SSME FMEA/CIL
REDUNDANCY SCREEN

Component Group:	**Ducts and Lines**	**Prepared:**	**D. Early**
CIL Item:	**K403-02**	**Approved:**	**T. Nguyen**
Part Number:	**RES1002**	**Approval Date:**	**7/25/00**
Component:	**Hydraulic Return Hose**	**Change #:**	**1**
FMEA Item:	**K403**	**Directive #:**	**CCBD ME3-01-5638**
Failure Mode:	**Quick-disconnect fails (disconnects).**	**Page:**	**1 of 1**

Phase	Failure / Effect Description	Criticality Hazard Reference
SMC 4.1	All actuators hydraulically lock and cannot be closed pneumatically. Engine operation continues until propellant depletion or prevalve closure. Loss of vehicle. Redundancy Screens: SINGLE POINT FAILURE: N/A	1 ME-E1P,S,A,M,C,D, ME-C1A,C, ME-G4M

SSME FMEA/CIL
DESIGN

Component Group:	Ducts and Lines	**Prepared:**	D. Early
CIL Item:	K403-02	**Approved:**	T. Nguyen
Part Number:	RES1002	**Approval Date:**	7/25/00
Component:	Hydraulic Return Hose	**Change #:**	1
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		Page:	1 of 1

Design / Document Reference

FAILURE CAUSE: A: Structural failure of: Support, Retainer.

THE SUPPORT AND RETAINER ARE SUPPLIED AS COMPONENTS OF A VENDOR ITEM, SYMMETRIC INCORPORATED PART NO. 511008 (DRAWING NO. 511008), PROCURED TO MEET THE REQUIREMENTS OF ROCKETDYNE PROCUREMENT SPECIFICATION (2).

THE QUICK-DISCONNECT IS A MALE-FEMALE INNER PASSAGE SEALING DESIGN. THE TWO HOUSINGS ARE ENGAGED BY THREADS. AN ANTI-ROTATION LOCKING MECHANISM IS EMPLOYED IN THE DESIGN TO PREVENT DISENGAGEMENT. THIS LOCKING MECHANISM IS VISUALLY VERIFIED TO BE ASSEMBLED CORRECTLY BY TWO PIN-DETENT MECHANISMS. DURING DISCONNECT THE INNER PLUG SEALS AGAINST THE HOUSINGS TO PREVENT CONTAMINATION OF THE INNER PASSAGES AND PREVENT FLUID LEAKAGE. DISCONNECT REQUIREMENTS ARE ESTABLISHED FOR OPERATING PRESSURE, BURST PRESSURE, TEMPERATURE RANGE, SHOCK, VIBRATION, SIDE LOADS, FLOW RATE AND HEAD LOSS PER ROCKETDYNE PROCUREMENT SPECIFICATION (2). INSTALLATION IS CONTROLLED PER SPECIFICATION REQUIREMENTS (3). THE DESIGN WAS VERIFICATION TESTED FOR VIBRATION, FLOW RATE, PRESSURE, SHOCK ACCELERATION AND COUPLING ENDURANCE PER SPECIFICATION REQUIREMENTS (2). THE MINIMUM FACTORS OF SAFETY FOR THE CONNECTOR MEET CEI REQUIREMENTS (4). THE HIGH AND LOW CYCLE FATIGUE LIFE MEET CEI REQUIREMENTS (5). THE QUICK-DISCONNECT CONNECTOR WAS CLEARED FOR FRACTURE MECHANICS/NDE FLAW GROWTH, SINCE IT CONTAINS NO FRACTURE CRITICAL PARTS (6).

(1) RE2201-03; (2) RC2201; (3) OMRSD V58AG0.121; (4) RSS-8546, CP320R0003B; (5) RL00532, CP320R0003B; (6) NASA TASK 117

SSME FMEA/CIL
INSPECTION AND TEST

Component Group:	Ducts and Lines
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Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
A	(VENDER P/N 511008)		RE2201-03
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RE2201
	ASSEMBLY INTEGRITY	THE FOLLOWING TESTS ARE PERFORMED DURING ACCEPTANCE TEST: - FLOW AND PRESSURE DROP. - PROOF PRESSURE. - BONDING.	RC2201 RE2201 RC2201
	FLIGHT FLOW TESTING	CONNECTOR INSTALLATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	OMRSD V58AG0.121
		FOLLOWING REPAIR OR REPLACEMENT, AN EXTERNAL LEAK CHECK IS PERFORMED TO REVALIDATE THE SUBSYSTEM.	OMRSD V41GEN.575
		DURING EXTERNAL INSPECTIONS, THE HYDRAULIC SYSTEM IS VISUALLY INSPECTED FOR LEAKAGE.	OMRSD V41BU0.030
		DURING AFT CLOSEOUT INSPECTION, ANY EVIDENCE OF PREVIOUS HYDRAULIC LEAKAGE REQUIRES FURTHER DISPOSITION. (LAST TEST)	OMRSD V41BU0.070

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 FMEA/CIL
WELD JOINTS

Component Group: Ducts and Lines
CIL Item: K403
Part Number: RES1002
Component: Hydraulic Return Hose
FMEA Item: K403

Prepared: D. Early
Approved: T. Nguyen
Approval Date: 7/25/00
Change #: 1
Directive #: CCBD ME3-01-5638

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
LINE	RES1002	1-5	GTAW	I	X			
LINE	RES1002	10,11,18,20	GTAW	I	X			
LINE	RES1002	6,9,12,15	GTAW	II	X			
LINE	RES1002	7,8,13,14	GTAW	II	X			
LINE	RES1002	16,17	GTAW	I	X	X		
LINE	RES1002	19	GTAW	I	X			