SSME FMEA/CIL
REDUNDANCY SCREEN

Component Group:	Fuel Turbopumps	Prepared:	F. Cromwell
CIL Item:	B600-02	Approved:	T. Nguyen
Part Number:	RS007801	Approval Date:	11/1/99
Component:	Low Pressure Fuel Turbopump	Change #:	3
FMEA Item:	B500	Directive #:	CCBD ME3-01-5248
Failure Mode:	Power loss in rotor.	Page:	1 of 1

Phase	Failure / Effect Description	Criticality Hazard Reference
S 4.1	Loss of turbine power causes reduced LPFTP speed and reduced output flow and pressure delivered to the HPFTP. The controller senses the increased HPFTP demand and increases the fuel preburner oxidizer flow. In the event of HPFTP cavitation, excessive turbine discharge temperatures result in a premature engine shutdown. Mission scrub if detected by redline. Loss of vehicle due to HPFTP turbine 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 items is detectable during flight. C: Pass - Loss of redundant hardware items could not result from a single credible event.	1R ME-01S,M
M 4.1	Loss of energy available to turbine results in decreased turbine power. Loss of turbine power causes reduced LPFTP speed and reduced output flow and pressure delivered to the HPFTP. The controller senses the increased HPFTP demand and increases the fuel preburner oxidizer flow. In the event of HPFTP cavitation, excessive turbine discharge temperatures result in a premature engine shutdown. Mission abort if detected by redline. Loss of vehicle due to HPFTP turbine 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 items is detectable during flight. C: Pass - Loss of redundant hardware items could not result from a single credible event.	1R ME-01S,M

SSME F[illegible]EA/CIL
DE[illegible]N

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Failure Mode:	Power loss in rotor.	Page:	1 of 2

Design / Document Reference

FAILURE CAUSE: A: Excessive loss of rotor bolt preload.

THE FIRST (1) AND SECOND-STAGE (2) ROTORS BOLT ONTO AND ARE RADIALLY PILOTED BY THE TURBINE WHEEL (3). THE 12 BOLTS (4) ARE LOCKED IN PLACE BY CUPWASHERS (4). ASSEMBLY PROCEDURES FOR LOCKING DEVICES ENSURE DEFECT-FREE INSTALLATION (5). DRY-FILM LUBRICANT IS APPLIED TO THE BOLT THREADS TO REDUCE FRICTION, PROVIDING A MORE CONSISTENT CLAMPING LOAD. THE BOLTS ARE MANUFACTURED UTILIZING A-286 CRES BAR (6), WHICH IS RESISTANT TO HYDROGEN ENVIRONMENT EMBRITTLEMENT AND HAS THE REQUIRED MECHANICAL PROPERTIES. THE MATERIAL IS SOLUTION TREATED AND AGE HARDENED. THE CUPWASHERS ARE MANUFACTURED UTILIZING 300 SERIES CRES (6), WHICH WAS SELECTED FOR ITS TENSILE STRENGTH, DUCTILITY, AND ITS INSENSITIVITY TO HYDROGEN ENVIRONMENT EMBRITTLEMENT. THE MATERIAL IS ANNEALED TO IMPROVE MECHANICAL PROPERTIES. THE BOLTS AND CUPWASHERS ARE NOT SERIALIZED OR TIME HISTORY TRACKED BUT HAVE INFINITE ALLOWABLE LIFE (7).

(1) RS007624; (2) RS007625; (3) RS007626; (4) RS007644, RS007621; (5) RL00353; (6) RSS-8577; (7) RL00532, CP320R0003B

FAILURE CAUSE: B: Fracture, distortion of rotor blade.
C: Rotor blade shroud damage.

