1) CIL ITEM : B400-04
2) FMEA CODE : B400
3) COMPONENT : HPOTP
4) PART NUMBER : RS007701
5) SYSTEM/SUBSYSTEM : PUMPB/BXXX
6) FAILURE MODE : TURBINE BLADE TIP SEAL LEAKAGE

7) PREPARED : SSME RELIABILITY
8) APPROVED :
9) DATE : 06-01-95
10) REVISION/CHANGE : -002/0
11) EFFECTIVITY : -761
12) HAZARD REFERENCE : SEE LISTINGS BELOW
13) CCBD # : ME3-01-5275

PHASE	FAILURE DESCRIPTION/EFFECT	CRITICALITY
S	TIP SEAL LEAKAGE REDUCES TURBINE POWER OUTPUT, RESULTING IN REDUCED PUMP SPEED, FLOW, AND DISCHARGE PRESSURE. REDUCED TURBOPUMP OUTPUT RESULTS IN REDUCED ENGINE THRUST. THIS IS SENSED BY THE CONTROLLER, WHICH INCREASES OXIDIZER PREBURNER FLOW. EXCESS TURBINE DISCHARGE TEMPERATURE WILL CAUSE REDLINE SHUTDOWN. MISSION SCRUB IF DETECTED BY REDLINE. LOSS OF VEHICLE DUE TO HPOTP TURBINE OR HEAT EXCHANGER FAILURE MAY RESULT IF NOT DETECTED. REDUNDANCY SCREENS: TURBOPUMP SYSTEM - SENSOR SYSTEM: UNLIKE REDUNDANCY --- 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.	1R HAZARD REF: ME-C15,M.
M	TIP SEAL LEAKAGE REDUCES TURBINE POWER OUTPUT, RESULTING IN REDUCED PUMP SPEED, FLOW, AND DISCHARGE PRESSURE. REDUCED TURBOPUMP OUTPUT RESULTS IN REDUCED ENGINE THRUST. THIS IS SENSED BY THE CONTROLLER, WHICH INCREASES OXIDIZER PREBURNER FLOW. EXCESS TURBINE DISCHARGE TEMPERATURE WILL CAUSE REDLINE SHUTDOWN. MISSION SCRUB IF DETECTED BY REDLINE. LOSS OF VEHICLE DUE TO HPOTP TURBINE OR HEAT EXCHANGER FAILURE MAY RESULT IF NOT DETECTED. REDUNDANCY SCREENS: TURBOPUMP SYSTEM - SENSOR SYSTEM: UNLIKE REDUNDANCY --- 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.	1R HAZARD REF: ME-C15,M.

