
FLANGE	RS007736	23	GTAW	II				
FLANGE	RS007736	24	GTAW	II	X			
FLANGE	RS007736	26	GTAW	II	X			
BELLOWS	RS007740	1,2,5,9	GTAW	I		X		
BELLOWS	RS007740	3,4	EBW	I				
HOUSING	RS007746	1,2	GTAW	I	X		X	
HOUSING	RS007746	3	GTAW	I	X			
HOUSING	RS007746	4	GTAW	II	X			
HOUSING	RS007746	5	GTAW	II	X		X	
HOUSING	RS007746	6-17	GTAW	II	X		X	
HOUSING	RS007746	18-29	GTAW	II	X		X	
HOUSING	RS007746	30-41	GTAW	II		X		X
BELLOWS	RS007748	1	EBW	I				
BELLOWS	RS007748	2	GTAW	I	X			
BELLOWS	RS007749	1-4	GTAW	I				
BELLOWS	RS007749	5,6	EBW	I				
BELLOWS	RS007749	11	EBW	I				
BELLOWS	RS007749	12	EBW	I				
BELLOWS	RS007751	3	EBW	I	X			
BELLOWS	RS007751	4	EBW	I	X	X		X
BELLOWS	RS007751	8	GTAW	I	X	X		
SECOND STAGE NOZZLE	RS007752	1,2	EBW	I	X			
SECOND STAGE NOZZLE	RS007752	1	GTAW	I	X	X		X
JET RING	RS007757	1	GTAW	I	X	X		X
FAIRING	RS007774	1-12	GTAW	I		X		
FAIRING	RS007774	13-24	GTAW	I		X		

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TABLE B100. HIGH PRESSURE OXIDIZER TURBOPUMP  
FMEAS/CIL WELD JOINTS

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT	CRITICAL INITIAL		COMMENTS
					SIDE NOT ACCESS	FLAW SIZE NOT DEFECTABLE	NOT DEFECTABLE	
						KEF	LCF	
FAIRING	RS007774	25-36	BTAW	I				X
FAIRING	RS007774	74	BTAW	I				
FAIRING	RS007774	75,76	BTAW	II	X			
STRUT	RS007779	23-44, 143-164	BTAW	II	X			
STRUT	RS007779	45-66, 165-186	BTAW	II	X			
STRUT	RS007779	67	BTAW	II	X			
STRUT	RS007779	69,70	EDW	II	X			
STRUT	RS007779	71	EDW	II				
STRUT	RS007779	72	EDW	II				
STRUT	RS007779	73-94	EDW	II				
STRUT	RS007779	95,96	EDW	II	X			
SHIELD	RS007781	1,11	BTAW	II				
SHIELD	RS007781	2,3,4	BTAW	II				
SEAL	RS006848	1 PLC	BTAW	I				
SEAL	RS006857	1 PLC	BTAW	I		X	X	