THE TURBINE IS A TWO-STAGE, SUBSONIC, IMPULSE PARTIAL ADMISSION TURBINE. THE FIRST ROTOR (1) HAS 121 BLADES, AN OUTER SHROUD WITH 2 SEALING LABYRINTHS AND 5 LABYRINTHS THAT SEAL ON THE TURBINE NOZZLE INSIDE DIAMETER. THE SECOND ROTOR (2) HAS 95 BLADES AND AN OUTER SHROUD WITH 1 SEALING LABYRINTH. BOTH ROTORS BOLT ONTO THE TURBINE WHEEL (3). THE ROTORS ARE RADIALLY PILOTED ON A LIP AT THE WHEEL OUTSIDE DIAMETER. THE ROTOR BLADES FILLETS ARE RADIUSED TO REDUCE STRESS RISERS. THE CLEARANCES BETWEEN THE ROTORS AND THE NOZZLE AND STATOR ARE CONTROLLED BY THE NOZZLE SHIM (4) AND DRAWING REQUIREMENTS. THE OUTER SHROUDS OF BOTH ROTORS ARE MANUFACTURED AS SEPARATE PIECES THAT ARE BRAZED TO THE BLADE OUTSIDE DIAMETERS. BOTH PIECES OF EACH ROTOR ARE MANUFACTURED UTILIZING A-286 CRES (5). A 286 CRES WAS SELECTED FOR ITS RESISTANCE TO HYDROGEN ENVIRONMENT EMBRITTLEMENT AND ITS MECHANICAL PROPERTIES. BOTH ROTOR SECTIONS ARE STRESS RELIEVED PRIOR TO BRAZING. BRAZE JOINT FIT-UP AND PROCESSING ARE CONTROLLED BY DRAWING REQUIREMENTS (1) (2). THE ASSEMBLY IS AGED AFTER BRAZING.

(1) RS007624; (2) RS007625; (3) RS007626; (4) RS007616, (5) RSS-8577

FAILURE CAUSE: D: Excessive clearance at 1st rotor labyrinth:
Labyrinth failure.
Copper disbond.

THE FIRST ROTOR (1) INBOARD LABYRINTHS SEAL AGAINST THE NOZZLE (2) INSIDE DIAMETER WHICH IS COPPER PLATED AT THE MATING SURFACE. THE ROTOR AND NOZZLE ARE MANUFACTURED UTILIZING A-286 CRES (3), WHICH IS RESISTANT TO HYDROGEN ENVIRONMENT EMBRITTLEMENT AND HAS THE REQUIRED MECHANICAL PROPERTIES. THE MATERIAL IS SOLUTION TREATED AND AGE HARDENED. THE COPPER PLATING IS RESISTANT TO HYDROGEN ENVIRONMENT EMBRITTLEMENT AND PROVIDES A SOFT MATING SURFACE TO MINIMIZE WEAR OF THE ROTOR LABYRINTHS. THE CLEARANCE BETWEEN THE ROTOR LABYRINTH AND NOZZLE IS CONTROLLED BY THE NOZZLE SHIM (4) AND DRAWING REQUIREMENTS. THE NOZZLE BLOCKING PLATES (5) ARE SYMMETRICALLY POSITIONED AND MATERIAL IS REMOVED FROM SPECIFIED LOCATIONS DURING ROTOR BALANCING (6), TO REDUCE THE TURBINE RADIAL LOADS, RESULTING IN EVEN AND STABLE WEAR OF THE COPPER.

(1) RS007624 (2) R0019783, RS007622; (3) RSS-8577; (4) RS007616; (5) R0019781, (6) RL00846

Design / Document Reference

FAILURE CAUSE: E: Fracture, distortion of stator vane.

THE STATOR (1) INCORPORATES 107 VANES WHICH GUIDES THE HYDROGEN FLOW EXITING THE FIRST ROTOR (2) INTO THE SECOND ROTOR (3). THE STATOR INSIDE DIAMETERS WHICH INTERFACE WITH THE WHEEL (4) AND SECOND ROTOR LABYRINTHS ARE COPPER PLATED TO PROVIDE A SOFT RUBBING SURFACE. THE STATOR IS LOCKED INTO THE NOZZLE/MANIFOLD (5) ASSEMBLY BY A KEY (6) AND LOCK (7) ASSEMBLY PROCEDURES FOR LOCKING DEVICES ENSURE DEFECT-FREE INSTALLATION (8). RADIAL PILOTING OCCURS AT THE INTERFACE BETWEEN THE MANIFOLD AND STATOR. THE CLEARANCE BETWEEN THE ROTOR AND STATOR IS CONTROLLED BY THE NOZZLE SHIM (9) AND DRAWING REQUIREMENTS. THE STATOR VANE FILLETS ARE RADIUSED TO REDUCE STRESS RISERS. THE OUTER SHROUD IS MANUFACTURED AS A SEPARATE PART, WHICH IS BRAZED TO THE VANE DIAMETERS. BOTH PIECES OF THE STATOR ARE MANUFACTURED UTILIZING FORGED A-286 CRES, WHICH WAS SELECTED FOR ITS RESISTANCE TO HYDROGEN ENVIRONMENT EMBRITTLEMENT AND ITS MECHANICAL PROPERTIES (10). BOTH STATOR PIECES ARE STRESS RELIEVED PRIOR TO BRAZING. BRAZE JOINT FIT-UP AND PROCESSING ARE CONTROLLED PER DRAWING REQUIREMENTS (1). THE STATOR ASSEMBLY IS AGED AFTER BRAZING.