CIL ITEM: B400-04	DESIGN	DOCUMENT REF.
	FAILURE CAUSE A: ROTOR BLADE TIP RUBBING FAILURE CAUSE B: HONEYCOMB RETAINER DISTORTION FAILURE CAUSE C: BLADE SHROUD CHIPPING	
	THE TURBINE BLADES (1) (2) INCORPORATE TIP SHROUDS AND UTILIZES TIP SEALS (3) (4) FOR IMPROVED SEALING. THE TIP SHROUDS CONTAIN TWO CIRCUMFERENTIAL RAILS AT THE OUTER DIAMETER WHICH ARE DESIGNED TO GROOVE INTO THE HONEYCOMB TIP SEALS FOR LEAKAGE CONTROL. THE BLADES ARE MACHINED FROM INVESTMENT SHELL CASTINGS UTILIZING DIRECTIONALLY SOLIDIFIED MAR-M-246 WITH HAFNIUM ADDITION. THE HAFNIUM ADDITION IMPROVES DUCTILITY AND CASTABILITY IN THIN WALLED HOLLOW SECTIONS (5). THE DIRECTIONAL SOLIDIFICATION PROCESS IMPARTS INCREASED DUCTILITY RESULTING IN IMPROVED RUPTURE, HIGH CYCLE AND LOW CYCLE FATIGUE LIFE (5). THE MATERIAL IS A NICKEL BASE ALLOY, WHICH WAS SELECTED FOR ITS COMBINATION OF RUPTURE STRENGTH, RESISTANCE TO CREEP, AND REQUIRED STATIC MECHANICAL PROPERTIES FROM ROOM TO ELEVATED TEMPERATURES (5). STRUCTURAL ANALYSIS FOR THE DESIGN OF THE TURBINE BLADES WITH HYDROGEN PROPERTIES SHOW ADEQUATE STRUCTURAL MARGIN WITHOUT PROTECTION. THE ALLOY IS SOLUTION HEAT TREATED AND AGE-HARDENED (1) (2). THE TIP SEALS CONSIST OF A CONTINUOUS LINER THAT IS BRAZED ON THE OUTER DIAMETER TO A BACKUP BAND. THE LINER IS MANUFACTURED UTILIZING HASTELLOY X, WHICH WAS SELECTED FOR ITS FORMING CHARACTERISTICS, STRENGTH, AND OXIDIZATION RESISTANCE AT ELEVATED TEMPERATURES (5). THE MATERIAL IS ANNEALED (3) (4) AND FORMED INTO HONEYCOMB CELLS FOR WEAR RESISTANCE AND ABRADABILITY DURING CONTACT WITH THE TURBINE BLADES. THE BACKUP BANDS ARE MANUFACTURED UTILIZING HSWE 41, WHICH WAS SELECTED FOR ITS STRENGTH AT ELEVATED TEMPERATURES AND CORROSION RESISTANCE (5). THE BANDS OPERATE WITHIN THE ELASTIC RANGE AND DO NOT REQUIRE PROTECTION IN A HYDROGEN ENVIRONMENT (5). THE BANDS ARE SOLUTION HEAT TREATED, AGE-HARDENED, AND NICKEL PLATED PRIOR TO BRAZING ONTO THE LINER, AND ARE SEGMENTED TO ALLOW UNRESTRICTED HOOP MOVEMENT FROM THERMAL LOADING (3) (4). THE FIRST-STAGE TIP SEAL IS SECURED TO THE SECOND-STAGE NOZZLE ASSEMBLY (6) BY TEN SEGMENTED RETAINERS (7) WHICH OVERLAP ADJACENT SEGMENTS TO FORM A CONTINUOUS HOOP. THE RETAINERS PROVIDES RADIAL AND AXIAL SUPPORT AND ARE SEGMENTED TO ALLOW FREE EXPANSION AND CONTRACTION IN THE HOT-GAS TURBINE ENVIRONMENT. THE RETAINERS ARE MANUFACTURED UTILIZING ANNEALED HAYNES 188, WHICH WAS SELECTED FOR ITS TENSILE STRENGTH AT ELEVATED TEMPERATURES, CORROSION RESISTANCE, AND RESISTANCE TO DEGRADATION IN HIGH PRESSURE GASEOUS HYDROGEN (5). TEN RETAINER SCREWS (8) ARE STAKED AT ASSEMBLY TO SECURE THE RETAINERS TO THE NOZZLE. ASSEMBLY PROCEDURES FOR LOCKING DEVICES ENSURE DEFECT-FREE INSTALLATION (9). THE SCREWS ARE MANUFACTURED UTILIZING A-286 CRES, WHICH WAS SELECTED FOR ITS TENSILE STRENGTH AND RESISTANCE TO CORROSION AND STRESS CORROSION CRACKING (5). HYDROGEN ENVIRONMENT EMBRITTLEMENT, AT ANY TEMPERATURE, DOES NOT HAVE A SIGNIFICANT EFFECT ON THE PROPERTIES OF THIS ALLOY (5). THE SCREW ALLOY IS SOLUTION HEAT TREATED, COLD WORKED, AGED, AND COLD WORKED AGAIN (8). THE SECOND-STAGE TIP SEAL IS PILOTED BY THE DISCHARGE STRUT (10), SECOND-STAGE NOZZLE FLANGE (11), AND THE SECOND-STAGE NOZZLE ASSEMBLY (6). TANGENTIAL MOVEMENT OF THE TIP SEALS IS PREVENTED BY THE USE OF ANTI-ROTATION TANGS WHICH ENGAGE INTO SLOTS IN THE BACKUP BANDS (3) (4). THE HONEYCOMB CELLS ARE DESIGNED TO ACCEPT RUBBING FROM THE TURBINE BLADE RAILS FOR MAXIMUM SEALING EFFECTIVENESS. SHROUD CHIP DAMAGE TO THE HONEYCOMB IS CONFINED TO THE LOCATIONS UPSTREAM OF THE FIRST SHROUD RAIL. TIP LEAKAGE CONTROL IS MAINTAINED BY THE REMAINING TIP SEAL AND SECOND SHROUD RAIL. THE ROTATING ASSEMBLY HAS COMPLETED DESIGN VERIFICATION TESTING FOR STRUCTURAL DEFLECTIONS (12), AND THE COMPONENT DYNAMIC BALANCE REQUIREMENTS MINIMIZE SYNCHRONOUS BLADE TIP DEFLECTIONS, WHICH ENHANCES TIP SEALING (13). THE FIRST-STAGE TURBINE BLADES ARE HIGH CYCLE AND LOW CYCLE FATIGUE LIFE LIMITED BY MAJOR	(1) RS0007707 (2) RS0007710 (3) RS0007914 (4) RS0007915 (5) RSS-8578-11 (6) R0016027, RS0007752 (7) RS0007913 (8) R035848 (9) RL00814 (10) RS0007779 (11) R0007910 (12) RSS-403-50 (13) RL00816 (14) RL00532, CP320R00038 (15) RSS-403-15, RSS-403-30 (16) RSS-403-29 (17) RSS-8546-16 CP320R00038 (18) NASA TASK 117 (19) RSS-8793 (20) CP406R0008 3.2.3:5.2 (21) RL00874 (22) DAR 2272 (23) DAR 2275 (24) DAR 2603