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FIELD CONFIGURATION VARIANCES FROM CIL RATIONALE

CIL ITEMS: B400-XN	HPOIP		P/N RS007791
BASE LINE RATIONALE	VARIANCE	CHANGE RATIONALE	VARIANT DASH NUMBER
<p>1. B400-02, B400-03 SECOND STAGE NOZZLE CASTING IS NOT ISOSTATIC PRESSED PER DRAWING REQUIREMENTS. (ECP 1A-2949)</p>	<p>SECOND STAGE NOZZLE CASTINGS HAVE NOT BEEN HOT ISOSTATIC PRESSED</p>	<p>NOT ISOSTATIC PRESS INCREASES STRUCTURAL INTEGRITY BY REDUCING CASTING MICROPOROSITY.</p> <p>USE AS IS RATIONALE:</p> <ol style="list-style-type: none"> <li>1. LIFE LIMIT ON NON HOT ISOSTATIC PRESSED 2ND STAGE NOZZLES REDUCES PROBABILITY OF LOW CYCLE FATIGUE CRACKING RESULTING FROM EXCESSIVE MICROPOROSITY. (DAR 2147)</li> <li>2. A PENETRANT INSPECTION INTERVAL HAS BEEN IMPOSED ON NON HOT ISOSTATIC PRESSED 2ND STAGE NOZZLES TO VERIFY NO CRACKING IN EXCESS OF ALLOWABLE LIMITS. (DAR 2147)</li> </ol>	<p>-121, -131, -141, -151, -161, -171, -181, -191, -201, -211, -221, -231, -241, -251, -261, -271, -291, -301, -311, -351, -351, -371, -401</p>
<p>2. B400-13, B400-22 PROCESSED AND INSPECTED PER SPECIFICATION REQUIREMENTS (RL00916). (ECP 909)</p>	<p>BEARINGS ARE PROCESSED AND INSPECTED PER SPECIFICATION REQUIREMENTS (RL00558).</p>	<p>LONG TERM FATIGUE LIFE OF BEARING IS EXTENDED BY REDUCING THE ALLOWABLE SIZE AND QUANTITY OF ALLOWABLE DEFECTS.</p> <p>USE AS IS RATIONALE:</p> <ol style="list-style-type: none"> <li>1. WEAR LIFE LIMIT ON BEARINGS PREVENTS WEAR FROM EXCEEDING ALLOWABLE LIMITS. (DAR 2054, DAR 2082)</li> <li>2. CONTINUED USE WITH ALLOWABLE DISCREPANCIES IS CONTROLLED PER THE MAINTENANCE CONTROL DOCUMENT REQUIREMENTS (RSS-8793).</li> </ol>	<p>-121, -131, -141, -151, -161, -171, -181, -191, -201, -211, -221, -231, -241, -251, -261, -271, -291, -301, -311, -331, -351, -371, -401, -411, -421, -431, -441, -451, -461</p>

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FIELD CONFIGURATION VARIANCES FROM CIL RATIONALE

CIL ITEMS: B400-NK		HPOTP	P/W RS007701
BASE LINE RATIONALE	VARIANCE	CHANGE RATIONALE	VARIANT DASH NUMBER
3. B400-21 HOUSING DETAILS ARE ULTRASONIC INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS. (ECP 680)	HOUSING DETAILS HAVE NOT BEEN ULTRASONIC INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS.	<p>THE ADDED NDI PROVIDES ADDED CONFIDENCE THAT THE CRITICAL FLAW SIZE IS DETECTED IN THE PARENT MATERIAL OF THE HOUSING DETAILS.</p> <p>USE AS IS RATIONALE:</p> <ol style="list-style-type: none"> <li>HOUSING DETAILS ARE ACCEPTABLE WITHOUT ULTRASONIC INSPECTION DUE TO A PENETRANT INSPECTION OF THE HOUSING DETAILS. THE PENETRANT INSPECTION IS ADEQUATE TO DETECT CRITICAL INITIAL FLAWS WHICH ARE THROUGH CRACKS.</li> </ol>	-121, -131, -141, -151, -161, -171, -181, -191, -201, -211, -221, -231, -241, -251, -261, -271, -291, -301, -311, -331, -351, -371, -401, -411, -421, -431, -441, -451, -461, -471, -481, -491, -501
4. B400-21 FITTING MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS (INCONEL 718, 880170-153).	RS007729-059 TEE-FITTING IS MANUFACTURED FROM AIR MELT 321 CRES BAR (02-S-763 CL321 COND A).	<p>INCONEL 718 MATERIAL DOES NOT EXHIBIT INCLUSION STRINGERS WHICH ARE SUSCEPTABLE TO CHEMICAL ATTACK AND MAY RESULT IN LEAKAGE.</p> <p>USE AS IS RATIONALE:</p> <ol style="list-style-type: none"> <li>FITTINGS ARE LEAK CHECKED FOLLOWING PROOF PRESSURE TEST PER RL00387.</li> <li>LOADS INDUCED BY FABRICATION (WELDING AND PROOF PRESSURE TESTING) ARE HIGHER THAN OPERATIONAL LOADS AND SUFFICIENT TO SCREEN -059 FITTINGS FOR LEAKAGE.</li> </ol>	-171, -181

R-412.01

RSS-8740-11