SSME FMEA/CIL
REDUNDANCY SCREEN

Component Group:	**Ducts and Lines**	**Prepared:**	**D. Early**
CIL Item:	**K552-01**	**Approved:**	**T. Nguyen**
Part Number:	**R0014416**	**Approval Date:**	**7/25/00**
Component:	**Remote Mount Fuel Preburner Pc Transducer Line**	**Change #:**	**1**
FMEA Item:	**K552**	**Directive #:**	**CCBD ME3-01-5638**
Failure Mode:	**Fails to contain hot gas.**		
		Page:	**1 of 1**

Phase	Failure / Effect Description	Criticality Hazard Reference
SMC 4.1	Leakage of hot-gas into the aft compartment and overpressurization of the aft compartment. Extensive engine damage. Erosion of Pc port. Loss of vehicle. Redundancy Screens: SINGLE POINT FAILURE: N/A	1 ME-D3S,A,M,C

SSME FMEA/CIL DESIGN

Component Group:	Ducts and Lines
CIL Item:	K552-01
Part Number:	R0014416
Component:	Remote Mount Fuel Preburner Pc Transducer Line
FMEA Item:	K552
Failure Mode:	Fails to contain hot gas.

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

Design / Document Reference

FAILURE CAUSE: A: Parent material failure or weld failure.

THE LINE ASSEMBLY (1) IS MANUFACTURED UTILIZING 321 CRES TUBE AND INCONEL 625. 321 CRES TUBING WAS SELECTED FOR ITS STRENGTH, FABRICABILITY, GENERAL CORROSION RESISTANCE, AND STRESS CORROSION RESISTANCE (2). INCONEL 625 WAS SELECTED FOR ITS WELDABILITY, FORMABILITY, RESISTANCE TO STRESS CORROSION CRACKING, AND CORROSION RESISTANCE (2). INCONEL 625 POSSESSES THE REQUIRED STRENGTH WITHOUT REQUIRING HEAT TREAT. INCONEL 625 IS NOT SIGNIFICANTLY EFFECTED BY HYDROGEN IN THIS ENVIRONMENT (2). PLATE SECTIONS INCORPORATE RADIUS JOINTS TO REDUCE STRESS CONCENTRATIONS. OFFSET LIMIT REQUIREMENTS ARE ESTABLISHED TO REDUCED STRESS CONCENTRATIONS AND IMPROVE WELD GEOMETRY. TUBING STOCK IS DRAWN TO MAINTAIN SURFACE REGULARITY. MINIMUM FACTORS OF SAFETY FOR THE MOUNT MEET CEI REQUIREMENTS (3). HIGH AND LOW CYCLE FATIGUE LIFE MEET CEI REQUIREMENTS (4). THE MOUNT ASSEMBLY HAS COMPLETED CERTIFICATION TESTING BY SIMILARITY AND HOT-FIRE TESTING (5). TABLE K552 LISTS ALL THE FMEA/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. THESE WELDS HAVE BEEN ASSESSED AS ACCEPTABLE FOR FLIGHT BY RISK ASSESSMENT (6).

(1) R0014416; (2) RSS-8582; (3) RL00532, CP320R0003B; (4) RL00532, CP320R0003B; (5) VRS 274; (6) RSS-8756

SSME FMEA/CIL
INSPECTION AND TEST

Component Group:	**Ducts and Lines**	**Prepared:**	**D. Early**
CIL Item:	**K552-01**	**Approved:**	**T. Nguyen**
Part Number:	**R0014416**	**Approval Date:**	**7/25/00**
Component:	**Remote Mount Fuel Preburner Pc Transducer Line**	**Change #:**	**1**
FMEA Item:	**K552**	**Directive #:**	**CCBD ME3-01-5638**
Failure Mode:	**Fails to contain hot gas.**	**Page:**	**1 of 1**

Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
A	MOUNT PLATE		R0014416 RS007342
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	R0014416 RS007342
		DETAILS ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	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
	ASSEMBLY INTEGRITY	THE ASSEMBLY IS PROOF PRESSURE TESTED PER SPECIFICATION REQUIREMENTS.	R0014416
	FLIGHT FLOW TESTING	THE EXTERNAL SURFACE IS VISUALLY INSPECTED PRIOR TO EACH LAUNCH.	OMRSD V41BU0.030
		A HELIUM SIGNATURE LEAK TEST IS PERFORMED PRIOR TO EACH LAUNCH. (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 FMEA/CIL
WELD JOINTS

Component Group: Ducts and Lines
CIL Item: K552
Part Number: R0014416
Component: Remote Mount Fuel Preburner Pc Transducer Line
FMEA Item: K552

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	R0014416	1,2	GTAW	I	X	X		