

not violate any requirements, but is beyond current SSME experience.

- CLOSURE RATIONALE:

The most likely cause of the hardware blueing was contamination which was either consumed in the OPS or caused temporary coolant flow blockage. Both cases can cause a local mixture ration change. Standard post flight inspections will detect this condition on Phase II HPOTP's. Analysis also shows the HPOTP can withstand a temperature of 1750 deg R for one flight duration with no detrimental effects. Block I HPOTP/AT's are not sensitive to "hot streaks" since they do not use hot gas from the OPS for mixing in their coolant circuit. Also, HPOTP/AT development testing twice demonstrated tolerance to an 1510 deg R inlet hot streak with no hardware anomalies noted.

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STS-067 (OV-105,FLT #8) INFLIGHT ANOMALY REPORT

10/19/98

PAGE 2

IFA NUMBER> STS-67-K-01

TITLE:MISSING WASHERS BETWEEN ORBITER FORWARD SEPARATION BOLT BEARING PLATE AND ATTACH BOLTS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 000 : 00.00.00

IFA DATE:

IFA STATUS: CLOSED : 08/14/1995 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062106A PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

* *****NONE FOUND***** * *****NONE FOUND*****

0 CLOSURE INITIATED BY: KSC-TV/J. SIMON |

RESPONSIBLE MANAGERS 1: JOHN SIMON KSC-PEO

2:

0 DESCRIPTION:

Sts0067.txt

At DFRC, during ordinance removal/safing operations, it was observed that the forward separation bolt bearing plate was lacking one each counter-sunk wash under the four attached bolt heads. Preliminary indications are that the bolt heads were not in contact with the bearing plate. KSC/SPC has convened a review team to investigate this incident.

- CLOSURE RATIONALE:

A special board reviewed the flight history, installation processes and problem report history of the hardware. Engineering technical documentation such as OMRSD, specifications, drawings and procedures were reviewed. The work environment was visited along with a thorough review of the work practices and human factors issues. The personnel involved in the KSC operation (6) and the DFRF operation (5) were interviewed. Logistical procedures were reviewed on how hardware is kitted, handled, and returned to logistics. Each area was addressed individually for problems, traps, inconsistencies, and deficiencies.

1

STS-067 (OV-105,FLT #8) INFLIGHT ANOMALY REPORT

10/19/98

PAGE 3

IFA NUMBER> STS-67-K-02

TITLE:WSB #2 EXCESS WATER USAGE

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 077 : 21.44.13
		IFA DATE: 03/18/1995
IFA STATUS: CLOSED	: 09/25/1995	ELAPSED TIME: 016 : 15.06.01
PRACA STATUS: UNKNOWN		HOUSTON TIME: 15.44.13
PRCBD NUMBER: S062106H		PHASE: ENTRY/LANDING

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 69V-0014	M	MMACS-05

0 CLOSURE INITIATED BY: KSC-TV-PEO/J. SIMON |
RESPONSIBLE MANAGERS 1:

2:

0 DESCRIPTION:

During entry the WSB #2 usage rate was noted at 8%/min (~15lbs/min). The excessive usage continued until touchdown at which time it stopped. A total of ~50 lbs of water was used during this time period, at least 30 lb more than expected. The APU lube oil and HYD fluid did not indicate any excessive cooling.

- CLOSURE RATIONALE:

The post-flight investigation concluded that the primary cause of the WSB#2 water tank load anomaly was the technician inadvertently connecting the GSE Manual Drain Valve assembly to the incorrect QD. The technician connected the drain valve assembly to the Water Tank Fill QD, Ref Des. 50V58PD11, instead of the Core Drain QDF, Ref Des. 50V58PD8. As the technician drained the water from the water tank, the WSB ullage pressure correspondingly decreased to ambient. Based on data obtained from the retest of the WSB#2 GN2 Regulator, ullage calculations verified that the water tank has approximately 26 lbs. of water in it prior to launch of STS-67. It should be noted that this calculation was performed as part of the post-flight investigation.

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STS-067 (OV-105,FLT #8) INFLIGHT ANOMALY REPORT

10/19/98

PAGE 4

IFA NUMBER> STS-67-S-01

TITLE:SCOS CACHE ADDRESSING ERROR

0 MISSION CONSTRAINT:

SUBS

IFA TIME GMT: 062 : 04.50.00

IFA DATE: 03/02/1995

IFA STATUS: OPEN

ELAPSED TIME: 000 : 22.11.48

PRACA STATUS: UNKNOWN

HOUSTON TIME: 22.50.00

PRCBD NUMBER: S062106

Sts0067.txt

PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	CDMS-02		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: R. MONTGOMERY DF22

2:

0 DESCRIPTION:

Attempts to uplink modifications to the IPS objective loads via POCC commanding using RI codes 5D, 5E and 5F resulted in a corrupted SCOS cache memory. A patch (SRN AST2-002) will have to be applied to SCOS in the event of any MMU IPL's or Upper Memory IPL's to SCOS.

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STS-067 (OV-105,FLT #8) INFLIGHT ANOMALY REPORT

10/19/98

PAGE 5

IFA NUMBER> STS-67-S-02

TITLE:ASTRO-2 POCC COMMANDING ERROR

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 070 : 03.33.30
		IFA DATE: 03/10/1995
IFA STATUS: OPEN		ELAPSED TIME: 008 : 20.55.18
PRACA STATUS: UNKNOWN		HOUSTON TIME: 21.33.30
PRCBD NUMBER: S062106		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	PYLD-21		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: M.A. POLT D062

2:

0 DESCRIPTION:

The ASTRO Telescopes all were inadvertently commanded to the shutdown state by POCC commanding error, resulting in door closure, and a halt to science ops. The error consisted of an item-95 (shutdown) command

Sts0067.txt

16 minutes MET. The crew reported that the same hand-held mic did not work when used at the airlock ATU. An IFM procedure to troubleshoot the failure produced roughly the results expected for nominal hardware. The IFM did not reveal a cause for the open circuit breaker. KSC troubleshooting is continuing. The orbiter audio system is operating properly. Investigation of hand held mike used during an orbit anomaly revealed no problem. Additional troubleshooting of speaker box pending buildup of test equipment.

- CLOSURE RATIONALE:

Since the failure could not be repeated, and troubleshooting could not find evidence of failed hardware, no corrective action has been identified. The IPR will be upgraded to a PR and closed as an unexplained anomaly. Upon upgrade to a PR, a CAR will be opened against the orbiter and then also closed as an unexplained anomaly. The hardware will be flown again as is.

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STS-067 (OV-105,FLT #8) INFLIGHT ANOMALY REPORT

10/19/98

PAGE 8

IFA NUMBER> STS-67-V-06

TITLE:PCS SYSTEM 2 N2 HIGH FLOW TRANSIENTS AFTER SWITCHES FROM O2 TO N2

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 074 : 21.49.00
IFA DATE: 03/15/1995
IFA STATUS: CLOSED : 07/06/1995 ELAPSED TIME: 013 : 15.10.48
PRACA STATUS: UNKNOWN HOUSTON TIME: 15.49.00
PRCBD NUMBER: S062106E PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 69V-0015	K	PR ECL-0418
M	EECOM-04		

0 CLOSURE INITIATED BY: JSC-EC3/D. HOY |

RESPONSIBLE MANAGERS 1: P.OLIVER X33323

2: M. HOY X30268

0 DESCRIPTION:

After the mid-mission changeover from pressure control system (PCS)-1 to PCS-2, several occurrences of transient high N2 flow were observed. The transients occur at the beginning of the N2 flow cycle upon switchover from O2 to N2 flow. Higher than normal initial N2 flow has been observed on six of the eleven O2/N2 switchover cycles that have occurred and range from 2.75 to 5.0 lbm/hr and last up to several minutes. Normal N2 flow profiles sustain an initial peak of 1.5 for a few seconds. During one event, the flow went offscale high (over 5.0 lbm/hr) for about 1.5 minutes, ripping the caution and warning alarm for exceeding N2 flow rate FDA limit of 4.9 lbm/hr. So far, none of the high flow transients can be explained by events known to produce high N2 flows, such as, WCS usage near the time of switchover, low cabin pressure or decreasing cabin temperature. Data from prior flights of OV-105 reveal similar transient high PCS-2 N2 flow behavior; however, this behavior typically only occurs on the first two or three switchover cycles. Data review complete at the vendor, Carlton. PR disposition is in work to close. No OMRSD violations exist.

- CLOSURE RATIONALE:

The component causing the transient-high N2 flow rates has been isolated to the PCS-214.7 psia cabin regulator. The exact failure has not been identified, but ground testing of the regulator has determined it to be acceptable for flight until an opportunity to replace the regulator occurs during the upcoming OMDP. Workaround procedures have been developed to enable the ground controllers to prevent the ringing of an FDA alarm as a result of this transient condition. During the OMDP following flight 11, the N2/O2 control panel will be removed and shipped to the vendor where test, teardown and evaluation (TT&E) plus

Sts0067.txt

to ET cyro loading. The FES feedline heaters were reconfigured from system 1 ot 2 at 069:05:22 G.m.t. Nominal heater cycles were seen on the FES supply B accumulator/hi-load line system 2 heater. Detailed inspection of insulation found gap in insulation that may have contributed to prelaunch problem. Insulation repair is in work. Heater performance is nominal. LCC revision is in progress to clarify heater switching process.

- CLOSURE RATIONALE:

The most probable cause of the FES supply B accumulator/hi-load line system 2 heater performance during the prelaunch time frame was a workmanship error that left a gap in the insulation on the accumulator line. The vendor and KSC technician have been informed of the importance of assuring that all FES insulation is installed properly. An LCC revision has been prepared that clarifies the heater switching process.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-068 (OV-105,FLT #7) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 1

IFA NUMBER> STS-68-D-01

TITLE:SIMULATION TERMINATION DURING DOLILU I-LOAD VERIFICATION

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 273 : 08.15.00
		IFA DATE: 09/30/1994
IFA STATUS: CLOSED	: 10/25/1994	ELAPSED TIME: 000 : 00.00.00
PRACA STATUS: UNKNOWN		HOUSTON TIME: 03.15.00
PRCBD NUMBER: S062103A		PHASE: PRE-LAUNCH

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	GPO-01		

0 CLOSURE INITIATED BY: B. STONE
 RESPONSIBLE MANAGERS 1: B.R. STONE - MOD
 2:

0 DESCRIPTION:

The Space Vehicle Dynamics Simulation (SVDS) prematurely terminated at Mach-0.6 while processing/verifying the DOLILU I-load with the L-4.25 hr wind. SVDS terminated on both file servers. Prior and subsequent I-load verifications (both Nominal and DOLILU) were successful. unique simulation anomaly due to the wind and atmospheric environment coupled with a specific I-load selection was immediately suspected. Because the Nominal I-load reflected significant structural loads margin. DOLILU operations were terminated.

- CLOSURE RATIONALE:

SVDS termination was traced to DOL to the transition from aerodynamic equations to aerodynamic data tables at Mach=0.6. The unique atmospheric/wind conditions resulted in a Mach decrease during the

Sts0068.txt

Engine mixture ratio has been adjusted to correct for additional fuel leakage since the engine was calibrated. This is now required per ECP 1254 which was first flown on STS-64. Other factors contributed to the abort which are now being addressed as part of the prediction process and the dotting of LCCs (engine ignition confirm limits.). The prediction process looks more closely at fuel flow meter history and calibration, engine acceptance test (calibration test), and High Pressure Pump greenrun data.

Post abort analysis indicate the cause of the abort was the combined effect of high mixture ratio and either a delayed OPS prime or a Fuel Flowmeter shift.

- CLOSURE RATIONALE:

The cause of the abort was engine 2032 running with a high MR combined with either the effects of a delayed OPB ignition or an engine FFM K shift. Engine 2032 has had the MCC and FFM replaced and the engine has been recalibrated.

