

SSME / A/CIL  
REDUNDANCY SCREEN

Component Group: Combustion Devices  
CIL Item: A705-08  
Part Number: R0017440  
Component: Oxidizer Preburner (Phase II+)  
FMEA Item: A705  
Failure Mode: Partial blockage of fuel to baffles.

Prepared: A. Kay  
Approved: T. Nguyen  
Approval Date: 9/9/99  
Change #: 2  
Directive #: CCBD ME3-01-5238

Page: 1 of 1

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| Phase      | Failure / Effect Description   | Originality<br>Hazard Reference        |
|------------|--|--|
| SMC<br>4.1 | Fuel starvation to the ASI core causes overheating and damage to the HPO1F turbine section resulting in turbine failure. Loss of vehicle.<br><br>Redundancy Screens: SINGLE POINT FAILURE: N/A | 1<br>ME-FB63,<br>ME-FB6M,<br>ME-FB6A,C |

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**SSME FMEA/CIL**  
**DESIGN**

Component Group: Combustion Devices  
CIL Item: A705-08  
Part Number: R0017440  
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Page: 1 of 1

Design / Document Reference

FAILURE CAUSE: A; Contamination.

THE FUEL IS FILTERED TO 400-MICRONS AT THE EXTERNAL TANK (1). THE LIQUID HYDROGEN IS SUPPLIED TO THE BAFFLES (2) BY 4 SLOTS ON THE BAFFLE SUPPORT PINS (3). THE SLOTS ACT AS A FILTER TO MINIMIZE BLOCKAGE OF THE EXIT ORFICE.

(1) ICC 13M15000; (2) RS009010; (3) RS009026

A - 322

**SSME FIM CIL  
INSPECTION AND TEST**

Component Group: Combustion Devices  
 CIL Item: A705-08  
 Part Number: R0017440  
 Component: Oxidizer Preburner (Phase II+)  
 FMEA Item: A705  
 Failure Mode: Partial blockage of fuel to baffles.

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Page: 1 of 1

| Failure Causes | Significant Characteristics                            | Inspection(s) / Tests  | Document Reference  |
|----------------|--|--|---|
| A              | OXIDIZER PREBURNER<br>INJECTOR<br>BAFFLE<br>BAFFLE PIN |  | R0017440<br>RS009010<br>RS009025  |
|                | CLEANLINESS  | INJECTOR AND BAFFLE CLEANLINESS IS VERIFIED PER SPECIFICATION REQUIREMENTS.<br><br>ALL UPSTREAM COMPONENTS ARE INSPECTED AND CLEANED PER SPECIFICATION REQUIREMENTS.   | RA110-018<br><br>RL10001  |
|                | ASSEMBLY INTEGRITY                                     | FURNACE BRAZE IS INSPECTED PER SPECIFICATION REQUIREMENTS.<br><br>BAFFLE IS RADIOGRAPHICALLY INSPECTED FOR EXCESS BRAZE ALLOY IN FUEL PASSAGES PER DRAWING AND SPECIFICATION REQUIREMENTS.<br><br>BAFFLES ARE FLOW CHECKED AFTER BRAZING PER SPECIFICATION REQUIREMENTS.<br><br>THE HOT FIRE TESTING AND 2ND E & M INSPECTION VERIFY COOLANT FLOW AND PREBURNER INTEGRITY. | RA1507-017<br>RA1507-007<br><br>R0017440<br>RAC115-006<br><br>RL00563<br><br>RL00050-04<br>RL00055-05<br>RL00056-07 |
|                |  | A VISUAL INSPECTION IS PERFORMED AFTER EACH FLIGHT FOR EVIDENCE OF THERMAL DAMAGE TO THE INJECTOR OUTLET AND TURBOPUMP INLET AREA.   | CMRSD V41BL0040   |

A - 323

Failure History: Comprehensive failure history data is maintained in the Problem Reporting database (PRAMS/PRACA).  
 Reference: NASA letter SA21/88/308 and Rocketdyne letter 88RCC9751

