1) CIL ITEM : 0400-02
2) FMEA CODE : 0400
3) COMPONENT : HPOTP
4) PART NUMBER : RS007701
5) SYSTEM/SUBSYSTEM : PUMPS/XXX
6) FAILURE MODE : EXCESSIVE TURBINE INLET FLOW DISTORTION

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 # : ME3-91-3275

PHASE	FAILURE DESCRIPTION/EFFECT	CRITICALITY
S	ENERGY LOSS IN INLET 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-C1S,M.
M	ENERGY LOSS IN INLET 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 ABORT IF DETECTED BY REDLINE. LOSS OF VEHICLE 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-C1S,M.

CIL ITEM: B400-02	DESIGN	DOCUMENT REF.
	FAILURE CAUSE A: FRACTURE, DISTORTION OF INLET SHEET METAL THE INLET SHEET METAL SUBASSEMBLY (1) PROVIDES FLOW GUIDANCE OF THE PREBURNER HOT-GAS TO THE INLET OF THE TWO-STAGE TURBINE. THE SHEET METAL ALSO PROTECTS THE INLET STRUTS AND BELLOWS OF THE TURBINE HOUSING (2) FROM DIRECT HOT-GAS IMPINGEMENT. THE SUBASSEMBLY IS MANUFACTURED UTILIZING ANNEALED HAYNES 188, WHICH WAS SELECTED FOR ITS TENSILE STRENGTH AT ELEVATED TEMPERATURES AND RESISTANCE TO DEGRADATION IN HIGH PRESSURE GASEOUS HYDROGEN (3). THE ALLOY HAS ACCEPTABLE WELDABILITY TO ITSELF AND IS CORROSION RESISTANT (3). THE OUTER SHELL IS A WELDED STRUCTURE WHICH UTILIZES A CIRCUMFERENTIAL STIFFENER RING AT THE DISCHARGE SHROUD AND A BACKUP LINER AT THE INLET FOR ADDITIONAL RIGIDITY. THE INLET OF THE SHELL AND THE LINER HAS OFFSET AXIAL SLOTS TO ACCOMMODATE THERMAL MOVEMENT. EIGHT RADIAL HOLES AT THE INLET PROVIDE HOT-GAS TO THE BELLOWS CAVITY FOR PROPER CONDITIONING OF THE HYDROGEN COOLANT. THE INNER CONE IS A WELDED STRUCTURE WHICH INCORPORATES A CIRCUMFERENTIAL STIFFENER RING AT THE DISCHARGE. THE OUTER SHELL AND THE INNER CONE ARE CONNECTED BY TWELVE STRUT SHIELDS AND FLANGES. THE INLET OF THE OUTER SHELL IS PILOTED BY THE TURBINE HOUSING INLET FLANGE LIP FOR RADIAL POSITIONING (2). DURING OPERATION, THE SHEET METAL ASSEMBLY TRANSMITS AXIAL LOADS TO THE STRUTS BY SIX BRACKETS AND PADS, WHICH ARE WELDED TO THE BACKSIDE OF THE CONE. THE STRUT HAS CORRESPONDING CHANNELS TO ACCEPT THE PADS AND PROVIDE AN ANTI-ROTATION FEATURE FOR THE ASSEMBLY (2). AXIAL RETENTION, IN THE UNLOADED DIRECTION, IS PROVIDED BY THE STRUT SHIELDS, WHICH ARE PAIRED TOGETHER AND WELDED AT THE TRAILING EDGE. THE TURBINE HOUSING, WHICH SUPPORTS THE SHEET METAL ASSEMBLY, IS MANUFACTURED UTILIZING FORGED INCOLOY 903. INCOLOY 903 IS AN IRON BASED ALLOY WHICH WAS SELECTED FOR ITS STRENGTH, RESISTANCE TO HYDROGEN ENVIRONMENT EMBRITTLEMENT, CORROSION RESISTANCE AND RESISTANCE TO STRESS CORROSION CRACKING (3). THE ALLOY IS SOLUTION TREATED AND AGED-HARDENED (2). THE SHEET METAL ASSEMBLY IS A VENTED DESIGN, WHICH MINIMIZES PRESSURE DIFFERENTIALS ACROSS THE SHEET METAL. THE NON-RESTRICTIVE SYSTEM OF RETENTION ALLOWS FREE THERMAL EXPANSION AND CONTRACTION OF THE ASSEMBLY. THE HIGH CYCLE FATIGUE LIFE OF THE TURBINE HOUSING MEETS CEI REQUIREMENTS (4) BUT THE TURBINE HOUSING IS LOW CYCLE FATIGUE LIFE LIMITED BY MAJOR WAIVER (7), AND IS SUBJECT TO MAINTENANCE AND REPAIR OF THE INLET SHEET METAL. CRACKS IN THE SHEET METAL ARE CONTROLLED PER THE REQUIREMENTS OF THE SHEET METAL INSPECTION SPECIFICATION (5). THE SPECIFICATION LIMITS THE CRACK LENGTH, SPACING, AND SHAPE AND IS BASED ON GROWTH RATES FROM ENGINE TEST EXPERIENCE. THE TURBINE HOUSING HAS COMPLETED DESIGN VERIFICATION TESTING FOR PROOF PRESSURE-STRESS RELATIONSHIP (6).	(1) RS007774 (2) RS007746 (3) RSS-8578-11 (4) RL00532, CP326R0003B (5) RL00703 (6) RSS-403-60A (7) DAR 2141

