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STS-060 (OV-103,FLT #18) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

IFA NUMBER> STS-60-B-01

TITLE:DROGUE PARACHUTE SUSPENSION LINE FAILURE

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

IFA DATE:

IFA STATUS: CLOSED : 03/18/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1994-06-17 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S044899D PHASE: PRE-LAUNCH

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A15861

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: S. PATTERSON SA45

2:

0 DESCRIPTION:

During drogue parachute deployment of the right SRB, parachute line #45 failed.

Each drogue chute has twelve suspension line bundles, comprised of five suspension lines each. Each bundle is retained in a confluence keeper which attaches the two outside lines by tabs. The failed suspension line was one of the outside lines adjacent to the keeper. This keeper also failed due to effects of the broken suspension line.

Physical inspection of the hardware revealed two key pieces of evidence relative to the failure. The failed suspension line had twisted within the confuence keeper, exposing the opposite side of the line to the keeper. The inspection also revealed two staples inside the keeper

which were installed as manufacturing aids.

The failure scenario involves the twisting of the suspension line and contact between the suspension line and the staple. The twist was introduced during drogue chute deployment, exposing the opposite side of the suspension lines to the staples. The staples reacted with the extreme vibrations in the line and cut approximately 60% through the line which subsequently failed due to operating loads. Failure of the suspension line is attributed to a combination of cuts introduced by the staples and twisting during drogue chute deployment.

Inspection of all lines identified eight of 140 bundles which has staples installed. All staples were removed from these lines. All drogue parachtues have been inspected, except for those installed on STS-59. STS-59 is the only flight remaining which may potentially have staples installed.

A failure analysis was conducted which demonstrated that a fail safe condition exists should one line per bundle fail, provided no two adjacent outside lines fail. The failure of two adjacent outside lines could result in the loss of an SRB. The statistical probability of success based on required failure of two adjacent suspension lines due to this condition provided 0.9999 reliability. This failure is contingent upon the staples being present, the lines twisting, and two

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IFA NUMBER> STS-60-B-01

TITLE:DROGUE PARACHUTE SUSPENSION LINE FAILURE

0 DESCRIPTION: (Continued from previous page).

adjacent outside lines both failing.

- CLOSURE RATIONALE:

Failure of the suspension line is attributed to the combination of cuts introduced by the staples and twisting of that line during drogue deployment. The high probability of success for the drogue parachutes installed on STS-59 provides sufficient confidence for use of those parachutes without destacking to inspect for staples.

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PAGE 3

IFA NUMBER> STS-60-D-01

TITLE:ARD NOMINAL DELTA V MARGIN TREND INDICATED SIGNIFICANT THRUST/MASS MODELING ERROR

0 MISSION CONSTRAINT: 62 SUBS IFA TIME GMT: 034 : 12.10.00

IFA DATE: 02/03/1994

IFA STATUS: CLOSED : 02/25/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 06.10.00

PRCBD NUMBER: S044899A PHASE: ASCENT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M FDO-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: M.R. ABBOT DM46 X31933

2:

0 DESCRIPTION:

Ard declared no-go, and abort mode boundary calls were made using tracking data and day-of-launch-computed velocities.

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STS-060 (OV-103,FLT #18) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

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IFA NUMBER> STS-60-D-02

TITLE:BOTH DVIS CPU'S (A AND B) DOWN

0 MISSION CONSTRAINT: 62 SUBS IFA TIME GMT: 033 : 10.57.00

IFA DATE: 02/02/1994

IFA STATUS: CLOSED : 02/25/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 04.57.00

PRCBD NUMBER: S044899B PHASE: PRE-LAUNCH

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

D DR 306407 D DR 306415

M MCC-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1:

2:

0 DESCRIPTION:

At launch minus 13 minutes, DVIS CPU-A failed with a crash code 153. A decision was made by engineering support to not fail-over to the backup CPU because of possible corruption of the entire system. DVIS loop connections made prior to failure continued to be operational. The DVIS users were unable to reconfigure keysets until CPU-B was re-started and placed online.

A second occurrence of this failure was experienced during on-orbit phase of the mission and is being tracked under DR306415.