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STS-068 (OV-105,FLT #7) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 3

IFA NUMBER> STS-68-E-02

TITLE:CRACKED SHEET METAL IN TURNAROUND DUCT IN TURBINE DISCHARGE OF HPFTP

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 000 : 00.00.00
		IFA DATE:
IFA STATUS: CLOSED	: 10/17/1995	ELAPSED TIME: 000 : 00.00.00
PRACA STATUS: CLOSED	: 1995-01-17	HOUSTON TIME: 00.00.00
PRCBD NUMBER: S062103P		PHASE: ASCENT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
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A	A16205	A	UCR A033169
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0 CLOSURE INITIATED BY: RI-RKDN/D. JOHNSON |

RESPONSIBLE MANAGERS 1: J. EBERT, RKDN

2:

0 DESCRIPTION:

Post abort inspections of High Pressure Fuel Pump U/N 4213R2 revealed an area of cracked sheet metal in the turnaround duct in the turbine discharge. The crack was 4.5 inches long along with a crack at each end, 0.8" and 0.9" long, forming a flap which is deflected outboard touching the coolant liner. The 4.6" long crack is running circumferentially in weld 51.

Degradation of the turbine performance would be small and the engine is tolerant to particle generation of this size in this area. The noted crack presents two flight concerns; turbine edit flow blockage and particle generation. The maximum flow blockage expected from this condition is 10%. Blockage of 50% is required to cause a redline cutoff. Downstream the Main Injector Lox Posts flow shields protect the lox posts from impact damage. Three cases have been experienced with fragments of similar size with no damage.

- CLOSURE RATIONALE:

The noted High Cycle Fatigue cracking is associated with large weld bead reentrant angle and oxide folds. The noted weld characteristics were accepted at the detail fabrication level (visually to RL 10011 class 1, X-Ray per RA0115-116), and penetrant inspection per RA0115-116, type 11a). Identification of large weld bead reentrant angle, oxide folds and cracks in high time unit 4406R2 indicates that this weld 51 condition may be generic. All pumps are inspected for cracks in this weld between flight. If the condition were to occur after lift-off it has been demonstrated to have no effect on pump/engine performance.

Sts0068.txt

After 2 additional hot fire tests for 650 seconds, housing unit 4213R2 has been scrapped for sectioning analysis of the flap. The functional analysis and hot-fire demonstration indicated safe operation for one flight with this condition. The turbine discharge sheet metal is currently borescope inspected prior to every flight per OMRSD and hot-fire specification requirement. A specific visual inspection of discharge sheet metal weld 51 was added to the OMI. A specification change (MCR # 1972) has been approved to revise the requirements for

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STS-068 (OV-105,FLT #7) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 4

IFA NUMBER> STS-68-E-02

TITLE:CRACKED SHEET METAL IN TURNAROUND DUCT IN TURBINE DISCHARGE OF HPFTP

0 CLOSURE RATIONALE:(Continued from previous page).

inspection of weld 51. The change affects the RL00655 sheet metal inspection specification. The change requires borescope inspection of weld 51 when the pump is removed from the engine, and a type 11a penetrant inspection when the housing is recycled. There are no contract requirements to fabricate additional sheet metal subassemblies which include weld 51. Options for precluding future parts from being fabricated with the conditions noted will be investigated if a requirement is received to fabricate additional parts.

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STS-068 (OV-105,FLT #7) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 5

IFA NUMBER> STS-68-I-01

TITLE:KU-BAND MODE 1 CHANNEL 2 OPS RECORDER DEGRADATION

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 273 : 20.00.00

IFA DATE: 09/30/1994

IFA STATUS: CLOSED : 11/20/1994 ELAPSED TIME: 000 : 08.44.00

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PRACA STATUS: UNKNOWN

HOUSTON TIME: 15.00.00

PRCBD NUMBER: S062103B

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M INCO-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: S. SIDES

2:

0 DESCRIPTION:

During a dump of the Ops recorder on Ku-Band channel 2 it was noted that the dump quality was poor. Channel 3 was transmitting payload data. This is the same anomaly as seen on STS-59. It was also noted that when PL Data was started on channel 3, it interfered with channel 1 data while Ku two-way.

- CLOSURE RATIONALE:

Approval of the test plan for post-STS-68 IVT testing if the SLR payload & TDRS can be included, is recommended, leaving the SRL payload, Ku-Band system & Ops recorders 1 & 2 in the flight configuration. If the problem is duplicated, the IFA & IPR will be closed based on results of troubleshooting.

Test plan reviewed by the Board. Program decided not to pursue test because of the cost and because the payload is not manifested on future flights. Anomaly closed as UA.

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STS-068 (OV-105,FLT #7) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 6

IFA NUMBER> STS-68-K-01

TITLE:LH RSS GSE COAXIAL CABLE JACKET DAMAGED

sts0068.txt
0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 000 : 00.00.00
IFA DATE:
IFA STATUS: CLOSED : 03/03/1995 ELAPSED TIME: 000 : 00.00.00
PRACA STATUS: UNKNOWN HOUSTON TIME: 00.00.00
PRCBD NUMBER: S062103J PHASE: ASCENT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K D-BI-067L-004

0 CLOSURE INITIATED BY: KSC-TM/C. ABNER

RESPONSIBLE MANAGERS 1:

2:

0 DESCRIPTION:

The LH RSS GSE coaxial cable jacket damaged in several areas exposing braided shield. There was similar damage on the RH SRB. Nonflight cable was used for RSS closed loop testing during SIT and at T-45 minutes. The damage does not appear to have been caused by hydrolaser. The damage was not near taped cables and therefore not attributed to tape removal.

- CLOSURE RATIONALE:

The RSS coax cable was not damaged during flight. The minor damage to the cable jacket was caused during cable installation/routing in the RPSF/VAB and/or disassembly at Hangar AF. The damage did not affect ground testing/use of the cable. Any significant pre-launch damage to cable or conductors would be detected by electrical testing before closouts or functional testing after closouts. An SRB Technical Awareness Bulletin (SRB/TAB-16) has been generated by engineering and distributed to appropriate shop and quality organizations. Shop and quality supervisors are to discuss proper cable handling and inspection techniques in their all-hands meetings.

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Sts0068.txt

oxidizer leak detection temperature of the vernier thrusters to approx. 0 deg F, with the fuel leak detection temperature remaining at 130 deg F. Data analysis showed that the data signature was typical of a sensor or wiring problem, most likely between the sensor and DSC. The thruster continues to function nominally. KSC will troubleshoot to isolate the source of the anomaly.

- CLOSURE RATIONALE:

The most probable cause of the erratic/offset low oxidizer injector temperature is an intermittent resistance variation in either the temperature transducer or in the wiring from the temperature transducer to the dedicated signal conditioner to the multiplexer/demultiplexer. Extensive troubleshooting was unable to repeat the problem. However, vernier thruster L5D (s/n 102) was removed and replaced to eliminate a potential source of the problem.

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STS-068 (OV-105,FLT #7) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 9

IFA NUMBER> STS-68-V-03

TITLE:PRIMARY TRUSTER L3D FAILED OFF

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 279 : 05.00.00
		IFA DATE: 10/05/1994
IFA STATUS: CLOSED	: 02/29/1996	ELAPSED TIME: 005 : 17.44.00
PRACA STATUS: CLOSED	: 1996-03-13	HOUSTON TIME: 23.00.00
PRCBD NUMBER: S062103E		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 67V-0005	M	PROP-02
P	CAR 68RF02		

0 CLOSURE INITIATED BY: JSC-FA2/D. MCCORMACK |

RESPONSIBLE MANAGERS 1: D. MCCORMACK X33327

2:

0 DESCRIPTION:

At 279:05:00 G.m.t., primary RCS thruster L3D failed off after operating successfully for numerous pulses. The RCS RM annunciated a fail-off condition when three consecutive 80ms firings had chamber pressures of less than 10 psia. There was no indication of a leak, and the thruster will remain de-selected for the remainder of the mission. KSC will remove and replace the thruster. The thruster will be sent to the WSTF for failure investigation.

- CLOSURE RATIONALE:

The cause of the failure was Teflon-seal extrusion in the fuel-valve pilot-poppet seat. This extrusion created a flow restriction through the pilot poppet, resulting in the failure of the upper valve cavity to bleed off and provide the main stage with the differential pressure required to open. The Teflon seal extrusion appears to be caused by normal thruster operation and/or processing.

KSC removed and replaced thruster L3D and transferred it to the WSTF for troubleshooting. This troubleshooting included an inspection and checkout prior to a hotfire, which was performed with full instrumentation. Although a contaminated oxidizer valve was suspected to be the most probable cause of the fail-off, the fuel valve failed-to-open during the the hotfire test. Oxidizer valve operation was acceptable. Failure analysis of the fuel valve identified extrusion of the pilot-poppet seat Teflon seal as the cause of the fail-off. The extrusion appears to be caused by normal thruster operation and/or processing. Thruster s/n 325 will be reassembled with a new fuel valve and will undergo an ATP at the WSTF. Final results of the thruster troubleshooting and failure analysis will be documented in CAR 68RF02.

Sts0068.txt

opened for entry. KSC has removed and replaced the regulator.

- CLOSURE RATIONALE:

Based on previous failure history, the WSB 2 GN2 regulator leakage experienced during STS-68 was most probably the result of extrusion and nibbling damage of the regulator's balance-stem O-ring seal. The WSB 2 regulator (s/n 021, a -3 config) was removed and replaced with a -7 configuration regulator. As a result of other problems with WSBs 1 and 3 during STS-68, the opportunity was also taken to replace the regulators on those WSBs with -7 configuraiton regulators.

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STS-068 (OV-105,FLT #7) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 12

IFA NUMBER> STS-68-V-07

TITLE:WSB SYSTEM 1 GN2 REGULATOR PRESSURE DECAY

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 273 : 14.35.00

IFA DATE: 09/30/1994

IFA STATUS: CLOSED : 03/09/1995 ELAPSED TIME: 000 : 03.19.00

PRACA STATUS: CLOSED : 1995-02-13 HOUSTON TIME: 09.35.00

PRCBD NUMBER: S062103K PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M MMACS-03 O HYD-5-08-0185

P CAR 68RF04

0 CLOSURE INITIATED BY: JSC-FA2/D. GERLACH

RESPONSIBLE MANAGERS 1: D. ALLISON X33295

2:

0 DESCRIPTION:

The WSB 1 GN2 regulator pressure began to decay following WSB deactivation post ascent. The slow decay in pressure continued

Sts0068.txt

throughout the mission and by entry day the pressure had decayed to 16.8 psia. The pressure decay is believed to be due to GN2 leakage through the relief valve. KSC will R&R the regulator.

- CLOSURE RATIONALE:

The regulator relief valve allowed leakage of GN2 and this resulted in the decay. The GN2 regulator was removed and replaced. The failure analysis of the regulator will be documented in CAR 68RF04.

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STS-068 (OV-105,FLT #7) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 13

IFA NUMBER> STS-68-V-10

TITLE:WSB SYSTEM 3 LEAK

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 273 : 11.29.55
		IFA DATE: 09/30/1994
IFA STATUS: CLOSED	: 01/25/1995	ELAPSED TIME: 000 : 00.13.55
PRACA STATUS: CLOSED	: 1995-06-19	HOUSTON TIME: 06.29.55
PRCBD NUMBER: S062103F		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 67V-0006	M	MMACS-11
O	HYD-5-08-0187	P	CAR 68RF06

0 CLOSURE INITIATED BY: K. BROWN JSC-FA22
 RESPONSIBLE MANAGERS 1: D. ALLISON X33295
 2:

0 DESCRIPTION:

Shortly after APU 3 shutdown, WSB 3 regulator outlet pressure started a rapid decay in pressure. Pressure dropped from approximately 38.1 psia to 19.8 psia in just over 1 hour. This WSB system was stable throughout the entire mission. A water leakage was observed coming from the ET umbilical doors and centerline hinge on the landing field. Analysis of

Page 15

the data indicate, that if the water leak is from the WSB 3, the leak had to be an external leak since the WSB core temperatures were the same for all systems.

It has since been verified that the water came from WSB 3. The WSB was inspected at DFRF and the source of the leak was found to be a crack on the lube oil spray valve inlet stem between the valve body and B-nut. A team has been formed to determine the required actions when the vehicle returns to KSC.

- CLOSURE RATIONALE:

FERRY FLIGHT IMPACT:

The WSB insulation blankets were dried prior to ferry flight. There were no other ferry flight impacts.

The cause of the WSB leak was determined to be an intergranular crack completely around the valve inlet stem of the lube oil spray valve. Only small ligaments between the crack ends held the valve stem together. The crack resulted from intergranular corrosion completely within the E-Brite material. The corrosion initiated at the ID and progressed to the outside diameter (OD) of the tube.

The WSB 3 valves were replaced with valves that had been screened for cracks. The spray valve inlet tubes on WSB's 1 and 2 were torqued to assure no similar cracks were present. The WSB systems on OV-105 were successfully leaked tested. The remainder of the flight and spare valve inlet stems were successfully torqued to assure no similar large cracks were present.