CIL ITEM: 0400-02	DESIGN	DOCUMENT REF.
	FAILURE CAUSE B: NOZZLE VANE DAMAGE	
	THE FIRST-STAGE (1) AND SECOND-STAGE (2) NOZZLES PROVIDE AERODYNAMIC CONTROL AND GUIDANCE TO THE TURBINE HOT-GAS FLOWSTREAMS. THE NOZZLE AIRFOIL VANES ARE CAST UTILIZING MAR-M-246 WITH HAFNIUM ADDITION TO THE BASIC ALLOY. THE HAFNIUM ADDITION IMPROVES DUCTILITY AND CASTABILITY IN THIN WALLED HOLLOW SECTIONS (3). THE FIRST AND SECOND-STAGE NOZZLE CASTINGS ARE HOT ISOSTATIC PRESSED TO FURTHER IMPROVE MATERIAL PROPERTIES. THE ALLOY WAS SELECTED FOR ITS COMBINATION OF RUPTURE STRENGTH, RESISTANCE TO CREEP, AND REQUIRED STATIC MECHANICAL PROPERTIES FROM ROOM TO ELEVATED TEMPERATURES (3). THE FIRST-STAGE NOZZLE IS AXIALLY SECURED TO THE TURBINE HOUSING ASSEMBLY (4) BY 36 STRETCH BOLTS (5) AND LOCKED BY 18 WASHERS (6). COOLANT IS INTRODUCED FROM THE STRUT TO THE NOZZLE FLANGE TO MINIMIZE THE THERMAL GRADIENT BETWEEN THE TWO PARTS, FOR STABILIZATION OF THE RADIAL PILOT INTERFERENCE FIT. THE SECOND-STAGE NOZZLE IS PILOTED TO THE TURBINE HOUSING (4) AND THE SECOND-STAGE NOZZLE FLANGE (7). TANGENTIAL ROTATION IS PREVENTED BY SCALLOPS IN THE NOZZLE FLANGE, WHICH ENGAGES WITH THE RADIAL COOLANT PASSAGES AT THE OUTER DIAMETER (2). THE VANES ARE CAST WITH HOLLOW CORES TO REDUCE THERMAL STRESSES DURING OPERATION. THE STRUCTURAL ANALYSIS FOR DESIGN OF THE TURBINE NOZZLES USED MATERIAL PROPERTIES APPROPRIATE FOR THE OPERATING ENVIRONMENT (HYDROGEN RICH STEAM) AND TEMPERATURE. THE RESULTS OF THE ANALYSIS SHOWED ADEQUATE MARGIN ON STRUCTURAL INTEGRITY BUT LESS THAN CEI LIFE FOR LOW CYCLE FATIGUE. THE NOZZLES ARE LOW CYCLE FATIGUE LIFE LIMITED BY MAJOR WAIVER (8). THE HIGH CYCLE FATIGUE LIFE OF THE NOZZLES MEET CEI REQUIREMENTS (9).	(1) RS007750 (2) R0016027 (3) RSS-8578-11 (4) RS007746 (5) RS007870 (6) RS007872 (7) RS007910 (8) DAR 2148, DAR 2147 (9) RL00532, CP320R00038
	ALL CAUSES:	
	THE MINIMUM FACTORS OF SAFETY FOR THESE PARTS MEET CEI REQUIREMENTS (1). THE INLET SHEET METAL PARENT MATERIAL WAS CLEARED FOR FRACTURE MECHANICS/NDE FLAW GROWTH SINCE IT IS NOT A FRACTURE CRITICAL PART, EXCEPT FOR THE FIRST AND SECOND-STAGE NOZZLES WHICH WERE CLEARED BY RISK ASSESSMENT (2). THE PHEA/CIL WELDS ARE CLEARED FOR FRACTURE MECHANICS/NDE FLAW GROWTH BY THE WELD ASSESSMENT (3). TABLE 0400 LISTS ALL PHEA/CIL WELDS AND IDENTIFIES THOSE WELDS IN WHICH THE CRITICAL INITIAL FLAW SIZE IS NOT DETECTABLE AND THOSE WELDS IN WHICH THE ROOT SIDE IS NOT ACCESSIBLE FOR INSPECTION. THOSE WELDS IN WHICH THE CRITICAL INITIAL FLAW SIZE IS NOT DETECTABLE ARE ACCEPTABLE FOR FLIGHT BY RISK ASSESSMENT (3). CONTINUED USE WITH ALLOWABLE DISCREPANCIES RESULTING FROM OPERATION IS EVALUATED AND CONTROLLED PER THE REQUIREMENTS OF THE MAINTENANCE CONTROL DOCUMENT (4). THE CONTROLLER SOFTWARE IS CONFIGURED TO DETECT AND RESPOND TO THE FAILURES IDENTIFIED AND COMMAND A SAFE ENGINE STATE (5). REUSE OF PARTS DURING OVERHAUL ARE CONTROLLED BY THE REQUIREMENTS OF THE OVERHAUL SPECIFICATION (6).	(1) RSS-8546-16, CP320R00038 (2) NASA TASK 117 (3) RSS-8756 (4) RSS-8793 (5) CP406R0008 3.2.3:5.2 (6) RL00874