1

IFA NUMBER> STS-60-E-01

TITLE:ME-1 EMERGENCY SHUTDOWN (EMSD) PRESSURE SENSOR SPIKE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 034 : 12.09.52

IFA DATE: 02/03/1994

IFA STATUS: CLOSED : 06/29/1995 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1995-06-15 HOUSTON TIME: 06.09.52

PRCBD NUMBER: S044899U PHASE: PRE-LAUNCH

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
A	A032841	A	A15814

0 CLOSURE INITIATED BY: RI-RKDN/A. HALLDEN |

RESPONSIBLE MANAGERS 1: P.JONES

2: W. TRAVIS EE22

0 DESCRIPTION:

At approximately 1.72 seconds after the engine start command (ESC), the ME-1 (E 2021) EMSD pressure sensor exhibited a positive spike on channel A of up to 523.8 psia.

No other EMSD pressure sensor anomalies were noted during the chill, mainstage, and post-shutdown phases. Three consecutive data points must be between the 600-900 psia range in order to resist a Failure Identification (FID). The two anomalous data points reported within the spike were not between the pressure sensor limits, therefore, no violation occurred. The sensor (P/N RES7001-207, S/N 41793) had experienced 7 starts and 2920 seconds of hot-fire time prior to the STS-60 mission.

Pressure sensor spikes have been attributed to sensor failure on four previous flight and have been documented/tracked on four separate IFAs (IFA No's STS-50-E-01, STS-47-E-01, STS-53-E-01, and STS-54-E-02). All of these spikes were caused by contamination introduced during the manufacturing process that resulted in short-circuit signature. The SSME Project has currently underway a sensor screening plan that will include Particle Imact Noise Detection (PIND) testing of all flight pressure sensor. IFA No. STS-54-E-02 will remain open until

implementation of the flight sensor screening plan is complete.

SSME pressure sensors of this design have been categorized into two families; the -100 and -200 series sensors. The -200 sensors have been either modified and/or re-identified since their original build. Statistical analysies have identified a highter failure rate for the -200 series sensors, and their use is restricted to non-flight critical locations. The -200 sensors, however, are allowed in two locations that can cause a pad abort: one being the discussed EMSD pressure; and the other location being the LPFP discharge pressure which requires two bridges to fail (remote possibility) for a pad abort condition.

Although the EMSD pressure sensor is not flight critical, it is used during the chill, start, and mainstage phases to verify the EMSD solenoid function. During purge sequence (PSN) -3, the EMSD pressure is verified to be between 600 and 900 psia. A sensor outside these limits

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IFA NUMBER> STS-60-E-01

TITLE:ME-1 EMERGENCY SHUTDOWN (EMSD) PRESSURE SENSOR SPIKE

0 DESCRIPTION: (Continued from previous page).

results in a FID, and a major component failure (MCF) is posted by the controller and issues an inhibit, preventing engine start. From PSN-4 (+2 seconds) to start enable, the pressure is verified to be less than 50 psia. Again, a sensor indication above this limit results in a FID, and the MCF is posted along with the issued inhibit, preventing engine start. From ESC to the end of mainstage, the EMSD pressure must indicate outside of the 600 to 900 psia limits. A sensor indicating between these limits results in a FID, an MCF, and an on-pad abort (only

if between ESC and T-0 /SRB ignition command). An EMSD pressure between 600 and 900 psia would indicate that the EMSD solenoid has failed open (deenergized). All SSME LCC and sensor redundancy management are currently under review by a Level II working group to attempt to assess risk and improve launch probability.

Postflight testing of the sensor, controller, and harness will be completed after Orbiter landing and engine removal.

- CLOSURE RATIONALE:

Internal contamination introduced during build caused a short within the sensor. Scanning revealed one cylindrical particle between the outer case and the temperature compensation elements on the inner housing assembly and two particles in the vacuum reference cavity. The sensor was removed from the engine for analysis. A process consisting of PIND testing and micro-focus x-ray has been developed to allow only the most contamination free sensors for use in flight.