Sts0068.txt

the secondary spool can not be determined until vendor testing and analysis is completed. The rudder speedbrake power drive unit (PDU) has been removed and replaced. The PDU has been sent to the vendor for testing, tear-down and analysis.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-069 (OV-105,FLT #9) INFLIGHT ANOMALY REPORT

10/17/96

PAGE 1

IFA NUMBER> STS-69-P-01

TITLE:SPARTAN RETRIEVE ATTITUDE

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 000 : 00.00.00
		IFA DATE:
IFA STATUS: CLOSED	: 11/30/1995	ELAPSED TIME: 000 : 00.00.00
PRACA STATUS: UNKNOWN		HOUSTON TIME: 00.00.00
PRCBD NUMBER: S062108		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	PYLD-06		

0 CLOSURE INITIATED BY: JSC-MT/R. /SWALIN
 RESPONSIBLE MANAGERS 1: A.ONG MT2
 2:

0 DESCRIPTION:

The SPARTAN spacecraft was estimated to be 150 deg out of intended attitude upon retrieval. The attitude was to be an inertial attitude with grapple fixture pin normal to orbit plane. The spacecraft appeared to be oriented as if it was under the control of its magnetic backup attitude control system (ACS). The attitude and body rates were consistent with minimum reserve shutdown (MRS) condition which could be caused by low battery voltage, low ACS cold steering gas, or excessive body rates.

- CLOSURE RATIONALE:

A modification was implemented prior to the third flight of SP201 that moved the source of MRS control electronics power to the recovery bus. At the end of the science mission, the EOM event was issued and the

Sts0069.txt

Payload Functional Control System (PFCS) shutdown as expected. The MRS control electronics sensed the loss of voltage in the PFCS and activated the MACS 90 seconds later. The MRS control electronics monitor the SP201 systems and configures the SP201 in a safe attitude hold mode should any of the following conditions occur. Low GN2, High Rates, or Low Voltage. Unfortunately the full implication of having the MRS voltage monitor point in the PFCS (which is powered down at the end of Mission) and the MRS control electronics power moved to the recovery bus was not fully realized at the time of modification. GSFC Special Payloads Division will make the appropriate corrections prior to the fourth flight of SP201 on STS-87.

This modification was made to SP206 (OAST-FLYER) on STS-72, but SP206 does not power down the PFCS at the EOM and therefore should not cause a MRS at the EOM.

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STS-069 (OV-105,FLT #9) INFLIGHT ANOMALY REPORT

10/17/96

PAGE 2

IFA NUMBER> STS-69-P-02

TITLE:WSF FREE FLYER SC-2 SOFTWARE LOCKUP

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 253 : 20.45.00
 IFA DATE: 09/10/1995
IFA STATUS: OPEN ELAPSED TIME: 003 : 05.36.01
PRACA STATUS: UNKNOWN HOUSTON TIME: 15.45.00
PRCBD NUMBER: S062108 PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER
 M PYLD-08

0 CLOSURE INITIATED BY:
RESPONSIBLE MANAGERS 1: A.ONG MT2

2:

0 DESCRIPTION:

SC-02 Free Flyer telemetry could not be transmitted to crew or ground. Free Flyer SCIU and carrier telemetry was still available. Crew performed malfunction procedure to recover SC-2 computer and nominal operations were resumed. Post-flight investigation of SC-2 computer planned.

1

STS-069 (OV-105,FLT #9) INFLIGHT ANOMALY REPORT

10/17/96

PAGE 3

IFA NUMBER> STS-69-P-03

TITLE:PDI/WSF CARRIER SCIU TELEMETRY

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 253 : 16.01.00
		IFA DATE: 09/10/1995
IFA STATUS: OPEN		ELAPSED TIME: 003 : 00.52.01
PRACA STATUS: UNKNOWN		HOUSTON TIME: 11.01.00
PRCBD NUMBER: S062108		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	PYLD-10		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: A.ONG MT2

2:

0 DESCRIPTION:

Both WSF carrier SCIU's would occasionally lose work and frame sync with the orbiter PDI, thus causing an FDA. WSF Deploy was delayed on rev while quantifying status of SCIU comm string 1. Deploy was accomplished using comm string 2. When problem occurs, ground loses carrier and Free Flyer Telemetry, however the command link is not affected. POCC resets the carrier SCIU and enables carrier handshaking when failure occurs. Crew PGSC does not lose any telemetry or command capability. This

Sts0069.txt

condition was exhibited on both WSF carrier comm strings. Post-flight analysis/testing of SCIU problem will be conducted by customer.

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STS-069 (OV-105,FLT #9) INFLIGHT ANOMALY REPORT

10/17/96

PAGE 4

IFA NUMBER> STS-69-P-04

TITLE:WSF ATTITUDE PROCESSING MODULE (APM) OVERHEATING

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 000 : 00.00.00

IFA DATE:

IFA STATUS: OPEN

ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062108

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-11

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: A.ONG MT2

2:

0 DESCRIPTION:

WSF Free Flyer experienced a temperature buildup in the APM over a 14 hour period during MBE Science ops runs 1-3. APM reached it's max upper operating range of 68 deg CAT Gmt 255:11:00. Science heaters and unnecessary instruments were powered off to conserve battery power and improve cooling. Science operations were rescheduled after a 12 hour quiescent period to allow APM cooldown to allow science runs 4 and 5. Post-flight thermal analysis and/or test will be conducted to determine cause and resolution of problem.

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STS-069 (OV-105,FLT #9) INFLIGHT ANOMALY REPORT

10/17/96

Page 4

Sts0069.txt

IFA STATUS: CLOSED : 01/03/1996 IFA DATE: 09/07/1995
ELAPSED TIME: 000 : 09.47.01
PRACA STATUS: CLOSED : 1996-03-11 HOUSTON TIME: 19.56.00
PRCBD NUMBER: S062108B PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR72V-0003	M	INCO-03
P	CAR69RF02		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K.L. BROWN X33891
2: L.LEONARD X31450

0 DESCRIPTION:

Ku-Band BCE bypass fault occurred. An I/O reset was performed at 251:01:03 G.m.t. by the crew and Ku-band operation was recovered. Another BCE bypass occurred at 251:01:19 G.m.t. The system was placed in standby until a recovery plan was developed. After crew awake, the crew powered off the Ku-band, cycled the circuit breakers, and repowered the Ku-band at 251:07:20 G.m.t. Another I/O reset was performed, and the Ku-band system began functioning nominally. KSC troubleshooting in progress. (Suspect undervoltage condition.)

- CLOSURE RATIONALE:

The probable causes for the Ku-Band BCE bypass event are a vehicle power bus or grounding problem or an EA-1 intermittent condition. Postflight investigation and troubleshooting was not able to repeat the in-flight anomaly; therefore, the cause of the anomaly could not be positively identified. The EA-1 s/n 105 unit was removed and replaced with s/n 104. EA-1 s/n 105 will undergo further LRU level testing at the NASA shuttle Logistic Depot (NSLD). The Ku-Band system successfully passed the STS-72 flow ground turnaround testing. The anomaly appears to be a temporary and recoverable condition.

that the problem was within the costas lock circuitry of EA-1 (Electronics Assembly 1). An attempt to regain the forward-link capability by changing from spread-spectrum to unspread-spectrum transmission mode was unsuccessful. A subsequent attempt to recover forward-link capability by cycling the Ku-band system power was also unsuccessful. Ku-Band forward-link capability was declared lost for the remainder of the mission, and S-Band was used for the forward-link. Post flight troubleshooting repeated the condition and isolated the anomaly to EA-1. The EA-1 was removed from the Orbiter and returned to NSLD for further troubleshooting and failure analysis.

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STS-069 (OV-105,FLT #9) INFLIGHT ANOMALY REPORT

10/17/96

PAGE 8

IFA NUMBER> STS-69-V-06

TITLE:HYD SYS 3 MAIN PUMP LOW PRESS ANOMALY

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 261 : 09.58.00
		IFA DATE: 09/18/1995
IFA STATUS: CLOSED	: 01/03/1996	ELAPSED TIME: 010 : 18.49.01
PRACA STATUS: CLOSED	: 1996-07-01	HOUSTON TIME: 04.58.00
PRCBD NUMBER: S062108D		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 72V-0008	M	MMACS-02

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: B.SWAN X32528

2: F.ALANIS X36393

0 DESCRIPTION:

After the APU prestart at 261:09:58, there were no RPC indications on hydraulic main pump system 3 depress. The crew cycled the APU low/norm switch 4 times in an attempt to take the system to low pressure.

Sts0069.txt

Nominal operation was achieved on the 4th switch cycle. Non-intrusive troubleshooting (wiring Hi-Pot, resistance checks, wire harness) complete and nothing anomalous was found. Wire replacements in-work.

- CLOSURE RATIONALE:

STS-69 was the first flight of this main hydraulic pump after being modified with the redesigned repressurization piston/piston cap. This modification did not affect the electrical circuit; however, the solenoid was changed out at that time because of wire damage to the original unit. Inspection of the fleet pumps for indications of wire damage at the solenoid header grommet area revealed bare wires at the solenoid inlet of two other pumps: system 3 of OV-104 and the system 3 pump replacement on OV-105. The damage observed on these two pumps also appears to be caused by mishandling. However the damage is not as extensive as S/N 193657. Both of the pumps have been removed and replaced, and the pumps will undergo failure analysis. The observed damage to the header subassembly was most likely caused by mishandling subsequent to the flight. However, the extent of the damage prior to flight is not known. This is the first occurrence of this type. The hydraulic system 3 main pump and damaged replacement pump have been removed and replaced. All 3 system main pumps have been inspected. A "from vendor to vehicle" pump installation process is being modified to preclude wire damage on future pumps.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-070 (OV-103,FLT #21) INFLIGHT ANOMALY REPORT

10/19/98

PAGE 1

IFA NUMBER> STS-70-M-01

TITLE:GAS PATH THRU JOINT 3 RTV WITH HEAT AFFECTED PRIMARY O-RING

0 MISSION CONSTRAINT: 0069 0072 SUBS X IFA TIME GMT: 000 : 00.00.00
IFA DATE:
IFA STATUS: CLOSED : 08/29/1995 ELAPSED TIME: 000 : 00.00.00
PRACA STATUS: CLOSED : 1995-10-25 HOUSTON TIME: 00.00.00
PRCBD NUMBER: S062110A PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER
A A16560 A DR4-5/264
T PFAR 360L044B-09

0 CLOSURE INITIATED BY: MSFC-RSRM/V. HENSON |
RESPONSIBLE MANAGERS 1: STAN GRAVES,(801)863-3511
2:

0 DESCRIPTION:

Gas path observed through the RTV on the right hand motor at 229 degrees with soot at the primary o-ring from 170-255 degrees. Heat-affected CCP, GCP, and eroded adhesive were found at the gas path location. Heat effect observed at three small locations with slight erosion (approx 0.0006 inches) at two locations on the primary o-ring.

- CLOSURE RATIONALE:

Assessment to date has identified the "closeout" during RTV backfill as the most likely cause of gas paths in more recent deeply filled joints. All dispositions/rework/repairs for the affected flight sets will be handled per MRS paperwork. When NDT is not used to detect voids, the repair process consists of removing the RTV down to the

inflection point of the joint for the full 360 degrees, visually inspecting the residual RTV surface at the inflection point for voids, and rebackfilling the joint with new RTV (except for the areas where voids are identified in the old material). After the new backfilled RTV is cured, the edges of the RTV backfill opening, where voids were identified in the old RTV, will be excavated to accommodate the backfill repair closeout. The repair closeout will incorporate a vacuum assisted backfill. If no pigtail void is found, the vacuum assisted backfill method will be used to closeout the excavated region. The repair closeout will be in a location away from the original backfill closeout location.

When NDT is used to detect voids in the joint, the repair process consists of removing the RTV down to the inflection point of the joint at each location where a void is identified and replacing it with new RTV using vacuum assist to reduce the chance of new voids. This process was developed and tested on subscale plexiglass test blocks and on full-up HPM and RSRM hardware joint which were then disassembled and inspected until the process was proven. The processes used for the repair work were analysed with a process FMEA. The process FMEA systematically identified repair concerns and controls to mitigate risk. The process FMEA work is documented in TWR-73177. The flight sets

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STS-070 (OV-103,FLT #21) INFLIGHT ANOMALY REPORT

10/19/98

PAGE 2

IFA NUMBER> STS-70-M-01

TITLE:GAS PATH THRU JOINT 3 RTV WITH HEAT AFFECTED PRIMARY O-RING

0 CLOSURE RATIONALE:(Continued from previous page).

affected by these DRs are 360X046 through 360X048 and 360X050 through 360X055.