CIL ITEM: B400-02		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
FAILURE CAUSE A:	RS007746 - TURBINE HOUSING RS007774 - FAIRING ASSEMBLY		RS007746 RS007774
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007774
		THE SHEET METAL IS PENETRANT AND ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116 RA0115-125
	HEAT TREAT	ANNEALING IS VERIFIED PER DRAWING REQUIREMENTS.	RS007774
	WELD INTEGRITY	ALL WELDS ARE INSPECTED TO DRAWING AND SPECIFICATION REQUIREMENTS PER WELD CLASS. INSPECTIONS INCLUDE: VISUAL, DIMENSIONAL, PENETRANT, RADIOGRAPHIC, ULTRASONIC, AND FILLER MATERIAL, AS APPLICABLE.	RL10011 RA0607-094 RA0115-116 RA0115-006 RA1115-001 RA0115-127
		WELDS 1 AND 2 AND ADJACENT PARENT MATERIAL WALL THICKNESSES ARE INSPECTED FOR THINNING AND STEPS AFTER FLUSHING OPERATIONS PER DRAWING REQUIREMENTS.	RS007746
		SHEET METAL WELDS ARE BORESCOPE AND CRACK GROWTH MONITORED PER SPECIFICATION REQUIREMENTS AFTER EACH HOT FIRE.	RL00703 OMRSD V41BJO.040
FAILURE CAUSE B:	RS007750 - FIRST-STAGE NOZZLE RS007752 - SECOND-STAGE NOZZLE R0016027 - SECOND-STAGE NOZZLE		RS007750 RS007752 R0016027
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION AND DRAWING REQUIREMENTS.	RB0170-166 RS007752
		THE FIRST AND SECOND-STAGE NOZZLE CASTINGS ARE HOT ISOSTATIC PRESSED PER SPECIFICATION REQUIREMENTS.	RL00368
		NOZZLES ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	ASSEMBLY INTEGRITY	NOZZLE FORGINGS ARE ULTRASONICALLY INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012

CIL ITEM: B400-02		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	ASSEMBLY INTEGRITY	NOZZLE FORGINGS ARE ULTRASONICALLY INSPECTED PER SPECIFICATION REQUIREMENTS.	RAD115-012
		NOZZLES HIDDEN SURFACES ARE INSPECTED PER SPECIFICATION REQUIREMENTS.	RL00314
		AIRFOIL CONTOURS ARE INSPECTED PER DRAWING REQUIREMENTS.	RS007760 RS007750
ALL CAUSES:	RS007701 - HPOTP		RS007701
	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.	RL00874 RAG115-116
		OPERATION/PERFORMANCE IS VERIFIED BY ENGINE HOT FIRE TESTING AND 2ND E & M INSPECTIONS.	RL00050-04 RL00056-06 RL00056-07 RL00461
		AN INTERNAL BORESCOPE INSPECTION OF THE INLET SHEET METAL AND THE FIRST-STAGE NOZZLE IS PERFORMED PRIOR TO EACH FLIGHT.	OMRSD V41BUO.065 OMRSD C00BAO.010
		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 (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