CIL ITEM: B400-04	DESIGN	DOCUMENT REF.
	WAIVER (22). THE SECOND-STAGE TURBINE BLADES ARE HIGH CYCLE AND LOW CYCLE FATIGUE LIFE LIMITED BY MAJOR WAIVER (23). THE FIRST-STAGE AND SECOND-STAGE TURBINE BLADES HAVE COMPLETED DESIGN VERIFICATION TESTING FOR NATURAL FREQUENCY, MODE SHAPE, (15), AND STRESS DISTRIBUTION AT THE FIR TREES (16). THE FIRST-STAGE TIP SEAL RETAINERS ARE ASSESSED TO HAVE INFINITE LIFE (14) AND ARE NOT TRACKED BY SERIALIZATION. THE SECOND-STAGE TIP SEALS ARE LOW CYCLE FATIGUE LIFE LIMITED BY MAJOR WAIVER (24). THE MINIMUM FACTORS OF SAFETY FOR THE FIRST-STAGE TURBINE BLADES, TIP SEALS, RETAINERS, AND THE SECOND-STAGE TURBINE BLADES MEET CET REQUIREMENTS (17). THE HARDWARE PARENT MATERIALS WERE CLEARED FOR FRACTURE MECHANICS/HCF FLAW GROWTH SINCE THEY ARE NOT FRACTURE CRITICAL PARTS, EXCEPT FOR THE FIRST AND SECOND TURBINE BLADES WHICH WERE CLEARED BY RISK ASSESSMENT (18). CONTINUED USE WITH ALLOWABLE DISCREPANCIES RESULTING FROM OPERATION IS EVALUTED AND CONTROLLED PER THE REQUIREMENTS OF THE MAINTENANCE CONTROL DOCUMENT (19). THE CONTROLLER SOFTWARE IS CONFIGURED TO DETECT AND RESPOND TO THE FAILURES IDENTIFIED AND COMMAND A SAFE ENGINE STATE (20). REUSE OF PARTS DURING OVERHAUL ARE CONTROLLED BY THE REQUIREMENTS OF THE OVERHAUL SPECIFICATION (21).	