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STS-070 (OV-103,FLT #21) INFLIGHT ANOMALY REPORT

10/19/98

PAGE 3

IFA NUMBER> STS-70-P-01

TITLE:IUS PCP PRI AND ALT CB OPENED- CONSTRAINT TO IUS/AXAF PYLD

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 194 : 20.06.00
 IFA DATE: 07/13/1995
 IFA STATUS: OPEN ELAPSED TIME: 000 : 06.24.05
 PRACA STATUS: UNKNOWN HOUSTON TIME: 15.06.00
 PRCBD NUMBER: S062110 PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER
 M PYLD-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: J.J.CONWELL

2:

0 DESCRIPTION:

The Inertial Upper Stage (IUS) Power Control Panel (PCP) primary and alternate circuit breakers popped open. Crew was unable to disengage the primary aft frame tilt actuator (AFTA) via the PCP. There was no safety impact as long as the lock pins on the AFTA remained engaged. The tilt table was safe to land in the configuration, however landing loads could damage the AFTA if not disengaged. The MCC discussed tilt table status and observations with the crew. All indications pointed to the tilt table being successfully lowered to the -6 degree position and the lock pins engaged. It was decided to stay in this safe configuration and to perform ground testing as soon as the Shuttle returned to the ground.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-071 (OV-104,FLT #14) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 1

IFA NUMBER> STS-71-M-01

TITLE:NOZZLE INTERNAL JOINT 3 GAS PATH AND SUBSEQUENT PRIMARY O-RING EROSION

0 MISSION CONSTRAINT: 0069 0072 SUBS X IFA TIME GMT: 000 : 00.00.00

IFA DATE:

IFA STATUS: CLOSED : 08/29/1995 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1995-10-25 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062109B PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A16560 A DR4-5/264

T PPAR 360T045A-01

0 CLOSURE INITIATED BY: MSFC-RSRM/V. HENSON |

RESPONSIBLE MANAGERS 1: STAN GRAVES(801)863-3511

2:

0 DESCRIPTION:

A gas path with primary o-ring erosion was observed in nozzle internal joint #3 RSRM-45A (LH) motor. The gas path was observed through the RTV on the left hand motor at 342 degrees. The gas path was formed by a void in the RTV. Another leg of the void extended to the charline and met the gas path at the axial joint surface but was not heat affected. The primary o-ring sealed. Soot extended to the primary o-ring from 325-358 degrees. The primary o-ring was heat-affected in four separate areas covering 1.78 inch circumferential. The area of erosion measured approximately 0.02 inch wide, 0.006 inches deep.

- CLOSURE RATIONALE:

Assessment to date has identified the "closeout" process during RTV

Sts0071.txt

backfill as the most likely cause of gas paths in more recent deeply filled joints. All dispositions/rework/repairs for the affected flight sets will be handled per NRB paper work. When NDT is not used to detect voids, the repair process consists of removing the RTV down to the inflection point of the joint for the full 360 degrees, visually inspecting the residual RTV surface at the inflection point for voids, and rebackfilling the joint with new RTV (except for the areas where voids are identified in the old material). After the new backfilled RTV is cured, the edges of the RTV backfill opening, where voids were identified in the old RTV, will be excavated to incorporate a vacuum assisted backfill. If no pigtail void is found, the vacuum assisted backfill method will be used to closeout the excavated region. The repair closeout will be in a location away from the original backfill closeout location.

When NDT is used to detect voids in the joint, the repair process consists of removing the RTV down to the inflection point of the joint at each location where a void is identified and replacing it with new RTV using vacuum assist to reduce the chance of new voids. This process was developed and tested on subscale plexiglas test blocks and on full-up HPM and RSRM hardware joints which were then disassembled and inspected until the process was proven. The processes used for the

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STS-071 (OV-104,FLT #14) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 2

IFA NUMBER> STS-71-M-01

TITLE:NOZZLE INTERNAL JOINT 3 GAS PATH AND SUBSEQUENT PRIMARY O-RING EROSION

0 CLOSURE RATIONALE:(Continued from previous page).

repair work were analyzed with a process FMEA. The process FMEA systematically identified repair concerns and controls to mitigate risk.

Sts0071.txt

The process FMEA work is documented in TWR-73177. The flight sets affected by these DRs are 360X046 through 360X050 and 360X050 through 360X055.

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STS-071 (OV-104,FLT #14) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 3

IFA NUMBER> STS-71-P-01

TITLE:PDIP POWER FAIL

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 185 : 18.51.00
IFA DATE: 07/04/1995
IFA STATUS: CLOSED : 09/11/1995 ELAPSED TIME: 006 : 23.18.41
PRACA STATUS: UNKNOWN HOUSTON TIME: 13.51.00
PRCBD NUMBER: S062109A PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER
M INCO-04

0 CLOSURE INITIATED BY: JSC-MS2/R. CLAYTON |
RESPONSIBLE MANAGERS 1: J. WILLIAMS X3-1177
2:

0 DESCRIPTION:

THE PDIP DIGITAL CAMERA RATE HIGH/LOW SWITCH WAS SET TO LOW RATE TO SUPPORT A KCA DOWNLINK. THE KCA AND SUBSEQUENT HIGH RATE DOWNLINK WERE NOT SUCCESSFUL (THE GROUND WAS CONFIRMED TO BE IN THE PROPER CONFIGURATION). THE CREW VERIFIED THAT THE DC POWER 2 OUTLET ON THE PDIP WAS NOT FUNCTIONING. THE POWER SUPPLY TO THE DIGITAL CAMERA RATE HIGH/LOW SWITCH USES THE SAMPLE POWER SUPPLY AS THE FAILED PDIP DC POWER 2 OUTLET. SUSPECT AN OPEN 5 AMP FUSE.

- CLOSURE RATIONALE:

The cause of the anomaly was the in-rush of the VHF radio which blew the fuse. Flight specific plug-in plans will identify what equipment may

Sts0071.txt

ALARM. CREW ATTEMPTED TO COMMAND THE VALVE TO "OPEN" WITH NO JOY.
PRESSURE DATA INDICATE THAT THE VALVE WAS NOT CLOSED. AT 182:11:09 THE
VALVE INDICATION RETURNED TO "OPEN". INDICATOR HAS TOGGLED SEVERAL
TIMES SINCE. POSTFLIGHT T/S FAILED TO RECREATE PROBLEM.

- CLOSURE RATIONALE:

Analysis performed during the mission could not identify any common failure mode that would have caused this problem and the failure-to-close problem experienced on this same valve (IFA STS-71-V-02). The cause of the problem is unknown since the problem could not be recreated. The most probable cause is an intermitent open condition in the valve status indicator circuit. The presence of a false manifold valve closed indication does not affect fuel cell or PRSD operation.

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STS-071 (OV-104,FLT #14) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 7

IFA NUMBER> STS-71-V-06

TITLE:LOW VESTIBULE DEPRESS RATE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 184 : 21.25.00

IFA DATE: 07/03/1995

IFA STATUS: CLOSED : 09/21/1995

ELAPSED TIME: 006 : 01.52.41

PRACA STATUS: UNKNOWN

HOUSTON TIME: 16.25.00

PRCBD NUMBER: S062109C

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EECOM-01

0 CLOSURE INITIATED BY: JSC-FA22/K. BROWN |

RESPONSIBLE MANAGERS 1: K. BROWN X33891

2: S. MCCLUNG X33015

0 DESCRIPTION:

Sts0071.txt

PRESSURE UP TO 30 PSI (10 PSI IS NORMAL). PRESSURE TRANSDUCER MEASUREMENT (V46P0351A) ERRATIC DURING REPRESS. SAME TRANSDUCER SHOWED SIMILAR BEHAVIOR ON sts-50. R/R TRANSDUCER, SEND TO DOWNEY FOR FAILURE ANALYSIS.

- CLOSURE RATIONALE:

The multiple gearbox repressurizations experienced during entry are attributed to the APU gearbox pressure transducer. This conclusion is based on the similarities of the output signals seen in the STS-50 and STS-71 missions, prior unexplained condition of pressure transducer s/n V4B001 that occurred on STS-50, and the troubleshooting resulting after STS-71. KSC troubleshooting during turnaround operations found no anomalies in the signal conditioning circuit which would contribute to an intermittent output. Based on this troubleshooting and the previous unexplained anomaly of the pressure transducer, the transducer was replaced with a new transducer from the APU contractor stock. Due to the obsolescence of the s/n V4B001 pressure transducer and the subsequent redesign, no further corrective action will be taken.

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STS-071 (OV-104,FLT #14) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 10

IFA NUMBER> STS-71-V-10

TITLE:PRSD O2 TK5 HTR ASSY 1 TEMP MEASUREMENT EXCURSIONS & ASSOC MASTER ALARM

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 188 : 14.53.14
IFA DATE: 07/07/1995
IFA STATUS: CLOSED : 09/25/1995 ELAPSED TIME: 009 : 21.51.41
PRACA STATUS: UNKNOWN HOUSTON TIME: 09.53.14
PRCBD NUMBER: S062109F PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 74V-0009

Sts0071.txt
M EGIL-04

0 CLOSURE INITIATED BY: JSC-FA22/B. ELIASON |

RESPONSIBLE MANAGERS 1: H.WAGNER X3904833

2: B.ELIASON X36037

0 DESCRIPTION:

At least three excursions of this measurement (V45T1507A) were noted starting at this time reaching as high as 240 deg F. Heaters were off. Heater assy 2 temp measurement stayed steady state. Most likely cause of prelanding master alarm. Postflight T/S has failed to recreate the problem.

- CLOSURE RATIONALE:

The most likely cause is either a complex short between wires that allows another signal, unrelated to the subjet temperature measurement, to appear on this channel, or an electrical connection, possibly within a resistor or capacitor, which partially disconnects and reconnects with temperature changes. Testing at KSC did not reveal the cause of the anomalous data, and no corrective action has been taken.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

Sts0072.txt

A borescope inspection of the topping evaporator core and a leak test of the topping evaporator A isolation and spray valves was performed. The condition of the core was visually unchanged from its preflight condition and the valves did not leak. The current plan includes the possible replacement of the topping evaporator system A valves and the system A controller. A data review indicates there may be a problem with the A feedline accumulator and as a result it will be tested (to be completed next week). Engineering evaluation is continuing.

A freon leak test (a known problem with this FES will be performed this week.

1

STS-072 (OV-105,FLT #10) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 2

IFA NUMBER> STS-72-V-02

TITLE:PRIMARY RCS THRUSTER L1A FAILED OFF

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 019 : 03.33.39
 IFA DATE: 01/18/1996
IFA STATUS: OPEN ELAPSED TIME: 007 : 17.52.39
PRACA STATUS: CLOSED : 1996-07-01 HOUSTON TIME: 21.33.39
PRCBD NUMBER: S062113 PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER
 M PROP-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: D.DILLMAN X31733

2:

0 DESCRIPTION:

During RCS hotfire primary thruster L1A (s/n 574) failed-off due to low Pc on its first pulse and was deselected by RM. The 320 msec pulse

Sts0072.txt

started at a Pc of 11 psia and ramped to a peak of 16.5 psia prior to the deselection. Injector temperature cooling trends indicated the presence of both oxidizer and fuel flow. On soak back, the injectory temperatures undershot the initial pre-firing temperature indicating minimal heat input and confirming low thruster performance. Based on the failure signature, the most probable failure mode is nitrate contamination of the oxidizer valve resulting in impeded pilot stage flow and failure of the main stage to open. KSC will R&R all three thrusters on the L1 manifold (early March).

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STS-072 (OV-105,FLT #10) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 3

IFA NUMBER> STS-72-V-03

TITLE:PRIMARY RCS THRUSTER R2U FAILED LEAK

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 019 : 03.39.45
IFA DATE: 01/18/1996
IFA STATUS: OPEN ELAPSED TIME: 007 : 17.58.45
PRACA STATUS: CLOSED : 1996-07-01 HOUSTON TIME: 21.39.45
PRCBD NUMBER: S062113 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	PR RP05-09-0191	M	PROP-02
P	CAR 72RF03		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: D.DILLMAN X31733

2:

0 DESCRIPTION:

During RCS hotfire the primary thruster R2U (s/n 620) oxidizer valve began leaking after its first pulse. The thruster fires a second time prior to being deselected by redundancy management (RM) as fail-leak.