(1) RS007622; (2) RS007624; (3) RS007625; (4) RS007626; (5) R0019783, RS007603; (6) RS007627; (7) RS007634; (8) RL00353; (9) RS007616; (10) RSS-8577

FAILURE CAUSE: ALL CAUSES

THE HIGH AND LOW CYCLE FATIGUE LIFE FOR THE NOZZLE STATOR, FIRST-STAGE ROTOR, ROTOR BOLTS AND CUPWASHERS MEET CEI REQUIREMENTS (1). THE SECOND STAGE ROTOR IS LIFE LIMITED BY MAJOR WAIVER (6). THE MINIMUM FACTORS OF SAFETY FOR THESE PARTS MEET CEI REQUIREMENTS (2). THE HARDWARE PARENT MATERIALS WERE CLEARED FOR FRACTURE MECHANICS/NDE FLAW GROWTH SINCE THEY CONTAIN NO FRACTURE CRITICAL PARTS (3). THE CONTROLLER SOFTWARE IS CONFIGURED TO DETECT AND RESPOND PROPERLY TO THE FAILURES IDENTIFIED AND COMMAND A SAFE ENGINE STATE (4). REUSE OF PARTS DURING OVERHAUL IS CONTROLLED BY THE REQUIREMENTS OF THE OVERHAUL SPECIFICATION (5).

(1) RL00532, CP320R0003B; (2) RSS-8546, CP320R0003B; (3) NASA TASK 117. (4) CP406R0002 PT 1 3.2.3 5.3; (5) RL00531; (6) DAR 2431

SSME FMEA/CIL
INSPECTION AND TEST

Component Group:	Fuel Turbopumps	Prepared:	F. Cromwell
CIL Item:	B600-02	Approved:	T. Nguyen
Part Number:	RS007601	Approval Date:	11/1/99
Component:	Low Pressure Fuel Turbopump	Change #:	3
FMEA Item:	B600	Directive #:	CCBD ME3-01-5248
Failure Mode:	Power loss in rotor.	Page:	1 of 4

Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
A	CUPWASHER BOLT FIRST-STAGE ROTOR		RS007621 RS007644 RS007624
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007621 MS9676 RS007624
		BOLTS ARE PENETRANT INSPECTED PER DRAWING REQUIREMENTS.	MS9676
	HEAT TREAT	HEAT TREAT IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	MS9676 RA0611-020
	SURFACE FINISH	BOLT DRY FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003
	ASSEMBLY INTEGRITY	BOLT TORQUE IS VERIFIED PER DRAWING REQUIREMENTS.	RS007601
		CUPWASHER DEFORMATION IS VERIFIED PER DRAWING REQUIREMENTS.	
		SUBASSEMBLIES ARE VERIFIED AS BOTTOMED PER SPECIFICATION REQUIREMENTS.	RL00353
B, C	FIRST-STAGE ROTOR SECOND-STAGE ROTOR		RS007624 RS007625
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	
		ROTOR FORGINGS ARE ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
		ROTORS ARE STRESS RELIEVED PER SPECIFICATION REQUIREMENTS BEFORE BRAZING	RA0611-020
		THE ROTORS ARE PENETRANT INSPECTED AFTER BRAZING PER SPECIFICATION REQUIREMENTS.	RA0115-116
	BRAZING INTEGRITY	BRAZING OPERATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS	RS007624 RS007625 RA0107-010
		NICKEL PLATING OF ROTOR IS VERIFIED BY EDDY CURRENT PER DRAWING AND SPECIFICATION REQUIREMENTS BEFORE BRAZING	RS007624 RS007625 RA1109-005 ASTM E376

Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference*
B, C	BRAZING INTEGRITY	NICKEL PLATING OF ROTOR IS VERIFIED BY EDDY CURRENT PER DRAWING AND SPECIFICATION REQUIREMENTS BEFORE BRAZING.	RS007624 RS007625 RA1109-005 ASTM E576
		THE SECOND STAGE ROTOR BRAZE JOINT INTEGRITY IS ULTRASONIC INSPECTED PER DRAWING REQUIREMENTS.	RS007625
	HEAT TREAT	ROTOR AGING IS VERIFIED PER SPECIFICATION REQUIREMENTS AFTER BRAZING.	RA0611-020
	ASSEMBLY INTEGRITY	THE ROTATING ASSEMBLY BALANCE IS VERIFIED PER SPECIFICATION REQUIREMENTS	RL00646
		THE AXIAL GAPS BETWEEN THE ROTORS AND THE NOZZLE AND STATOR ARE VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007601 RL00353
		TIP RADIAL CLEARANCE IS INSPECTED PER DRAWING REQUIREMENTS.	RS007624 RS007625 RS007622 RS007623
		ROTOR BLADE RADII AND COORDINATE MEASUREMENTS ARE INSPECTED PER DRAWING REQUIREMENTS.	RS007624 RS007625
	CLEANLINESS OF COMPONENTS	THE SSME SYSTEM CLEANLINESS IS VERIFIED THROUGHOUT ASSEMBLY PER SPECIFICATION REQUIREMENTS	RL10001
D	NOZZLE FIRST-STAGE ROTOR		RS007622 RS007624
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	
		ROTOR FORGING IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
	COPPER PLATING INTEGRITY	THE NOZZLE COPPER PLATING ADHESION IS VERIFIED PER DRAWING REQUIREMENTS.	RS007622
	HEAT TREAT	ROTOR AGING IS VERIFIED PER SPECIFICATION REQUIREMENTS AFTER BRAZING.	RA0611-020
	SURFACE FINISH	THE NOZZLE COPPER PLATING AND MACHINING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007622 RA1609-010

Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
O	ASSEMBLY INTEGRITY	THE ROTATING ASSEMBLY IS TORQUE CHECKED AT ASSEMBLY PER SPECIFICATION REQUIREMENTS.	RL00353
		THE ROTOR-TO-NOZZLE RADIAL CLEARANCE IS INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007622 RS007624 RL00353
		THE ROTATING ASSEMBLY IS BALANCED PER SPECIFICATION REQUIREMENTS.	RL00646
E	STATOR		RS007623
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS	
		THE STATOR FORGING IS PENETRANT AND ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116 RA0115-012
		THE STATOR STRESS RELIEF IS VERIFIED BEFORE BRAZING PER SPECIFICATION REQUIREMENTS	RA0611-020
		THE STATOR IS PENETRANT INSPECTED AFTER BRAZING PER SPECIFICATION REQUIREMENTS.	RA0115-116
	COPPER PLATING INTEGRITY	THE STATOR COPPER PLATING ADHESION IS VERIFIED PER DRAWING REQUIREMENTS.	RS007623
	SURFACE FINISH	THE STATOR COPPER-PLATING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RA1609-010 RS007623
	BRAZING INTEGRITY	BRAZING OPERATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS	RS007623 RA0107-010
		NICKEL PLATING OF THE STATOR IS VERIFIED BY EDDY CURRENT PER SPECIFICATION REQUIREMENTS, BEFORE BRAZING.	RA1103-005 RS007623 ASTM E376
	HEAT TREAT	THE STATOR AGING IS VERIFIED PER SPECIFICATION REQUIREMENTS AFTER BRAZING.	RA0611-020
	ASSEMBLY INTEGRITY	THE AXIAL GAPS BETWEEN THE ROTORS AND THE STATOR ARE VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007601 RL00353
		STATOR VANE RADII AND COORDINATE MEASUREMENTS ARE INSPECTED PER DRAWING REQUIREMENTS.	RS007623
ALL CAUSES	LPFTP		RS007601
	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.	RL00531 RA0115-116
		OPERATION/PERFORMANCE IS VERIFIED BY ENGINE HOT-FIRE TESTING AND 2ND E & M TESTS ON INSPECTIONS.	RL00050-04 RL00056-06 RL00056-07 RL00461
		TORQUE CHECKS ARE PERFORMED PRIOR TO EACH FLIGHT.	OMRSD V41BS0.010
		DATA FROM PREVIOUS FLIGHT OR HOT-FIRE IS REVIEWED FOR PROPER TURBOPUMP OPERATION/PERFORMANCE. (LAST TEST)	MSFC PLN 1228