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IFA NUMBER> STS-60-I-01

TITLE:NO AUTO ACTIVATION OF NOSE WHEEL STEERING

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

IFA DATE:

IFA STATUS: CLOSED : 04/05/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 00.00.00

PRCBD NUMBER: S044899G PHASE: ENTRY/LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

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

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: D. MAY WG2

2:

0 DESCRIPTION:

Nose wheel touchdown for STS-60 occurred after the vehicle decelerated below the wheel speed sensors lower threshold of 190 ft/sec. At this lower threshold, the flight software resets the WOW flag which is required along with the WONG flag to enable nose wheel steering. Concerns have been raised on the necessity of having nose wheel steering immediately after WONG (e.g. blown tire) if landing conditions were not nominal or when nose gear derotation is at slower speeds with the drag chute deployed.

- CLOSURE RATIONALE:

Analysis of the WOW redundancy mamagement requirements indicate that the WOW flag in the software, once set true, should be latched true and not allowed to be reset false. This ensures the enabling of nose wheel steering by the software without addtion hardware/avionics failures for nose gear derotations at slower speed.

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IFA NUMBER> STS-60-P-01

TITLE:BPM #8 VALVE LEAKAGE DETECTION

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 035 : 22.26.00

IFA DATE: 02/04/1994

IFA STATUS: CLOSED : 01/06/1995

ELAPSED TIME: 001 : 10.16.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 16.26.00

PRCBD NUMBER: S044899J

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-09

0 CLOSURE INITIATED BY: C. CHASSAY JSC-MT

RESPONSIBLE MANAGERS 1: T. BATTEN

2: D. SMITH

0 DESCRIPTION:

During the Spacehab experiment Bioprocessing Lab (BPL) termination activity, Bioprocessing Module (BPM) #8 had an internal breach of containment at the location of the valve. The amount of the leakage is unknown, flight data file indicated that the highest tox level for BPM #8 was a level 2, but updated tables indicating what was actually loaded for flight, state that the highest tox level for BPM #8 was in fact a level 1 (one).

Spacehab had the correct sample loading data, but had not communicated it to the payload officer.

The crew bagged and stowed BPM #8. Updated tox tables were uplinked to the crew.

- CLOSURE RATIONALE:

During the sterilization process, a very small amount of water vapor was entrained & condensed inside the valve stem/seal cavity. 3-way valves on each of the BPMs will be replaced before each flight. An alternate method (other than autoclaving) will be used to sterilize the 3-way valves.

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IFA NUMBER> STS-60-P-02

TITLE:COMMANDING TO WAKE-SHIELD INFLT FREE-FLYER

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 036 : 12.10.00

IFA DATE: 02/05/1994

IFA STATUS: CLOSED : 05/16/1995 ELAPSED TIME: 002 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 06.10.00

PRCBD NUMBER: S044899L PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-012

0 CLOSURE INITIATED BY: JSC-MT2/A. ONG |

RESPONSIBLE MANAGERS 1: A. ONG TC3

2: G. LAWS

0 DESCRIPTION:

FD 3 DEPLOY:

At MET 02/00:00, during the post unberth checkout, both the crew and ground experienced difficulty sending commands to the Free-Flyer from the carrier. The command had to be sent several times. Use of red LED indicators on the Free-Flyer to determine status became unreliable for troubleshooting due to sun shadowing. Both crew and ground assumed LED indicators no-op and began performing malfunction procedures. After several hours of troubleshooting, Free-Flyer was reberthed.

FD4 DEPLOY:

On FD 4, Free-Flyer was unberthed in preparation for release. Ground commnading to the Free-Flyer was sporadic again. Due to loss of horizon sensor, a decision was made to conduct experiment operations on the RMS. Ground commanding to WSF Free-Flyer was lost several times during remainder of WSF experiment operations.

- CLOSURE RATIONALE:

The commanding failures was caused by heat-sensitive components in the WSF Carrier Signal Conditioning Interface Unit (SCIU) data clock circuit. The components, when heated to approximately 45 deg C, caused the data clock to change frequency and thereby not allowing the

commands to be read properly. The temperature sensitive components were replaced with new components and retested successfully. Red indicator lights have been replaced with brighter bulbs and clear lenses. Testing has been conducted at JSC to assure visibility of lights under orbital daylight conditions.

