SSME FMEA/CIL
REDUNDANCY SCREEN

Component Group:	**Propellant Valves**	**Prepared:**	**P. Lowrimore**
CIL Item:	**D130-04**	**Approved:**	**T. Nguyen**
Component:	**Fuel Preburner Oxidizer Valve**	**Approval Date:**	**6/30/99**
Part Number:	**RS008267**	**Change #:**	**1**
Failure Mode:	**Structural failure.**	**Directive #:**	**CCBD ME3-01-5226**
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Phase	Failure / Effect Description	Criticality Hazard Reference
PSMCD 4.1	Oxidizer flow to preburner reduced; high pressure oxidizer leakage into aft compartment. Loss of vehicle. Redundancy Screens: SINGLE POINT FAILURE: N/A.	1 ME-C3P,D, ME-C3S, ME-C3M, ME-C3A,C

SSME FMEA/CIL
DESIGN

Component Group:	**Propellant Valves**
CIL Item:	**D130-04**
Component:	**Fuel Preburner Oxidizer Valve**
Part Number:	**RS008257**
Failure Mode:	**Structural failure.**

Prepared:	**P. Lowrimore**
Approved:	**T. Nguyen**
Approval Date:	**6/30/99**
Change #:	**1**
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Design / Document Reference

FAILURE CAUSE: **A: Fracture of housing or end cap.**

THE FPOV HOUSING (1) AND CAP (2) ARE MADE FROM HEAT TREATED INCONEL 718 (1). THE HIGH STRENGTH AND RELATIVELY LOW THERMAL EXPANSION-CONTRACTION CHARACTERISTICS ARE PRIMARILY THE REASON FOR SELECTING INCONEL 718. INCONEL 718 EXHIBITS CRYOGENIC DUCTILITY AND HIGH MODULUS OF ELASTICITY. IT IS CORROSION RESISTANT AND HAS HIGH RESISTANCE TO STRESS CORROSION CRACKING (3). THE ROUGH MACHINED HOUSING IS HYDROSTATIC PRESSURIZED (4) AND THE FINAL MACHINED HOUSING AND CAP ARE PROOF PRESSURE TESTED TO ASSURE PART INTEGRITY (5). THE HIGH CYCLE AND LOW CYCLE FATIGUE LIFE OF THE FPOV MEETS CEI REQUIREMENTS (6). THE MINIMUM FACTORS OF SAFETY FOR THE FPOV MEET CEI REQUIREMENTS (7). THE FPOV WAS CLEARED FOR FRACTURE MECHANICS/NDE FLAW GROWTH SINCE IT CONTAINS NO FRACTURE CRITICAL PARTS (8). THE FPOV HAS COMPLETED DESIGN VERIFICATION TESTING (9), INCLUDING VIBRATION (10), AND ENDURANCE TESTS (11).

(1) RS008236; (2) RS008266; (3) RSS-8582; (4) RL00185; (5) RL00472; (6) RL00532, CP320R0003B; (7) RSS-8546, CP320R0003B; (8) NASA TASK 117; (9) DVS-SSME-515, (10) RSS-515-24; (11) RSS-515-17

SSME FMEA/CIL
INSPECTION AND TEST

Component Group:	**Propellant Valves**	**Prepared:**	**P. Lowrimore**
CIL Item:	**D130-04**	**Approved:**	**T. Nguyen**
Component:	**Fuel Preburner Oxidizer Valve**	**Approval Date:**	**6/30/99**
Part Number:	**R6008257**	**Change #:**	**1**
Failure Mode:	**Structural failure.**	**Directive #:**	**CCBD ME3-01-5226**
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Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
A	HOUSING CAP HOUSING FORGING		RS008236 RS008286 RS009303
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	
		TWO TRANSVERSE AND ONE LONGITUDINAL TENSILE SPECIMENS ARE TAKEN FROM THE HOUSING FORGING AT LOCATIONS SPECIFIED ON DRAWING. SPECIMENS ARE TESTED TO ESTABLISH CONFORMANCE TO THE REQUIRED MECHANICAL PROPERTIES.	RS008203
		THE HOUSING AND CAP HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
		THE HOUSING IS PROOF PRESSURE TESTED AFTER ROUGH MACHINING.	RL00185
		THE HOUSING AND CAP ARE PENETRANT INSPECTED AFTER FINAL MACHINING.	RA0115-116
	ASSEMBLY INTEGRITY	THE ASSEMBLED VALVE IS PRESSURE FUNCTIONAL, AND LEAK TESTED.	RL00472
	HOT-FIRE ACCEPTANCE TESTING (GREEN RUN)	VALVE OPERATION IS VERIFIED THROUGH HOT-FIRE ACCEPTANCE TESTING.	RL00461
		THE VALVE IS HELIUM SIGNATURE LEAK TESTED. (LAST TEST)	OMRSD S00030 950

Failure History: Comprehensive failure history data is maintained in the Problem Reporting database (PRAMS/PRACA)
Reference: NASA letter SA21/86/308 and Rocketdyne letter 86RC09761.

Operational Use: Not Applicable.

SSME FA/CIL WELD JOINTS

Component Group: Propellant Valves
CIL Item: D130
Component: Fuel Preburner Oxidizer Valve
Part Number: RS008257

Prepared: P. Lowrimore
Approved: T. Nguyen
Approval Date: 6/30/99
Change #: 1
Directive #: CCBD ME3-01-5226
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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
BELLOWS	RS008230	3,4	GTAW	II	X	X		
BELLOWS	RS008230	5-7	GTAW	I				
SHAFT	RS008252	1,2	EBW	II	X	X		