CIL ITEM: B400-04	INSPECTION AND TEST		
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
FAILURE CAUSE: A,B,C:	RS007913 - RETAINER		RS007913
	RS007914 - FIRST-STAGE HONEYCOMB SEAL		RS007914
	RS007915 - SECOND-STAGE HONEYCOMB SEAL		RS007915
	RS007707 - FIRST-STAGE BLADES		RS007707
	RS007710 - SECOND-STAGE BLADES		RS007710
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007913 RS007914 RS007915 RB0170-157
		BLADE CASTINGS ARE RADIOGRAPHIC INSPECTED PER DRAWING REQUIREMENTS.	RS007707 RS007710

CIL ITEM: 8400-04		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	HEAT TREAT	HEAT TREAT AND ANNEALING ARE VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RSD07913 RS007914 RS007915 RB0170-157
	SURFACE FINISH	NICKEL PLATING IS INSPECTED PER DRAWING REQUIREMENTS.	RS007914 RS007915
	BRAZING INTEGRITY	HONEYCOMB BRAZING IS INSPECTED PER DRAWING REQUIREMENTS.	RA0107-010
		HONEYCOMB SEALS ARE INSPECTED PER SPECIFICATION REQUIREMENTS.	RF0001-004
	ASSEMBLY INTEGRITY	THE RETAINER ASSEMBLY, SCREW TORQUE, AND STAKING OPERATIONS ARE INSPECTED PER ASSEMBLY DRAWING REQUIREMENTS AND MAJOR WAIVER.	RS007701 DAR 2696
		THE RETAINER TO SECOND-STAGE NOZZLE ASSEMBLY GAP IS INSPECTED PER SPECIFICATION REQUIREMENTS AND MAJOR WAIVER.	RL00814 GNRSD V41BUD.066 DAR 2696
		AIRFOIL, CONTOURS, CASTING TRANSITIONS, AND RADII ARE INSPECTED PER DRAWING REQUIREMENTS.	RS007707 RS007710
		BLADE FINAL SURFACE IS PENETRANT AND RADIOGRAPHIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116 RA0115-006
		BLADE WEIGHT, FINISH, BLADE SET BALANCING, AND ACCEPTABILITY ARE VERIFIED BY ENGINEERING PER SPECIFICATION ROUIREMENTS.	RL00814 RL00816
		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.	RL00874 RA0115-116
		OPERATION/PERFORMANCE IS VERIFIED BY ENGINE HOT FIRE TESTING AND 2ND E & M INSPECTIONS.	RL00050-04 RL00056-06 RL00056-07 RL00461

CIL ITEM: B400-04		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
		TORQUE CHECKS ARE PERFORMED PRIOR TO EACH FLIGHT.	CMRSD V41BSD.040
		HPOTP MICROSHAFT TRAVEL IS PERFORMED PRIOR TO EACH FLIGHT PER SPECIFICATION REQUIREMENTS.	CMRSD V41BSD.045 ALD1034 ALD0050-04
		AN INTERNAL BORESCOPE INSPECTION OF THE FIRST-STAGE BLADES IS PERFORMED EACH FLIGHT.	CMRSD V41BUO.065
		DATA FROM PREVIOUS FLIGHT OR HOT FIRE IS REVIEWED FOR PROPER TURBOPUMP OPERATION/PERFORMANCE. (LAST TEST)	HSFC PLN 122B
FAILURE HISTORY:	COMPREHENSIVE FAILURE HISTORY DATA IS MAINTAINED IN THE PROBLEM REPORTING DATABASE (PRACA). REFERENCE: NASA LETTER SA21/88/308 AND ROCKETDYNE LETTER 88RC09761.		