The fail-leak limit is approximately 30 deg F for oxidizer. The actual

Sts0072.txt

deselection came when the ox injector temperature was 17.5 deg F. This can be explained by the 0.52 Hz rate of the JET-LEAK Monitor module and the 'filter' that requires 3 consecutive out-of-limit values prior to fault annunciation. This effectively requires the ox injector temperature to stay below 30 deg F for 6 seconds prior to deselection.

The most probable cause of the leakage is contamination trapped on the valve sealing surface. This could be either nitrates/oxides or transient foreign contamination. The leak stopped approximately 6 hours prior to landing. The thruster was reselected for entry and kept in last prior. KCS will R&R all three thrusters on the R2 manifold (early March).

-JFDPO12: NORMAL TERMINATION OF PROCESSING

souces of the detected leak.

There has been one prior occurrence of a main fuel valve leak pre-launch. This was during the STS-02 tanking test on ME-2 and was due to contamination on the ball seal. Recurrence control was added which now requires a ball seal leak check to be performed after final valve actuation prior to flight. There have been a total of twelve main fuel valve leaks during chill (including STS-02 & STS-73). Seven of the leaks have been attributed to contamination with five unexplained. The probability of a main fuel valve leak during chill based on flight experience (133 KSC chilldowns) is 1 in 79 flight chilldowns with a 50% confidence.

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STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 2

IFA NUMBER> STS-73-K-01

TITLE:HYDRAULIC SYSTEM 1 RESERVOIR QUANTITY ANOMALY

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 000 : 00.00.00
		IFA DATE:
IFA STATUS: CLOSED	: 03/01/1996	ELAPSED TIME: 000 : 00.00.00
PRACA STATUS: UNKNOWN		HOUSTON TIME: 00.00.00
PRCBD NUMBER: S062111J		PHASE: PRE-LAUNCH

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 73-0228		

0 CLOSURE INITIATED BY: KSC-LMSO/R. DOUGERT |

RESPONSIBLE MANAGERS 1: C.ABNER KSC/PEO

2:

0 DESCRIPTION:

Just prior to tanking during Hyd Circ Pump activation, the system 1

reservoir quantity dropped from 68% to 52%. Two weeks prior, the GSE sampling valve had been in the open position during Final Reservoir Adjust but the procedure to correct this condition had inadvertently left the Brake Iso Valve closed. This caused the nose landing gear return line of Hyd Sys 1 to be void of hydraulic fluid. Decision was made to enter the aft compartment to perform a Sys 1 compressibility test.

- CLOSURE RATIONALE:

The primary cause of the noted processing anomaly was due to failure of the hydraulic test team to properly recognize and evaluate the effect that the mistakenly open sampling valve and the resultant drain of the vehicle system would have on the landing gear circuit. Due to this incomplete evaluation, reserivicing of the landing gear circuit was not performed after the processing anomaly was observed nor detected during subsequent review of data and procedures related to verification of close-out requirements.

The secondary cause was failure to properly execute hydraulic fluid sampling procedures. Work instructions related to closing of the sampling valve were not properly specified and verified complete prior to performing the reservoir adjust procedure.

The Hydraulic system close-out procedure has been revised to include redundant performance and verification of the landing gear circuit fill operation. Acceptable reservoir quantity displacement levels are now specified for the various configurations associated with close-out operations to allow for control and detection of unacceptable variations in volume level.

Hydraulic system sampling procedures have been revised to positively control closure of the sampling valve prior to reservoir adjust

Sts0073.txt

operations to prevent system drain and the potential for introducing
air into the drained system. Sampling placards have been posted

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STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 3

IFA NUMBER> STS-73-K-01

TITLE:HYDRAULIC SYSTEM 1 RESERVOIR QUANTITY ANOMALY

0 CLOSURE RATIONALE:(Continued from previous page).

adjacent to the sampling ports to further control the sampling process.

Existing requirements to document all anomalies that effect flight
hardware have been emphasized to all involved personnel to assure that
the proper level of review and evaluation is accomplished for all
processing anomalies.

1

STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 4

IFA NUMBER> STS-73-V-01

TITLE:MEC 1 PRE-FLIGHT BITE WORD INDICATED FAILURE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 280 : 13.08.00

IFA DATE: 10/07/1995

IFA STATUS: CLOSED : 02/07/1996 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1996-02-17 HOUSTON TIME: 07.08.00

PRCBD NUMBER: S062111C PHASE: PRE-LAUNCH

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 73V-0236 K PR OEL-2-18-1761

P CAR 73RF01

0 CLOSURE INITIATED BY: JSC-FA2/B. ELIASON |

RESPONSIBLE MANAGERS 1: B.J. ELIASON X36037

2: R.E. MUNOZ X38359

0 DESCRIPTION:

During the launch attempt on 10/07/95, the master events controller 1 (MEC-1) pre-flight BITE word 5, bit 9, indicated that the MEC 1 core B critical drivers were not enabled. As a result, the launch was scrubbed. The MEC was removed and replaced and the retest of the replacement MEC was successfully completed. The core B failure on the the removed unit was confirmed in testing.

- CLOSURE RATIONALE:

The most likely cause of this failure can be isolated to module 3B within the MEC. There are two PTO circuits on module 3B. Either of these circuits could have triggered, and this would have caused the failure indication observed. There are approximately 60 components in each circuit. Due to the intermittent nature of the failure, a bad solder joint is a more likely cause than a faulty component. The MEC in question has been removed and replaced. The core B failure was confirmed at NSLD, but the original signature observed has not been duplicated. Further troubleshooting is planned.

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STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 5

IFA NUMBER> STS-73-V-02

TITLE:WSB 3 FAILED TO COOL

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 293 : 14.07.00
		IFA DATE: 10/20/1995
IFA STATUS: CLOSED	: 02/08/1996	ELAPSED TIME: 000 : 00.14.00
PRACA STATUS: OPEN		HOUSTON TIME: 08.07.00
PRCBD NUMBER: S062111H		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 75V-0012	M	MMACS-01
P	CAR 73RF02		

0 CLOSURE INITIATED BY: JSC-FA2/D. GERLACH |
 RESPONSIBLE MANAGERS 1: D.H. ALLISON X39033
 2: D.A. GERLACH X33337

0 DESCRIPTION:

During ascent, water spray boiler (WSB) 3 failed to provide cooling to APU 3 as evidenced by the lube oil return temperature increasing above the normal spray start temperature of 250 deg F. When the temperature reached 290 deg F, the crew was requested to switch from controller A to controller B on system 3. After switching controllers, the temperature continued to rise at the same rate. When the temperature reached 326 deg F, the crew was directed to shut down APU 3 early. Approximately one minute later, WSB 3 (on controller B) began spraying. The data suggest a spraybar freeze-up that subsequently thawed. All three WSBs have the heater modification that was implemented to preclude WSB freeze-ups. This heater modification was also flown on STS-69/OV-105 on WSB 3. APU 3 was run during FCS C/O and the WSB 3 A and B controllers were used. Although an undercool to 273 deg F and subsequent overcool to 236 deg F were experienced, lube oil cooling on the WSB 3 A controller was satisfactory. WSB 3 performance on the B controller was nominal during entry. KSC has checked out the heater and no anomalies were noted. The A controller will be removed and replaced.

- CLOSURE RATIONALE:

The most probable cause of the WSB to fail to cool is due to a spray-bar freeze-up or a controller, water valve, or temperature sensor intermittent failure. The lubrication oil water valve system has been checked by an IR test of the spray valve, a valve cycle, and visual inspection. The supply line electrical heater has received continuity,

Sts0073.txt

and line-heater checks. The primary controller was visually inspected, removed, replaced and sent to NSLD for special testing under dynamic conditions.

Investigation will continue on the controller and observe the WSB flight performance with the new controller installation. Assess removal and replacement of the water valve and the WSB lubrication oil temperature sensors if problem repeats.

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STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 6

IFA NUMBER> STS-73-V-03

TITLE:PRIMARY THRUSTER F1F FAILED OFF

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 293 : 16.54.00
		IFA DATE: 10/20/1995
IFA STATUS: CLOSED	: 02/08/1996	ELAPSED TIME: 000 : 03.01.00
PRACA STATUS: CLOSED	: 1996-06-03	HOUSTON TIME: 10.54.00
PRCBD NUMBER: S062111D		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 75V-0006	M	PROP-01
P	CAR 73RF03		

0 CLOSURE INITIATED BY: JSC-FA2/D. MCCORMACK |

RESPONSIBLE MANAGERS 1: J.APPLEWHITE X39030

2: D.L. MCCORMACK X33327

0 DESCRIPTION:

Primary thruster F1F failed-off when fired during the RCS trim burn at approximately 00:03:01 MET. The thruster chamber pressure reached only 17 psia prior to the thruster being deselected by RM. F1F injector temperature drops indicated that both propellant valves achieved at least pilot flow. The chamber pressure subsequently took about 15 minutes to return to zero psia. The fact that the chamber pressure

Sts0073.txt

decreased so slowly indicates the fail-off was due to a blockage of the Pc tube orifice, rather than the typical oxidizer valve failure. This Pc tube was flushed during the STS-73 flow. KSC inspected for Pc tube blockage and none was found. The thruster was removed and replaced and will be sent to the WSTF for failure analysis.

- CLOSURE RATIONALE:

The fail-off was most probably caused by a blockage of the thruster F1F Pc tube. The thruster was removed and replaced and sent to the WSTF for repair.

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STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 7

IFA NUMBER> STS-73-V-05

TITLE:TRANSIENT THRUSTER COMMAND PATH FAILURE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 300 : 18.04.00
IFA DATE: 10/27/1995
IFA STATUS: CLOSED : 02/08/1996 ELAPSED TIME: 007 : 04.11.00
PRACA STATUS: CLOSED : 1996-04-08 HOUSTON TIME: 12.04.00
PRCBD NUMBER: S062111E PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 75V-0013	M	PROP-02
P	CAR KB3493	P	CAR 73RF05

0 CLOSURE INITIATED BY: JSC-FA2/B. ELIASON |
RESPONSIBLE MANAGERS 1: B.J. ELIASON X36037
 2: R. LOFFI X38346

0 DESCRIPTION:

Vernier RCS thrusters R5R and R5D failed to fire when commanded at 300:18:04 G.m.t. Chamber pressure remained zero and RM software

Sts0073.txt

deselected both thrusters. Data suggest a command path problem. Because no indication of a thruster failure was present, both the R5F and R5R thrusters were hot-fired and each provided a good one-second pulse. The two vernier thrusters were then reselected for flight use. Note that a similar failure of thruster R5D occurred during the previous flight of this vehicle (STS-65), and troubleshooting failed to indicate the cause. The MDM (S/N 121) and the RJD (S/N 20) in the command path to the R5D and R5R vernier thrusters are the same units flown on STS-65. Several additional fail-offs of vernier thrusters R5D and R5R occurred, as well as a fail-off of primary thrusters L3D and R3D. The commands for the aft manifold 3 thrusters share the same MDM cards and channels as vernier thrusters R5D and R5R. Extensive postflight troubleshooting has been performed on the vehicle and the failure has not been reproduced. The MDM and the RJD have been removed and replaced. Testing of the removed units at NSLD have not indicated an anomaly.

- CLOSURE RATIONALE:

The cause of the intermittent fail-off of the thrusters is the RJDA. NSLD troubleshooting indicates momentary drops in the 5V power supply. A review of the RJDA failure history revealed no previous relevant failures. The MDM and RJDA have been removed and replaced. Troubleshooting duplicated the failure in the RJDA and is continuing under CAR KB3493. The MDM will be returned to flight spares after undergoing standard acceptance test procedure.