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IFA NUMBER> STS-60-P-03

TITLE:WAKE-SHIELD INFLT ADACS OFF-NOMINAL PITCH AND ROLL INDICATORS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 037 : 15.33.00

IFA DATE: 02/06/1994

IFA STATUS: CLOSED : 05/16/1995 ELAPSED TIME: 003 : 03.23.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 09.33.00

PRCBD NUMBER: S044899M PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-013

0 CLOSURE INITIATED BY: JSC-MT2/A. ONG |

RESPONSIBLE MANAGERS 1: A. ONG TC3

2:

0 DESCRIPTION:

During WSF Free-Flyer release preparations, WSF ADACS indicated improper pitch (10 deg) and roll (8 deg) indications. This indicative of failed horizon sensor. Troubleshooting could not recover horizon sensor. All experiment operations required to be conducted on RMS.

- CLOSURE RATIONALE:

The ADACS improper pitch and roll indications was caused by the 1200 Hz interference signal in the IRSA cable from the SCANWHEEL motor driver magnets due to improper shielding and routing of cables. In addition,

pre-flight checkout of the ADACS system was not conducted in the flight configuration. The IRSA and motor driver cables have been replaced with twisted shielded pair wiring and rerouted. Extensive preflight ADACS testing will be conducted for WSF 02.

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IFA NUMBER> STS-60-P-04

TITLE:SPACEHAB FLEXIBLE AIR DUCT COLLAPSE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 037 : 13.25.00

IFA DATE: 02/06/1994

IFA STATUS: CLOSED : 01/11/1995 ELAPSED TIME: 003 : 01.15.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 07.25.00

PRCBD NUMBER: S044899K PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-014

0 CLOSURE INITIATED BY: T. MCPHERSON JSC-MT2

RESPONSIBLE MANAGERS 1: T. BATTEN

2:

0 DESCRIPTION:

The spacehab flexible rubber duct connecting the Orbiter ECS to Spacehab collaped due to a blockage of the ARS fan debris inlet screen in the fan inlet muffler. The ARS fan delta P reached 4.5 inches of water. The crew was asked to remove the ASC/DES inlet stub cap to reduce the suction from the flexible section of ducting. Following the cap removal procedure the ARS fan delta P was reduced to approx. 2.2 inches of water. The collapse of the airduct restricted air exchange between the Orbiter and the SH module.

An IFM was successfully performed on FD5 to clean the ARS fan inlet debris screen. Nominal performance of the ARS fan was restored. The flexible duct was removed, reinforced with flight data file material, and reinstalled as part of the IFM.

- CLOSURE RATIONALE:

Blockage of the fan inlet debris screen was caused by lint and debris pulled into the inlet muffler by the spacehab module air circulation system. Blockage of the ARS fan inlet screen caused increased negative pressure in the flexible duct. The duct did not have sufficient stiffness to resist the increased pressure differential and partially collapsed. The fan inlet debris screen has been redesigned to increase its surface area by over 300% The increased surface area will better resist blockage by lint and debris. A thin aluminum stiffener has been designed and installed in the duct to provide increased capability to withstand negative pressure diffferentials.

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IFA NUMBER> STS-60-P-05

TITLE:WAKE-SHIELD INFLT FREE-FLYER SC2 COMPUTER LOCKUP

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 038 : 15.18.00

IFA DATE: 02/07/1994

IFA STATUS: CLOSED : 05/16/1995 ELAPSED TIME: 004 : 03.08.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 09.18.00

PRCBD NUMBER: S044899N PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-017

0 CLOSURE INITIATED BY: JSC-MT2/A. ONG |

RESPONSIBLE MANAGERS 1: A. ONG TC3

2: G.LAWS

0 DESCRIPTION:

At MET 04/03:08, the WSC SC2 Free-Flyer computer locked up during WSF experiment operations. Ground unable to send commands and no telemetry was received on the ground. Subsequent automatic reboot of SC2 computer occurred in which SC2 computer recovered itself. There was loss of experiment operations during SC2 lockup.