OPERATIONAL USE: NOT APPLICABLE.

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

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT SIDE NOT ACCESS	CRITICAL INITIAL FLAW SIZE NOT DETECTABLE HCF	LCF	COMMENTS
MAIN HOUSING	RS007729	1,2	EBW	1	X	X		
MAIN HOUSING	RS007729	3	EBW	1		X		
MAIN HOUSING	RS007729	9,10	GTAW	II	X	X	X	
MAIN HOUSING	RS007729	11,12	GTAW	I		X		
MAIN HOUSING	RS007729	13	EBW	1	X	X		
MAIN HOUSING	RS007729	14-17,46	GTAW	II	X			
MAIN HOUSING	RS007729	18,19	GTAW	II	X	X	X	
MAIN HOUSING	RS007729	21,23	GTAW	II	X			
MAIN HOUSING	RS007729	22,24	GTAW	II	X			
MAIN HOUSING	RS007729	44,55-59	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	1	X			
MAIN HOUSING	RS007729	66-70	GTAW	II	X			
INLET HOUSING	RS007732	4	GTAW	I		X		
INLET HOUSING	RS007732	8,9	GTAW	I		X		
VOLUTE	RS007732	10,15	GTAW	I	X	X		
VOLUTE	RS007732	20,21	GTAW	I				
VOLUTE	RS007732	22,23	GTAW	1				
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			

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

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT SIDE NOT ACCESS	CRITICAL INITIAL FLAW SIZE NOT DETECTABLE HCF	LCF	COMMENTS
FLANGE	R0007736	6,7	GTAW	II	X			
FLANGE	R0007736	9-12,17	GTAW	II	X			
FLANGE	R0007736	13-16	GTAW	II	X			
FLANGE	R0007736	18,20	GTAW	I	X			
FLANGE	R0007736	19,21	GTAW	II	X			
FLANGE	R0007736	22	EBW	I	X			
FLANGE	R0007736	23	GTAW	II				
FLANGE	R0007736	24	GTAW	II	X			
FLANGE	R0007736	26	GTAW	II	X			
BELLOWS	R0007740	1,2,5,9	GTAW	I		X		
BELLOWS	R0007740	3,4	EBW	I				
HOUSING	R0007746	1,2	GTAW	I	X	X	X	
HOUSING	R0007746	3	GTAW	I	X			
HOUSING	R0007746	4	GTAW	II	X			
HOUSING	R0007746	5	GTAW	II	X	X		
HOUSING	R0007746	6-17	GTAW	II	X	X		
HOUSING	R0007746	18-29	GTAW	II	X	X	X	
HOUSING	R0007746	30-41	GTAW	II		X	X	
BELLOWS	R0007748	1	EBW	I				
BELLOWS	R0007749	2	GTAW	I	X			
BELLOWS	R0007749	1-4	GTAW	I				
BELLOWS	R0007749	5,6	EBW	I				
BELLOWS	R0007749	11	EBW	I				
BELLOWS	R0007749	12	EBW	I				
BELLOWS	R0007751	3	EBW	I	X			
BELLOWS	R0007751	4	EBW	I	X	X	X	
BELLOWS	R0007751	8	GTAW	I	X	X		
SECOND STAGE NOZZLE	R0007752	1,2	EBW	I	X			
SECOND STAGE NOZZLE	R0007752	1	GTAW	I	X	X	X	
JET RING	R0007757	1	GTAW	I	X	X	X	
FAIRING	R0007774	1-12	GTAW	I		X		
FAIRING	R0007774	13-24	GTAW	I		X		

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

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT SIDE NOT ACCESS	CRITICAL INITIAL FLAW SIZE NOT DETECTABLE REF	LCF	COMMENTS
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	EBW	II	X			
STRUT	RS007779	71	EBW	II				
STRUT	RS007779	72	EBW	II				
STRUT	RS007779	73-94	EBW	II				
STRUT	RS007779	95,96	EBW	II	X			
SHIELD	RS007781	1,11	BTAW	II				
SHIELD	RS007781	2,3,4	BTAW	II				
SEAL	RS008848	1 PLC	BTAW	I				
SEAL	RS008857	1 PLC	BTAW	I		X	X	