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STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 8

IFA NUMBER> STS-73-V-06

TITLE:S-BAND LOWER RIGHT ANTENNA FORWARD LINK DROPOUTS

0 MISSION CONSTRAINT:

SUBS

IFA TIME GMT: 295 : 12.27.00

Page 9

Sts0073.txt

IFA DATE: 10/22/1995

IFA STATUS: CLOSED : 02/08/1996

ELAPSED TIME: 001 : 22.34.00

PRACA STATUS: CLOSED : 1996-06-03

HOUSTON TIME: 06.27.00

PRCBD NUMBER: S062111F

PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 75V00011	M	INCO-04
P	CAR73RF08		

0 CLOSURE INITIATED BY: JSC-FA2/L. WAGSTER |

RESPONSIBLE MANAGERS 1: B.G. SWAN X32528

2: J. MYRRANN X36054

0 DESCRIPTION:

S-band forward link dropouts have occurred while on the lower right antenna. The dropouts have occurred when on low and high frequencies and on both TDRS satellites. The lower right antenna path is suspect. On-orbit troubleshooting was performed and it indicates a problem in the cabling to the lower right antenna. Postflight troubleshooting repeated the problem. The lower right antenna was replaced but testing indicates that dropouts are still occurring. More troubleshooting is planned.

- CLOSURE RATIONALE:

During postflight troubleshooting, the anomaly was isolated to the S-band antenna switch assembly by physically interchanging the lower antenna path cables at the switch assembly. The S-band antenna switch assembly was removed and replaced. Further troubleshooting of the switch will be conducted at the Electronic Systems Test Laboratory per CAR 73RF08.

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STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 9

IFA NUMBER> STS-73-V-08

Sts0073.txt

testing of other valves as described previously.

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STS-073 (OV-102,FLT #18) INFLIGHT ANOMALY REPORT

12/10/96

PAGE 10

IFA NUMBER> STS-73-V-09

TITLE:APU 1 FUEL PUMP INLET PRESSURE DECAY

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 309 : 12.10.00
 IFA DATE: 11/05/1995
IFA STATUS: CLOSED : 02/08/1996 ELAPSED TIME: 015 : 22.17.00
PRACA STATUS: UNKNOWN HOUSTON TIME: 06.10.00
PRCBD NUMBER: S062111G PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER
 M MMACS-04 P CAR KB3473

0 CLOSURE INITIATED BY: JSC-FA2/L. WAGSTER |
RESPONSIBLE MANAGERS 1: B.W. IRLBECK X38617
 2: D.L.MCCORMACK X33327

0 DESCRIPTION:

Postlanding, a decay was noted in the APU 1 fuel pump inlet pressure. The pressure dropped from 150 to 35 psia during a 20 minute period. The fuel pump seal cavity drain line pressure rose from 20.5 to 22.0 psia during the same period. Data review revealed that a slower decay was experienced prelaunch, after the hot-fire of the APU, and following the on-orbit APU shutdown. The signature may indicate leakage past the fuel pump seal into the seal cavity. Approximately 108 cc of liquid was present in the catch bottle. The APU was removed and replaced.

- CLOSURE RATIONALE:

Failure analysis was not able to identify a specific cause for the anomaly. During testing, Sundstrand detected out-of-specification

sts0073.txt

helium leakages, but none of the observed conditions were great enough to explain the postlanding leakage. The most probable causes for the leakage are transient contamination of the fuel pump seal, and/or a slight misalignment or defect which allows the seal to leak when rotated to a specific position (thermal effects may also contribute to the condition).

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 1

IFA NUMBER> STS-74-I-01

TITLE:TRAJECTORY CONTROL SENSOR (TCS) 1 LOSS OF CALIBRATION

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 318 : 16.27.00
		IFA DATE: 11/14/1995
IFA STATUS: OPEN		ELAPSED TIME: 002 : 03.56.17
PRACA STATUS: UNKNOWN		HOUSTON TIME: 10.27.00
PRCBD NUMBER: S062112		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
	M GNC-01		

0 CLOSURE INITIATED BY:
 RESPONSIBLE MANAGERS 1: M.HENDERSON DA8
 2:

0 DESCRIPTION:
 Calibration data from TCSI stopped updating while other TCS data continued to update. DR will be opened and PGSC log files will be analysed, DR will be dispositioned based on analysis of log files.

1

STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 2

IFA NUMBER> STS-74-M-01

TITLE:RADIAL FLOWLINE O 270-DEG OPT SECONDARYO-RING

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 000 : 00.00.00
		IFA DATE:
IFA STATUS: OPEN		ELAPSED TIME: 000 : 00.00.00

Sts0074.txt

PRACA STATUS: UNKNOWN

HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062112

PHASE:

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

T PFA 360T051A-03

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: S.GRAVES - THIOKOL

2: L.HAMILTON - THIOKOL

0 DESCRIPTION:

A radial flowline was observed on the 270-deg OPT secondary O-ring. The flowline was oriented facing the bottom of the O-ring groove and was 0.162 inch in radial length. The flowline extended from the OD parting line to within 0.010 inch of the ID parting line and through approximately half of the O-ring cross-section. The flowline was located 180-deg away and on the opposite face from the removal tool puncture mark.

This condition was initially reported to be a cut, but further detailed evaluation, using magnification, showed that the separation had rough edges which indicated that it was a separated flowline instead of a cut.

The concern is the sealing integrity of the OPT secondary O-ring.

1

STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 3

IFA NUMBER> STS-74-M-02

TITLE:GAS PATHS IN NOZZLE JOINT 2

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 000 : 00.00.00

IFA DATE:

IFA STATUS: OPEN

ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062112

Sts0074.txt
PHASE:

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
T	PFAR 360T051A-09		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: S.GRAVES - THIOKOL
2: L.HAMILTON - THIOKOL

0 DESCRIPTION:

Gas paths through the Joint 2 RTV were observed at 162, 165, 176, 178, 181, 185, 217, 221, 231, and 317 degrees. Heat affected RTV, GCP and adhesive were observed at 231 and 317 degrees. Soot reached the primary O-ring intermittently around the circumference.

The concern is multiple gas paths in a single joint exceeding backfilled Joint 2 data base.

1

STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 4

IFA NUMBER> STS-74-V-01

TITLE:APU 2 FUEL PUMP INLET PRESSURE ERRATIC

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 316 : 12.39.31
		IFA DATE: 11/12/1995
IFA STATUS: OPEN		ELAPSED TIME: 000 : 00.08.48
PRACA STATUS: CLOSED	: 1996-02-12	HOUSTON TIME: 06.39.31
PRCBD NUMBER: S062112		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR76V-0006	M	MMACS-01
P	74RF03		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K.BROWN FA22 X33891
2:

0 DESCRIPTION:

The APU 2 pump inlet pressure (V46P0210A) became erratic for slightly over a minute and then recovered satisfactory until APU 2 shutdown. KSC will perform troubleshooting.

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STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 5

IFA NUMBER> STS-74-V-02

TITLE:FUEL CELL 2 CELL PERFORMANCE MONITOR SHIFT

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 318 : 20.02.00

 IFA DATE: 11/14/1995

IFA STATUS: OPEN ELAPSED TIME: 002 : 07.31.17

PRACA STATUS: CLOSED : 1996-06-03 HOUSTON TIME: 14.02.00

PRCBD NUMBER: S062112 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 76V-0005	M	EGIL-01
P	74RF04		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K.BROWN FA22 X33891
2:

0 DESCRIPTION:

All three substack delta V measurements shifted approximately 8 mV. There was not a significant load change on FC3 at the time. The CPM self-test signal, which had been indicating 48 mV, shifted to a self-test value of 56 mV (the value should be NMT 58 mV). Vendor to R&R CPM.

1

STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

IFA NUMBER> STS-74-V-03

TITLE:PRSD O2 MANIFIOLD 1 ISOLATION VALVE FAILED TO CLOSE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 319 : 18.32.00
 IFA DATE: 11/15/1995
 IFA STATUS: OPEN ELAPSED TIME: 003 : 06.01.17
 PRACA STATUS: CLOSED : 1996-10-02 HOUSTON TIME: 12.32.00
 PRCBD NUMBER: S062112 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 76V-0007	M	EGIL-02
P	74RF05		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K.BROWN FA22 X33891
 2:

0 DESCRIPTION:

The PRSD O2 manifold 1 isolation valve (p/n MC284-0429-4110, s/n CRP0029) failed to close when the crew performed the cryo valve reconfiguration prior to the sleep period. The H2 manifold 1 valve closed successfully. The H2 manifold 1 valve was subsequently reopened, and the H2 and O2 manifold 2 valves were closed. For the crew sleep period. S/N 29 successfully passed cryo screening at NSLD with the valve attached to the valve panel in 10/93. The valve cycled successfully during STS-66 and STS-71 after being installed in OV-104. The valve cycled properly earlier on STS-74. KSC will R&R the valve panel.

1

STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 7

IFA NUMBER> STS-74-V-04

TITLE:OPS RECORDER 1 TRACK 8 DATA DEGRADATION
 Page 5

Sts0074.txt

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 319 : 19.22.00
IFA DATE: 11/15/1995
IFA STATUS: OPEN ELAPSED TIME: 003 : 06.51.17
PRACA STATUS: CLOSED : 1996-01-05 HOUSTON TIME: 13.22.00
PRCBD NUMBER: S062112 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
D	IPR 76V-0008	M	INCO-02
P	74RF06		

0 CLOSURE INITIATED BY:
RESPONSIBLE MANAGERS 1: K.BROWN FA22 X33891
2:

0 DESCRIPTION:
During an AOS data dump of OPS recorder 1, the ground was unable to lock on modulation of track 8. The data were played in the forward and reverse directions, and both were unsuccessful. Newly-recorded data playback was performed, and again the ground was unable to lock on modulation. During both attempts, the data were recorded at 15 ips. Data were then dumped at 24 ips, again without success. A 1:1 dump at VTS was performed without success for track 8. However, track 7 was locked on. KSC will troubleshoot.

1

STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 8

IFA NUMBER> STS-74-V-05

TITLE:UNABLE TO REMOVE ODS STOWAGE BAG

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 319 : 00.00.00
IFA DATE:
IFA STATUS: OPEN ELAPSED TIME: 000 : 00.00.00

Sts0074.txt

PRACA STATUS: UNKNOWN

HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062112

PHASE:

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M IFM-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K.BROWN FA22 X33891

2:

0 DESCRIPTION:

Prior to opening the ODS hatch, the crew reported that they could not remove the airlock stowage bag from the ODS wall due to two stuck actuating pins which prevented the removal of the mounting attach fitting system. The bag was preventing the full opening of the hatch. therefore, the contents of the ODS stowage bag were removed and placed into an LES suit bag. The hardware is produced by RI Houston. The drawing number is SJD321104522, titled ODS STWG BAG, EDV KIT/FLEX DUCT HOSE. During CEIT the crew found that the bag had to be forced down into the dovetail fitting. It should drop in smoothly. A .005-inch shim was fabricated for the forward and aft locations to move the fitting further away from the wall. This actin allowed the bag to be installed smoothly and to cause paint to be removed from the ODS wall. This bag was flown on STS-71. A new larger bag is being designed by RI and is scheduled to be flown on the STS-76 and sub.

1

STS-074 (OV-104,FLT #15) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 9

IFA NUMBER> STS-74-V-06

TITLE:WSB 3 GN2 REGULATOR OUTLET PRESSURE ERRATIC

0 MISSION CONSTRAINT:

SUBS

IFA TIME GMT: 324 : 17.15.00

IFA DATE: 11/20/1995

IFA STATUS: OPEN

ELAPSED TIME: 008 : 04.44.17

Sts0074.txt

PRACA STATUS: CLOSED : 1996-10-29 HOUSTON TIME: 11.15.00

PRCBD NUMBER: S062112 PHASE: ENTRY/LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 76V-0009 M MMACS-05

P 74RF07

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K.BROWN FA22 X33891

2:

0 DESCRIPTION:

After landing, WSB 3 GN2 regulator outlet pressure (V58PO3044) became erratic and eventually went to 0 psia. A few minutes later, the measurement returned to the appropriate value. KSC will perform troubleshooting.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

IFA NUMBER> STS-75-V-02

TITLE:APU 1 FUEL PUMP INLET PRESSURE LOW

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 054 : 00.03.00
 IFA DATE: 02/22/1996
IFA STATUS: OPEN ELAPSED TIME: 000 : 03.45.00
PRACA STATUS: CLOSED : 1996-05-01 HOUSTON TIME: 18.03.00
PRCBD NUMBER: S062114 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 78V-0005	M	MMACS-02
P	CAR 75RF03		

0 CLOSURE INITIATED BY:
RESPONSIBLE MANAGERS 1: B.IRLBECK/EP2/X38617
 2:

0 DESCRIPTION:
APU 1 fuel pump inlet pressure (V46P0110A) decreased below an expected minimum pressure of approximately 100 psia. It continued to decrease to approximately 38 psia (22 psia based on known instrumentation bias), with slight transient pressure increases corresponding to heater cycles. An analysis of the condition was performed and no concerns were identified regarding the use of APU 1. Data suggests that the low inlet pressure was caused by leakage past the fuel pump seal and into the seal cavity draining system. The MER recommendation was to proceed with nominal operations for the remainder of the mission. Per the normal plan, APU 1 was used during FCS checkout and its performance was nominal. A decrease in the fuel pump inlet pressure was seen following both the FCS checkout and entry runs of APU 1. KSC will drain and measure the liquid in the catch bottle. Further actions will be determined based on the results of the catch bottle content analysis. The drain is scheduled for 3rd shift on Saturday, March 16, 1996.