- CLOSURE RATIONALE:

The SC2 computer lockup on FD3 was caused by the power interrupt which occurred during the unberthing of the Free-Flyer due to Free-Flyer to attachment bell elastomeric seal stiction. Anomaly is not considered a significant problem. WSF 02 crew has been made aware of potential SC2 computer lockup problem during unberthing. Seal stiction is anticipated to be somewhat less for WSF 2 due to reduced time when the Free-Flyer is attached to the attachment bell.

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STS-060 (OV-103,FLT #18) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

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IFA NUMBER> STS-60-P-06

TITLE:WSF SCIU/PSP INTERFACE FAILURE

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 039 : 21.30.00

IFA DATE: 02/08/1994

IFA STATUS: CLOSED : 05/23/1995

ELAPSED TIME: 005 : 09.20.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 15.30.00

PRCBD NUMBER: S044899P

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-018

0 CLOSURE INITIATED BY: JSC-MT2/A. ONG

RESPONSIBLE MANAGERS 1: A. ONG TC3

2: G.LAWS

0 DESCRIPTION:

Ground command to the WSF through SCIU/PSP was lost on FD6. The interface through the SCIU from the crew PGSC remained operational. Attempts were made to command through both SCIU/PSP1 and SCIU/PSP2 with no success. SCIU power cycles were ineffective. Commnand was later recovered when SCIU 1 was power cycled on FD7. Additional WSF science commanding from the ground was lost. The crew left carrier comm string 1 activated and the ground continued commanding. Carrier and FF commanding was reestablished prior to berthing. The reason is unknown. Delogs of ground command outputs are being cross-checked. KSC testing will be performed prior to demating the orbiter/WSF. Further payload testing will be performed post-demate.

- CLOSURE RATIONALE:

The commanding failures was caused by heat-sensitive components in the WSF Carrier Signal Conditioning Interface Unit (SCIU) data clock circuit, which when heated to approximately 45 deg C, caused the data clock to change frequency and thereby not allowing the commands to be read properly.

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IFA NUMBER> STS-60-P-07

TITLE:LOSS OF WAKE SHIELD INFLT FREE-FLYER TELEMETRY

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 039 : 19.52.00

IFA DATE: 02/08/1994

IFA STATUS: CLOSED : 05/16/1995

ELAPSED TIME: 005 : 07.42.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 13.52.00

PRCBD NUMBER: S044899Q

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-020

0 CLOSURE INITIATED BY: JSC-MT2/A. ONG |

RESPONSIBLE MANAGERS 1: A. ONG TC3

2: S. BEISERT

0 DESCRIPTION:

At MET 05/07:42, the ground lost Free-Flyer teletry after seeing high temperatures on both transmitters. Free-Flyer transmitters were cycled in an attempt to keep temperatures within limits. The carrier telemetry was still being downlinked. The WSF experiment operations were suspended.

- CLOSURE RATIONALE:

Loss of Free-Flyer telemetry was at first thought to be casued by the high temperatues on the transmitters. However, further investigation showed that telemetry was lost when the Carrier SCIU's were powered-cycled. Since telemetry acquisition by the de-interleaver is interrupt-driven, the software allowed the interrupt process to occur before all necesary system initializations were competed, resulted in locking up the Carrier SCIU's, and not passing either commands or telemetry. The loss of Free-Flyer telemetry was caused by a bug in the Carrier de-interleaver code which allowed the interrupt process to occur before all necessary system initializations were completed, locking up the Carrier SCIU, and not passing either commands or telemetry. The carrier de-interleaver software was modify to prevent interrupts prior to system initialization.