Operational Use: Not Applicable

**SSME EA/CIL  
WELD JOINTS**

Component Group: Combustion Devices  
 CIL Item: A706  
 Component: R0017440  
 Part Number: Oxidizer Preburner (Phase II\*)  
 A706

Prepared: A. Kay  
 Approved: T. Nguyen  
 Approval Date: 6/9/99  
 Change #: 1  
 Directive #: CCBD ME3-01-6238  
 Page: 1 of 1

A - 341

| Component         | Basic Part Number | Weld Number        | Weld Type | Class | Root<br>Side Not<br>Access | Critical initial<br>Flaw Size Not<br>Detectable |     | Comments |
|-------------------|-------------------|--------------------|-----------|-------|----------------------------|---|-----|----------|
|                   |                   |                    |           |       |                            | HCF   | LCF |          |
| OPB FUEL CHAMBER  | R0017425          | 1                  | GTAW      | I,II  | X                          | X   | X   |          |
| OPB FUEL CHAMBER  | R0017425          | 2                  | GTAW      | II    | X                          | X   | X   |          |
| OPB INJECTOR      | R0017440          | 1                  | FRW       | Ib    | X                          | X   | X   |          |
| OPB INJECTOR      | R0017440          | 2                  | EBW       | II    | X                          | X   | X   |          |
| OPB INJECTOR      | R0017440          | 3                  | GTAW      | II    | X                          | X   | X   |          |
| OPB INJECTOR      | R0017440          | 9                  | EBW       | II    | X                          | N/A   | N/A |          |
| OPB INJECTOR      | R0017440          | 28                 | EBW       | II    | X                          | N/A   | N/A |          |
| OPB INJECTOR      | R0017440          | 29                 | EBW       | II    | X                          | X   | X   |          |
| OPB INJECTOR      | R0017440          | 31                 | GTAW      | II    | X                          |   |     |          |
| OPB BODY          | R0018067          | 1                  | GTAW      | II    | X                          | X   | X   |          |
| OPB BODY          | R0018067          | 2                  | EBW       | I     | X                          |   |     |          |
| OPB BODY          | R0018067          | 6                  | GTAW      | II    | X                          |   |     |          |
| OPB BODY          | R0018067          | 7                  | GTAW      | II    | X                          |   |     |          |
| OPB FUEL MANIFOLD | RS009013          | 9(OPT),<br>10(OPT) | GTAW      | I     |                            | X   | X   |          |
| OPB FUEL MANIFOLD | RS009013          | 11(OPT)            | GTAW      | I     |                            | X   | X   |          |
| OPB FUEL MANIFOLD | RS009013          | 13(OPT)            | GTAW      | I     | X                          |   |     |          |
| OPB OXID INLET    | RS009014          | 6-8                | GTAW      | I     |                            | X   |     |          |
| OPB ASI FUEL LINE | RS009024          | 1                  | GTAW      | I     | X                          | X   | X   |          |

**SSME FMEA/CIL**

**FIELD CONFIGURATION VARIANCES FROM CIL RATIONALE**

Component Group: Combustion Devices  
Item Name: Oxidizer Preburner (Phase II+)  
Item Number: A705  
Part Number: R0017449

Prepared: A. Kay  
Approved: T. Nguyen  
Approval Date: 9/9/99  
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Page: 1 of 1

| Base Line Rationale                             | Variance  | Change Rationale  | Variation Dash Number                   |
|---|---|---|---|
| 1. A705-09, -10, -11:<br>NO RATIONALE EFFECTED. | POWERHEADS EXIST UTILIZING<br>THE COMBINED FOUR ZONE<br>PROOF PRESSURE TEST FROM<br>THE HOT GAS MANIFOLD. CEI<br>REQUIREMENTS ARE<br>MAINTAINED | HOT GAS MANIFOLD PROOF PRESSURE TEST ACCOMPLISHED SEPARATELY<br>PRIOR TO COOLANT DUCT AND MAIN INJECTOR INSTALLATION. | R0018001-691, -701,<br>731, 991, -1051. |

A - 342