1

STS-075 (OV-102,FLT #19) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 4

IFA NUMBER> STS-75-V-03

TITLE:SSME2 LH2 RECIRCULATION VALVE CLOSURE UNCONFIRMED

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 000 : 00.00.00

IFA DATE:

IFA STATUS: OPEN

ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1997-05-12

HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062114

PHASE:

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 78V-0010

M EGIL-03

P CAR 75RF08

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: H.WAGNER/EP2/X39048

2:

0 DESCRIPTION:

A closed indication was not received for engine 2 LH2 recirculation valve (PV15) after it was commanded closed at T-9.5 seconds. Loss of the valve open indication was nominal. Note that recirculation valve position indications are monitored by a ground bus and are lost at T-0. All three engine recirculation valves are closed by removal of open pneumatic pressure from a common solenoid valve. The engine 1 and 3 valves operated nominally. The LH2 recirculation valve is only critical in the event of an engine out situation to contain trapped LH2 in the feed system. A review of post-MECO engine-inlet and LH2-manifold pressure data indicate that PV15 was closed at that time. This indicates that the problem may be with the valve position indication; however, a sluggish valve is also a possibility. KSC troubleshooting

Sts0075.txt
scheduled to start on Thursday, March 14, 1996.

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STS-075 (OV-102,FLT #19) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 5

IFA NUMBER> STS-75-V-04

TITLE:H2 TANKS 4 AND 5 QUANTITY DIVERGENCE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 055 : 21.00.00
 IFA DATE: 02/24/1996
IFA STATUS: OPEN ELAPSED TIME: 002 : 00.42.00
PRACA STATUS: CLOSED : 1996-07-01 HOUSTON TIME: 15.00.00
PRCBD NUMBER: S062114 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 78V-0010	M	EGIL-03
P	CAR 75RF08		

0 CLOSURE INITIATED BY:
RESPONSIBLE MANAGERS 1: H.WAGNER/EP2/X39048
 2:

0 DESCRIPTION:

while the fuel cells were using O2 and H2 tanks 4 and 5, H2 tanks 4 and 5 quantities began diverging, with the tank 4 quantity decreasing at a lower rate than tank 5. Analysis of fuel cell 3 current data indicate that the 'A' heater in tank 4 had failed-off and caused this divergence. The heaters to both tanks are controlled by a common controller and are therefore commanded simultaneously. The crew switched to H2 tanks 6 and 7. Being unable to use the H2 in tanks 4 and 5 had no impact on the planned mission duration plus contingency days. A request was made to switch back to H2 tanks 4 and 5 using only the 'B' heaters in order to obtain data on the behavior of paired tanks with a quantity imbalance. This switch was made at 06:21:14 G.m.t. During operation of H2 tanks 4 and 5, the quantities within the tanks converged. The tanks were depleted at approximately 06:21:18:35 G.m.t.

Sts0075.txt

Prior to detanking, the heater failure was confirmed on the ground. Will test again on wed., 3/13/96, following detanking. Further troubleshooting will start with a checkout of the fuse in the heater controller.

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STS-075 (OV-102,FLT #19) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 6

IFA NUMBER> STS-75-V-05

TITLE:FES SHUTDOWNS (ORB)

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 062 : 08.04.00
 IFA DATE: 03/02/1996
IFA STATUS: OPEN ELAPSED TIME: 008 : 11.46.00
PRACA STATUS: CLOSED : 1997-03-21 HOUSTON TIME: 02.04.00
PRCBD NUMBER: S062114 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	78V-0019	M	EECOM-01
M	M-15	P	CAR 75RF11

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: N.CERNA - EC3 - X39045
 2: C.DUMIS - RIH - X45120

0 DESCRIPTION:

Upon initiation of the FES water dump, the FES shut down on the primary A controller without ever reaching the control band. Several minutes later, the FES was successfully restarted on primary A. However, approximately one and an half hours into that run, the FES shut down again. The FES was configured to the primary B controller and a FES startup was initiated with no response. A second attempt on the primary B was attempted five minutes later and the FES responded initially, but shut down before stabilized cooling was established. Icing was

Sts0075.txt

suspected and the FES core flush procedure was performed to flush ice from the core. It was believed that the first shutdown on the primary A controller and the subsequent FES core icing were procedurally induced. In order to verify this theory for the cause of the shutdowns, a supply water dump through the FES using the primary A controller was initiated at 065:07:20. The dump was terminated at 065:09:13, when icing led to a shutdown. A FES core flush was performed to clear the ice from the core. Subsequently, starting at 065:18:44, a three hour supply water dump using the B controller was performed in an effort to exonerate the B system and FES core. The data indicate that the performance of the B system was nominal. The FES primary A system was selected for topping evaporator supplemental cooling to obtain additional data in this mode. The FES primary A system was enabled for approximately 23 hours and during this time its performance was nominal. The FES was configured back to the primary B controller.

The FES shut down while on the primary B controller. At the time, the radiator coldsoak (radiators at high set point) was being extended for the rev 236 deorbit opportunity. The FES core flush procedure was completed successfully to rid the FES of ice. The shutdown occurred after the FES outlet temperatures became unstable and increased above the temperature control band indicating that ice had formed in the core. This shutdown was similar to the two shutdowns that occurred during primary A system FES water dumps. Procedures to back out of deorbit prep were completed at approximately 068:15:33 following the waive-off due to forecasted cloud coverage at KSC. No further FES problems were encountered during the mission.

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STS-075 (OV-102,FLT #19) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 7

IFA NUMBER> STS-75-V-05

Page 7

TITLE:FES SHUTDOWNS (ORB)

0 DESCRIPTION: (Continued from previous page).

KSC will perform postflight troubleshooting. Currently planned troubleshooting includes: an analysis of water samples taken from the vehicle and GSE to determine particulate, dissolved gas, and non-volatile residue (NVR) content, and a borescope inspection of the FES core to inspect for contaminants and corrosion.

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STS-075 (OV-102,FLT #19) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 8

IFA NUMBER> STS-75-V-06

TITLE:IMU 3X- AND Y-AXIS EXCESSIVE DRIFT

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 000 : 00.00.00

IFA DATE:

IFA STATUS: OPEN

ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1997-02-07

HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062114

PHASE:

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K PR GNC02-20-0119

M GNC-01

P CAR75RF10

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: T.PHAM/EV/X36123

2:

0 DESCRIPTION:

The IMU 3 (s/n 210) Y-axis drift increased steadily over the course of the flight. A one sigma compensation for a HAINS IMU is 0.006 deg/hr. A Y-axis compensation of 1.5-sigma was performed at 057:14:31 G.m.t. and a 3-sigma compensation was uplinked at 061:06:26 G.m.t. Up until that

time, the drift rate trend had been increasing linearly in the Y-axis and very little drift rate trend had been seen in the X-axis. At approximately 8 days MET, a significant increase was seen in the Y-axis drift rate trend and a drift rate trend was also seen in the X-axis. At 062:19:33 G.m.t., and 8-sigma compensation was uplinked for the Y-axis and a 3-sigma compensation was uplinked for the X-axis in an attempt to arrest the observed drift. A fourth compensation (3-sigma to the Y-axis and 2-sigma to the X-axis) was performed at 063:14:26 G.m.t. This magnitude of drift is out-of-family for a HAINS IMU.

An analysis of the drift signature indicates that the IMU X-Y (vertical) axis gyro is failing. Past failure history suggests a lubrication problem within the bearings of that gyro. As a result, to preserve the remaining useable life of the IMU, a recommendation was made to power it down until shortly before entry. The IMU was powered down 064:00:12 G.m.t. It was subsequently powered back up at approximately 068:00:48 G.m.t., and commanded from standby to operate at 068:01:50 G.m.t. in support of landing. As expected, the IMU exhibited drift rate trending similar to what was seen prior to shutdown. When the nominal end-of-mission landing opportunities were waived-off because of cloud coverage, the IMU was powered off to preserve operating time. IMU 3 was powered up prior to the subsequent landing and again its performance was as expected. No additional drift rate uplink compensations were required and the unit performed within the redundancy management thresholds.

The IMU will be briefly operated in the vehicle to determine its postflight condition prior to shipment. It will then be removed and sent to the JSC ISL where initial troubleshooting and evaluation will be performed. If the problem is with the gyro, the IMU will be shipped to the manufacturer for additional failure analysis and repair.

Sts0075.txt

lock on. Azimuth and elevation for this unit were nominal, as was the performance of all parameters on MSBLS units 1 and 3. The unit passed its self-test during FCS checkout. KSC will troubleshoot.

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STS-075 (OV-102,FLT #19) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 12

IFA NUMBER> STS-75-V-10

TITLE:LH AFT STRUCTURAL ATTACH BLADE VALVE NOT FULLY CLOSED

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 053 : 20.26.48
IFA DATE: 02/22/1996
IFA STATUS: OPEN ELAPSED TIME: 000 : 00.08.48
PRACA STATUS: CLOSED : 1996-07-22 HOUSTON TIME: 14.26.48
PRCBD NUMBER: S062114 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	PYR-2-20-0150	M	MER-25
P	CAR 75RF16		

0 CLOSURE INITIATED BY:
RESPONSIBLE MANAGERS 1: C.CAMPBELL/ES6/X38948
2:

0 DESCRIPTION:

During the post-landing walk-around video, it was noted that one of the six blades on the blade valve mechanism at the left-hand aft structural-attach point did not fully close. The blade was one of three in the outer blade set. No ordance fragments were found on the runway beneath the umbilical cavity. The blade valve assembly will be removed for failure analysis. STS-75 was the eight flight of the Program since implementation of the blade valve mechanism modification (3 flight each on OV-104 and OV-105 and 2 flights on OV-102). This is the first in-flight problem with the blade valve mechanism.

Sts0075.txt

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-076 (OV-104,FLT #16) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 1

IFA NUMBER> STS-76-E-01

TITLE:ME-2 FUEL PREBURNER CHANNEL A IGNITER NOT INDICATING ON

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 000 : 00.00.00
		IFA DATE:
IFA STATUS: OPEN		ELAPSED TIME: 000 : 00.00.00
PRACA STATUS: UNKNOWN		HOUSTON TIME: 00.00.00
PRCBD NUMBER: S062115		PHASE:

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
A	A033675		

0 CLOSURE INITIATED BY:
 RESPONSIBLE MANAGERS 1: JENIFER EBERT RKDN-SSME
 2:

0 DESCRIPTION:

During the STS-76 post flight data review, it was noted that the ME-2 Fuel Preburner (FPB) channel A igniter did not indicate "ON" at engine start. This is the first known occurrence in the SSME program of an igniter failing to indicate "ON" at engine start and is considered a FMEA Crit 3 failure.

The channel B igniter did energize and the engine started normally. There are 2 igniters located in each preburner and in the main combustion chamber (6 total per engine) for redundancy. The worst case failure of both igniters failing to spark at engine start would be in the Fuel Preburner chamber and is considered a Crit 1 R condition. If this were to occur, the engine would safely shut down on the pad due to a High Pressure Fuel Pump minimum speed violation, (4600 rpm minimum

sts0076.txt

required from 1.24 to 1.28 seconds). The single igniter MTBF is 3856 hot fire tests with a 90% confidence. The dual failure vehicle MTBF is greater than 1 million flights with a 90% confidence. The failure could be located in the igniter, harness or controller.