Component Group:	Fuel Turbopumps	Prepared:	F. Cromwell
CIL Item:	B600-02	Approved:	T. Nguyen
Part Number:	RS007601	Approval Date:	11/1/99
Component:	Low Pressure Fuel Turbopump	Change #:	3
FMEA Item:	B600	Directive #:	CCBD MF3-01-5248
Failure Mode:	Power loss in rotor.	Page:	4 of 4

Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference

Failure History: Comprehensive failure history data is maintained in the Problem Reporting database (PRAMS/PRACA)
Reference: NASA letter SA21/88/308 and Rocketdyne letter 88RC09751.

Operational Use: Not Applicable.

Component Group: Fuel Turbopumps
CIL Item: B600
Part Number: RS007601
Component: Low Pressure Fuel Turbopump
FMEA Item: B600

Prepared: P. Cromwell
Approved: T. Nguyen
Approval Date: 11/1/99
Change #: 2
Directive #: CCBD ME3-01-5248
Page: 1 of 1

Component	Basic Part Number	Weld Number	Weld Type	Class	Root Side Not Access	Critical Initial Flaw Size Not Detectable HCF	Critical Initial Flaw Size Not Detectable LCF	Comments
MANIFOLD	RS007603	1	EBW	Ia	X			
MANIFOLD	RS007603	2	GTAW	I				
MANIFOLD	RS007603	5,8,10	GTAW	II	X	X		
MANIFOLD	RS007603	9,10	GTAW	II	X			
MANIFOLD	RS007603	13	GTAW	I				
MANIFOLD	RS007603	17	EBW	II	X	X	X	
MANIFOLD	RS007603	18	GTAW	I	X	X	X	

SSME FMEA/CIL

FIELD CONFIGURATION VARIANCES FROM CIL RATIONALE

Component Group: Fuel Turbopumps
Item Name: Low Pressure Fuel Turbopump
Item Number: B600
Part Number: RS007601

Prepared: F. Cromwell
Approved: T. Nguyen
Approval Date: 11/1/99
Change #: 3
Directive #: CCBD ME3-01-5248

