SSME FMEA/CIL
REDUNDANCY SCREEN

Component Group:	**Propellant Valves**	**Prepared:**	P. Lowrimore
CIL Item:	**D600-05**	**Approved:**	T. Nguyen
Component:	**Recirculation Isolation Valve**	**Approval Date:**	6/30/99
Part Number:	**RS010161**	**Change #:**	1
Failure Mode:	**Structural failure.**	**Directive #:**	CCBD ME3-01-5225
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Phase	Failure / Effect Description	Criticality Hazard Reference
PSMCD 4.1	Overpressurization of aft compartment. Loss of vehicle. Redundancy Screens: SINGLE POINT FAILURE. N/A.	1 ME-C3P,D, ME-C3S, ME-C3M, ME-C3A,C

SSME [illegible]EA/CIL
DE[illegible]GN

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Failure Mode:	Structural failure.

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

FAILURE CAUSE: A: Fracture of housing.

THE RIV HOUSING (1) IS MADE FROM INCONEL 718 BAR. INCONEL 718 IS USED FOR ITS WELDABILITY, CRYOGENIC DUCTILITY, HIGH STRENGTH, ELASTIC MODULUS, CORROSION RESISTANCE, AND RESISTANCE TO STRESS CORROSION (2) INCONEL 718 MEETS STANDARD LOX COMPATIBILITY REQUIREMENTS (3). THE HOUSING IS SOLUTION HEAT TREATED AND AGED FOR ADDITIONAL STRENGTH (1). HIGH CYCLE AND LOW CYCLE FATIGUE LIFE FOR THE RIV MEETS CEI REQUIREMENTS (4). THE MINIMUM FACTORS OF SAFETY FOR THE RIV MEET CEI REQUIREMENTS (5). THE RIV WAS CLEARED FOR FRACTURE MECHANICS/NDE FLAW GROWTH, SINCE IT CONTAINS NO FRACTURE CRITICAL PARTS (6). THE RIV HAS COMPLETED DESIGN VERIFICATION SPECIFICATION TESTING (7), INCLUDING VIBRATION (8), AND ENDURANCE (9).

(1) RS010152; (2) RSS-8582; (3) RL10017; (4) RL00532, CP320R0003B; (5) RSS-8545, CP320R0003B; (6) NASA TASK 117; (7) DVS-SSME-49; (8) RSS-517-41, RSS-517-58, RSS-ECP-579; (9) RSS-517-49

SSME FMEA/CIL
INSPECTION AND TEST

Component Group: Propellant Valves
CIL Item: D600-05
Component: Recirculation Isolation Valve
Part Number: RS010161
Failure Mode: Structural failure.

Prepared: P. Lowrimore
Approved: T. Nguyen
Approval Date: 8/30/99
Change #: 1
Directive #: CCBD ME3-01-5226
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Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
A	HOUSING LINE FLANGE		RS010162 RS010439 RS010440
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	
		THE HOUSING IS PROOF PRESSURE TESTED PRIOR TO ASSEMBLY	RS010162
		THE MACHINED HOUSING IS PENETRANT INSPECTED.	RA0115-116
		THE HOUSING HEAT TREAT IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS	RS010162 RA0611-020
		THE VALVE IS PROOF PRESSURE TESTED DURING ASSEMBLY AND FUNCTIONAL TESTING.	RL00442
		VALVE AND LINE ASSEMBLY IS PROOF PRESSURE TESTED.	RS010439
	HOT-FIRE ACCEPTANCE TESTING (GREEN RUN)	VALVE OPERATION IS VERIFIED THROUGH HOT-FIRE ACCEPTANCE TESTING.	RL00461
		SIGNATURE LEAK TEST VERIFIES NO EXTERNAL LEAK OR RUPTURE OF THE CHECK VALVE HOUSING PRIOR TO EACH FLIGHT. (LAST TEST)	OMRSD S00000.950

Failure History: Comprehensive failure history data is maintained in the Problem Reporting database (PRAMS/PRACA)
Reference: NASA letter SA21/88/308 and Rocketdyne letter 88RC09761

Operational Use: Not Applicable.

SSME CRITICAL WELD JOINTS

Component Group: Propellant Valves
CIL Item: 0600
Component: Recirculation Isolation Valve
Part Number: RS010161

Prepared: P. Lowrimore
Approved: T. Nguyen
Approval Date: 6/30/99
Change #: 1
Directive #: CCBD ME3-01-5228

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	RS010163	1,2	GTAW	II	X			
BELLOWS	RS010163	5	GTAW	II	X			
BELLOWS	RS010163	6	EBW	II	X			
POPPET	RS010166	1 PLACE	EBW	II	X			
BELLOWS	RS010171	1 PLACE	EBW	II	X			