FIELD CONFIGURATION VARIANCES FROM CIL RATIONALE

CIL ITEMS: B400-XX		HPOTP	P/N RS007791
BASE LINE RATIONALE	VARIANCE	CHANGE RATIONALE	VARIANT DASH NUMBER
1. B400-02, B400-03 SECOND STAGE NOZZLE CASTING IS HOT ISOSTATIC PRESSED PER DRAWING REQUIREMENTS. (ECP 1A-2949)	SECOND STAGE NOZZLE CASTINGS HAVE NOT BEEN HOT ISOSTATIC PRESSED	HOT ISOSTATIC PRESS INCREASES STRUCTURAL INTEGRITY BY REDUCING CASTING MICROPOROSITY. USE AS IS RATIONALE: 1. LIFE LIMIT ON NON HOT ISOSTATIC PRESSED 2ND STAGE NOZZLES REDUCES PROBABILITY OF LOW CYCLE FATIGUE CRACKING RESULTING FROM EXCESSIVE MICROPOROSITY. (DAR 2147) 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)	-121, -131, -141, -151, -161, -171, -181, -191, -201, -211, -221, -231, -241, -251, -261, -271, -291, -301, -311, -331, -351, -371, -401
2. B400-13, B400-22 PROCESSED AND INSPECTED PER SPECIFICATION REQUIREMENTS (RL00916). (ECP 909)	BEARINGS ARE PROCESSED AND INSPECTED PER SPECIFICATION REQUIREMENTS (RL00558).	LONG TERM FATIGUE LIFE OF BEARING IS ENHANCED BY REDUCING THE ALLOWABLE SIZE AND QUANTITY OF ALLOWABLE DEFECTS. USE AS IS RATIONALE: 1. WEAR LIFE LIMIT ON BEARINGS PREVENTS WEAR FROM EXCEEDING ALLOWABLE LIMITS. (DAR 2054, DAR 2082) 2. CONTINUED USE WITH ALLOWABLE DISCREPANCIES IS CONTROLLED PER THE MAINTENANCE CONTROL DOCUMENT REQUIREMENTS (RSS-8795).	-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

FIELD CONFIGURATION VARIANCES FROM CIL RATIONALE

CIL ITEMS: 8400-RK		HPOTP	P/N RS007701
BASE LINE RATIONALE	VARIANCE	CHANGE RATIONALE	VARIANT DASH NUMBER
3. 8400-21 HOUSING DETAILS ARE ULTRASONIC INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS. (ECP 680)	HOUSING DETAILS HAVE NOT BEEN ULTRASONIC INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS.	THE ADDED NDI PROVIDES ADDED CONFIDENCE THAT THE CRITICAL FLAW SIZE IS DETECTED IN THE PARENT MATERIAL OF THE HOUSING DETAILS. USE AS IS RATIONALE: 1. 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.	-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. 8400-21 FITTING MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS (INCONEL 718, #80170-153).	RS007729-059 TEE-FITTING IS MANUFACTURED FROM AIR MELT 321 CRES BAR (QQ-S-763 CL321 COND A).	INCONEL 718 MATERIAL DOES NOT EXHIBIT INCLUSION STRINGERS WHICH ARE SUSCEPTABLE TO CHEMICAL ATTACK AND MAY RESULT IN LEAKAGE. USE AS IS RATIONALE: 1. FITTINGS ARE LEAK CHECKED FOLLOWING PROOF PRESSURE TEST PER RL00587. 2. LOADS INDUCED BY FABRICATION (WELDING AND PROOF PRESSURE TESTING) ARE HIGHER THAN OPERATIONAL LOADS AND SUFFICIENT TO SCREEN -059 FITTINGS FOR LEAKAGE.	-171, -181