Base Line Rationale	Variance	Change Rationale	Variant Dash Number
1. B600-05: RS007605, RS007606; CAUSE A. THE INNER AND OUTER BEARING RINGS ARE EDDY CURRENT INSPECTED PER RA1615-034.	BEARING RINGS RECEIVED FROM SUPPLIER SPLIT BALL BEARING INCORPORATED RECEIVED NO GENERAL EDDY CURRENT INSPECTION.	GENERAL EDDY CURRENT INSPECTION OF RINGS REPLACES TYPE IVC IN PENETRANT INSPECTION IN DETECTING SURFACE FLAWS. USE AS IS RATIONALE: 1 RINGS ARE SUPPLIED BY SPLIT BALL BEARING INCORPORATED RECEIVED 10X VISUAL AND TYPE IVC PENETRANT INSPECTION INSTEAD OF GENERAL EDDY CURRENT INSPECTION. FLAW DETECTABILITY RELIABILITY LEVELS BETWEEN PENETRANT AND GENERAL EDDY CURRENT INSPECTIONS ARE 0.060 AND 0.057 RESPECTIVELY	SEE DAR 2745 FOR VARIANT PART SERIAL NUMBERS
2 B600-10. THE HOUSING INSULATION IS PROTECTED BY A KEVLAR COMPOSITE SURFACE WITH L-T-90 FIRE RETARDANT ALUMINUM TAPE APPLIED TO THE KEVLAR SURFACE	CERTAIN FLIGHT HOUSINGS HAVE NICKEL PLATED INSULATION WITH COPPER PLATED TIE-IN AREAS.	THE BLOCK I AND PHASE II HAVE NICKEL PLATING TO PROTECT THE INSULATION FROM MECHANICAL DAMAGE AND PROVIDE A MOISTURE BARRIER. THE HOUSING IS COPPER PLATED AT THE INSULATION CLOSE-OUT AREAS TO IMPROVE THE NICKEL BOND. THE MINIMUM FACTORS OF SAFETY FOR THE INSULATED HOUSING MEET C.E.I. REQUIREMENTS. DAR 2068 ADDRESSES THE TIME CONSTRAINTS FOR NICKEL PLATED INSULATION WITH COPPER PLATED TIE-IN CONFIGURATIONS.	RS007632 121, -131, -231, -21*
3. B600-05 THE BALLS ARE POSITIONED BY AN FEP COATED ARMALON CAGE. FEP COATING ON CAGES USED TO REDUCE POCKET AND BALL WEAR THUS INCREASING BEARING LIFE.	BLOCK I AND PHASE II PUMPS DO NOT HAVE FEP COATED CAGES.	BLOCK I AND PHASE II CAGES HAVE TEFLON CONTAINED IN THE FIBERGLASS CAGE THAT PROVIDES BEARING LUBRICATION.	RS007605-027 RS007606-007, -025
4. B600-01. BLOCK II NOZZLE ASSEMBLY ALLOWS A MINIMUM OF 12 OF THE 43 NOZZLE PASSAGES TO BE BLOCKED.	BLOCK I PHASE II NOZZLE ASSEMBLY ALLOWS A MINIMUM OF 16 OF THE 43 NOZZLE PASSAGES TO BE BLOCKED	THE BLOCK I PHASE II NOZZLE ASSEMBLY DOES NOT VIOLATE THE REQUIREMENTS OF THE BLOCK II NOZZLE ASSEMBLY. BLOCK I PHASE II NOZZLE MEETS CEI NOZZLE VANE REQUIREMENTS.	R0019780-091
5 B600-02. CAUSE B,C THE SECOND STAGE ROTOR BRAZE JOINT INTEGRITY IS ULTRASONIC INSPECTED PER DRAWING REQUIREMENTS.	CERTAIN SECOND STAGE ROTORS RECEIVED NO ULTRASONIC INSPECTION OF THE BRAZE JOINT.	THE BRAZE JOINTS OF ALL SECOND STAGE ROTORS HAVE RECEIVED A VISUAL AND PENETRANT INSPECTION. ALL PARTS SUSPECTED TO HAVE BRAZE JOINT ANOMALIES HAVE BEEN ADDRESSED.	RS007625-031
6. B600-02. CAUSE D NOZZLE COPPER PLATING ADHESION IS VERIFIED PER DRAWING REQUIREMENTS.	CERTAIN NOZZLES DID NOT RECEIVE A BAKE TEST.	ADHESION BAKE TEST IS NOT REQUIRED FOR NOZZLES WHICH HAVE BEEN PREVIOUSLY HOT FIRE TESTED. THE HOT FIRE ENVIRONMENT ADEQUATELY VERIFIES THE COPPER PLATING ADHESION INTEGRITY.	RS007622-025 R0019783-023
7. B600-02. CAUSE E. THE STATOR COPPER PLATING ADHESION IS VERIFIED PER DRAWING REQUIREMENTS	CERTAIN STATORS DID NOT RECEIVE A BAKE TEST.	ADHESION BAKE TEST IS NOT REQUIRED FOR STATORS WHICH HAVE BEEN PREVIOUSLY HOT FIRE TESTED. THE HOT FIRE ENVIRONMENT ADEQUATELY VERIFIES THE COPPER PLATING ADHESION INTEGRITY	RS007623-031