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STS-076 (OV-104,FLT #16) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 2

IFA NUMBER> STS-76-V-01

TITLE:HYDRAULIC SYSTEM 3 EXTERNAL LEAK

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 000 : 00.00.00

IFA DATE:

IFA STATUS: CLOSED

ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1996-10-02

HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062115

PHASE:

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 79V-0004

K PRHYD-0681

M MMACS-01

P CAR76R01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: D. ALLISON/EP2/X39033

2:

0 DESCRIPTION:

Hydraulic system 3 experienced an external leak of hydraulic fluid throughout the ascent run. The leak rate was approximately 1% per minute, for a total of 20% leaked. The main engine TVC isolation valve was closed in an unsuccessful attempt to isolate the leak. The APU was taken to low press and the leak rate decreased significantly. Hydraulic system 3 has been stable since APU shutdown and system 3 circ pump runs have not affected the system 3 reservoir quantity. The exact location of the leak is not known, but it is suspected to be in the aft

sts0076.txt

compartment. The management of the APU/hydraulic systems during FCS C/O and entry has been determined. FCS C/O was performed using a circ pump. APU 2 was started pre-deorbit and APU 1 was started at EI-13. Systems 1 and 2 were taken to NORM pressure at EI-6 minutes. APU 3 was started at TAEM and will remain in low press because it was not needed. APU 3 was shut down at wheel stop. Prior to APU 3 start, hydraulic system 3 reservoir quantity was 41.6 % and increased to 44. 0% upon landing. This indicates that the leak observed during ascent was minimized by leaving APU 3 in low pressure. APUs 1 and 2 were taken to high speed at TAEM and returned to normal speed after APU 3 shutdown. The weather placards for the loss of a single APU were observed.

Hydraulic fluid was found in the aft compartment. The highest amount of mist found in the rear portion of the righthand side towards the top of the aft. Some puddling of fluid seen along the center floor area aft of AV Bay 6. The total quantity aspirated is small so far about a quart or less. The fluid splattered as a mist around the inside of Vent door 8 and 9 on the lefthand side. No data has been taken on the righthand side. External inspections found signs of hydraulic fluid in film form around the Engine 1 and 3 Dome heat shields. The heaviest area is Engine 3 between the 8 to 12 o'clock position. The vent doors on both sides showed no indications of fluid.

Leak checks were performed at KSC to locate source. No leak was discovered at return pressure. The hydraulic system supply was attached to the flexhose. With the system at 950 psi a leak was discovered at the flexhose to elbow joint. The B nut was subjected to 95 ft/lb with no movement. A X-ray of the joint was taken in place on 4-17-96 and

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STS-076 (OV-104,FLT #16) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 3

IFA NUMBER> STS-76-V-01

Page 3

Sts0076.txt

TITLE:HYDRAULIC SYSTEM 3 EXTERNAL LEAK

0 DESCRIPTION: (Continued from previous page).

then subsequently removed. The hose/elbow assembly was sent to RI Downey for failure analysis. Initial observation of the X-rays found indications of misalignment. The assembly had a blowing leak at 600 psi and when the assembly was dismantled the mating surfaces had crescent shaped deformations. KSC will be installing new hose and elbow. The new hardware will be leak checked at 3000 PSIA. The pump to flexhose joint will be leak checked at low pressure in the OPF. A RCN is in work to require an APU hot fire at the pad.

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STS-076 (OV-104,FLT #16) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 4

IFA NUMBER> STS-76-V-02

TITLE:PRIMARY THRUSTER L2L FAILED LEAK

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 089 : 06.11.00
 IFA DATE: 03/29/1996
IFA STATUS: OPEN ELAPSED TIME: 006 : 21.57.57
PRACA STATUS: CLOSED : 1996-09-09 HOUSTON TIME: 12.11.00
PRCBD NUMBER: S062115 PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER
 K LP03-0508 M PROP-02
 P CAR 76RF05

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: J.APPLEWHITE/EP2/X39030

2:

0 DESCRIPTION:

During RCS hotfire, RM software declared primary thruster L2L

sts0076.txt

failed-leak on the second firing of the thruster when the oxidizer injector temperature dropped below the 30 deg F leak detect limit. The thruster had fired twice during the hotfire procedure with nominal results. The leak was visually confirmed by the crew. The crew isolated left RCS manifold 2. The plan is for KSC to replace thruster and L2D/L2U on same manifold. A chit J4914 was prepared and requests the following: Remove all primary thrusters on LP03 manifold 2 and RP04 manifold 4 and send them to WSTF. All thrusters will be water flushed at WSTF with the exception of L2L (s/n 334) and L2U (s/n 222). These thrusters had been water flushed in 1994, three flights prior to failing on this flight. L2L and L2U will undergo oxidizer valve replacement at WSTF.

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STS-076 (OV-104,FLT #16) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 5

IFA NUMBER> STS-76-V-03

TITLE:PRIMARY THRUSTER L2U FAILED OFF

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 089 : 06.08.00
		IFA DATE: 03/29/1996
IFA STATUS: OPEN		ELAPSED TIME: 006 : 21.54.57
PRACA STATUS: CLOSED	: 1996-09-09	HOUSTON TIME: 12.08.00
PRCBD NUMBER: S062115		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	PR LP03-0509	M	PROP-03
P	CAR 76RF05		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: J.APPLEWHITE/EP2/X39030

2:

0 DESCRIPTION:

During RCS hotfire, RM deselected primary thruster L2U as failed off due to low chamber pressure (Pc). The maximum Pc achieved on the firing

Sts0076.txt

During RCS hotfire, RM software declared primary thruster R4R failed off due to low chamber pressure (Pc). The maximum Pc achieved on this firing was 10 psia, whereas nominal Pc is 150 psia. This was the first attempted firing of the flight. Oxidizer and fuel injector temperatures dropped due to evaporative cooling, indicating at least partial pilot flow. Subsequent injector temperature response indicated none of the heat soak back normally associated with nominal combustion. Plan is for KSC to replace thruster and R4D/R4U on same manifold. A chit J4914 was prepared and requests the following: Remove all primary thrusters on LP-3 manifold 2 and RP04 and send them to WSTF. All thrusters will be water flushed at WSTF with the exception of L2L (s/n 334) and L2U (s/n 222). These thrusters had been water flushed in 1994, three flights prior to failing on this flight. L2L and L2U will undergo oxidizer valve replacement at WSTF.

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STS-076 (OV-104,FLT #16) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 7

IFA NUMBER> STS-76-V-05

TITLE:WSB 3 UNDERCOOL

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 082 : 08.21.00
		IFA DATE: 03/22/1996
IFA STATUS: OPEN		ELAPSED TIME: 000 : 00.07.57
PRACA STATUS: CLOSED	: 1996-07-01	HOUSTON TIME: 02.21.00
PRCBD NUMBER: S062115		PHASE: ASCENT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	PR HYD-0687	M	MER-02
M	MMACS-02	P	CAR 76RF03

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: D.ALLISON/EP2/X39033

2:

0 DESCRIPTION:

The water spray boiler (WSB) for APU/hydraulic system 3 experienced an undercool condition during ascent. When the APU lube oil temperature reached 307 degrees F, WSB 3 controller B was selected. The WSB should control the APU lube oil temperature at approximately 250 degrees F. Thirty-one seconds after selecting the B controller, cooling was observed. After an expected overcool to 243 degrees F, the lube oil achieved a steady state temperature of 255 degrees F. The signature is similar to that seen when there is a freeze-up of the WSB lube oil spray bar. Controller A will be removed and replaced. An ATP will be performed on the controller. Hamilton Standard will be shipping a replacement controller part no SV766501-3 s/n 00005.

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STS-076 (OV-104,FLT #16) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 8

IFA NUMBER> STS-76-V-06

TITLE:WSB 2 OVERCOOLS NO FERRY IMPACTS

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 082 : 08.28.00
		IFA DATE: 03/22/1996
IFA STATUS: OPEN		ELAPSED TIME: 000 : 00.14.57
PRACA STATUS: CLOSED	: 1996-06-04	HOUSTON TIME: 02.28.00
PRCBD NUMBER: S062115		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 79V-0018	M	MER-03
M	MMACS-03	P	CAR 76RF04

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: D.ALLISON/EP2/X39033

2:

0 DESCRIPTION:

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The water spray boiler (WSB) for APU/hydraulic system 2 experienced two overcools during ascent while operating on the A controller. In the initial overcool, the APU 2 lube oil return temperature dropped to 195 degrees F before recovering to nominal temperatures around 250 degrees F. The APU was shut down during the second overcool (the overcool was not the cause of the shutdown). At the time of APU 2 shutdown, the lube oil temperature had dropped to 193 degrees F. The overcool condition did not impact APU or hydraulics system operations. WSB overcooling testing is scheduled for mid-April at Palmdale. The results from the testing will determine the actions to be taken on this controller.

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STS-076 (OV-104,FLT #16) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 9

IFA NUMBER> STS-76-V-07

TITLE:WSB 3 VENT HEATER DROPOUT ON B CONTROLLER

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 091 : 11.00.00
		IFA DATE: 03/31/1996
IFA STATUS: OPEN		ELAPSED TIME: 009 : 02.46.57
PRACA STATUS: CLOSED	: 1996-11-04	HOUSTON TIME: 05.00.00
PRCBD NUMBER: S062115		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 79V-0017	M	MER-16
M	MMACS-05	P	CAR 76RF09

0 CLOSURE INITIATED BY:
 RESPONSIBLE MANAGERS 1: D.ALLISON/EP2/X39033
 2:

0 DESCRIPTION:
 Just prior to the entry deorbit burn, the WSB 3 vent temperature number 2 (V58T0366A) went off scale low (122 degrees F). Nominally, the heater

Sts0076.txt

should have cycled on at around 145 degrees F. The system was operating on the B controller at the time, and this signature indicated that the B heater had failed off. The system was switched to the WSB 3A controller at 091:11:16 G.m.t. and a rise in vent temperature was observed a short time later. In order to better characterize the problem after about 30 minutes and nominal heater cycle on the A controller, the system was switched back to the B controller. Nominal cycling of the B vent heater was observed for the remainder of the flight. KSC will perform troubleshooting. A SPAR chit J4909 is in the system that requests heater resistance check and insulation resistance check to be performed.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-077 (OV-105,FLT #11) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 1

IFA NUMBER> STS-77-V-01

TITLE:RCS THRUSTER F2F FAILED LEAK

0 MISSION CONSTRAINT:	SUBS	IFA TIME GMT: 141 : 11.32.46
		IFA DATE: 05/20/1996
IFA STATUS: OPEN		ELAPSED TIME: 001 : 01.02.46
PRACA STATUS: CLOSED	: 1997-10-08	HOUSTON TIME: 06.32.46
PRCBD NUMBER: S062116		PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	MER-03	M	PROP-01
P	SPR/CAR 77RF03		

0 CLOSURE INITIATED BY:
 RESPONSIBLE MANAGERS 1: C.BUDAH/EP4/X34561
 2:

0 DESCRIPTION:

During the post-SPARTAN deploy (SEP 1-D) -X maneuver thruster F2F successfully completed its first firing. The thruster was deselected by the redundancy management (RM) software one minute 25 seconds later when the oxidizer temperature dropped below the 30 deg F leak detect limit. About 15 minutes later the crew reported that they thought the leaking thruster was causing perturbations to the stationkeeping and requested concurrence to close forward manifold 2. The manifold was closed at 141:12:06:49 G.m.t. Liquid leakage apparently stopped, as indicated by Ox=Fu temperature, around 141:15:40 G.m.t.

The manifold was subsequently reopened at 149:10:24 G.m.t., and the leaking condition resumed. The manifold was isolated prior to crew

sts0077.txt

sleep for the remainder of the mission.

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STS-077 (OV-105,FLT #11) INFLIGHT ANOMALY REPORT

08/26/98

PAGE 2

IFA NUMBER> STS-77-V-02

TITLE:PRIMARY THRUSTER R3A HEATER FAILED OFF

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 142 : 23.30.00
IFA DATE: 05/21/1996
IFA STATUS: OPEN ELAPSED TIME: 002 : 13.00.00
PRACA STATUS: CLOSED : 1997-03-12 HOUSTON TIME: 18.30.00
PRCBD NUMBER: S062116 PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 88V-0001	M	MER-06
M	PROP-02	P	SPR/CAR 77RF04

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: C.BUDAH/EP4/X34561
2:

0 DESCRIPTION:

The heater on primary thruster R3A failed off. Primary thruster R3A is being hot-fired on a non-interference basis with payload activities to maintain the valve temperature due to the failure of its heater. The first of these firings was performed at approximately 143:06:20 and the temperatures responded as expected.

-JFDPO12: NORMAL TERMINATION OF PROCESSING