1

IFA NUMBER> STS-60-P-08

TITLE:LOSS OF PAYLOAD SYSTEM 2A LATCH INDICATION

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 042 : 13.58.00

IFA DATE: 02/11/1994

IFA STATUS: CLOSED : 05/23/1995 ELAPSED TIME: 008 : 01.48.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 07.58.00

PRCBD NUMBER: S044899T PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-24

0 CLOSURE INITIATED BY: JSC-MT2/A. ONG |

RESPONSIBLE MANAGERS 1: S HASKINS

2:

0 DESCRIPTION:

During deorbit prep (MET 008/01:48), the A microswitch indication from the primary payload retention latch system was lost. Since there are redundant microswitches for the WSF primary and secondary latch system, we believe the primay switch latch system is engaged. We believe it is a macroswitch failure after verifying on the MDM channelization (of 1 card 4 channel 2) of the LAT 2A. Other flight controllers confirmed good data on OF1 card 4 channel 2. Note WSF primary and secondary latch systems are wired to PRLA Latch systems 2 and 3. If both microswitch indications for the primary latch system were lost, WSF is still go from entry per flight rule A4-10 A, which states only 1 of 2 latch systems is required for entry. The confiiguration is acceptable.

- CLOSURE RATIONALE:

Post-flight inspection at KSC of the Primary Latch System microswitch indicated that a shift in the latch arm mechanical adjustment mechanism had caused the erroneous latch indication. The shift in the adjustment mechanism was most probably caused by mechanical movement between the carrier and the Free-Flyer due to thermal effects. For subsequent flight, the microswitch area adjustment mechanism will be readjusted to provide greater tolerance for Free-Flyer to carrier mechanical shifts.

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STS-060 (OV-103,FLT #18) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

IFA NUMBER> STS-60-V-02

TITLE:SUPPLY WATER DUMP VALVE "BURPS"

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 036 : 10.38.00

IFA DATE: 02/05/1994

IFA STATUS: CLOSED : 04/04/1994 ELAPSED TIME: 001 : 22.28.00

PRACA STATUS: CLOSED : 1994-03-01 HOUSTON TIME: 04.38.00

PRCBD NUMBER: S044899E PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EECOM-02 P CAR 48RF04

P IM/60RF05

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: H.BRASSEAU X39248

2:

0 DESCRIPTION:

There were several supply water valve burps (10) after the second water dump and one other indication by the nozzle temperatures that water was moving through the nozzle. OV-103 and OV-104 have exhibited similar burps on previous missions. for this mission, the dump line will be purged after all supply water dumps to prevent further burping. No postflight KSC action. An automatic air purge capability piece of equipment will be developed and flown as a workaround for severe "burping".

- CLOSURE RATIONALE:

In-flight maintenance equipment and procedures are in-place to perform cabin air purges of the supply dump line should burping occur and

present a contamination concern.

For STS-64 and STS-66, a new piece of equipment will be provided to allow automatic air purges following supply water dumps. If the results are favorable, this new method of performing supply water dumps will be applied to all vehicles.

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STS-060 (OV-103,FLT #18) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

IFA NUMBER> STS-60-V-05

TITLE:WSF RETENTION LATCH 2 SWITCH INDICATES RELEASE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 040 : 16.07.00

IFA DATE: 02/09/1994

IFA STATUS: CLOSED : 05/05/1994 ELAPSED TIME: 006 : 03.57.00

PRACA STATUS: CLOSED : 1994-09-26 HOUSTON TIME: 10.07.00

PRCBD NUMBER: S044899H PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 64V-0005	K	PR DDC-3-19-0093
M	MMACS-05	P	CAR 60RF04
P	IM/60RF04		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: R. DAVIS X38946

2:

0 DESCRIPTION:

PYLD Retention Latch Switch 2 position indication shows RELEASE and should be OFF.

KSC performed the troubleshooting plan after the orbiter had been powered down. When the vehicle was powered backup, the anomaly was no longer present. The switch was cycled several times and did not

exhibit any anomalous characteristics. MDM OF2 troubleshooting to be scheduled.

The switch has been R&R'd. MDM OF2 troubleshooting was performed. No anomalous conditions were noted. The MDM will be left onboard and monitored throughtout the turnaround flow. Potential UA.

- CLOSURE RATIONALE:

The MDM is believed to be the cause of the erroneous indicaiton. This is based on the observed signature being sustained through entry and only clearing when vehicle power was cycled.

The switch was removed and replaced. It will undergo ATP and possibly destructive failure analysis. The MDM will be monitored, and if anuy further anomalies are observed, the MDM will be removed and replaced. This is not believed to be a generic failure.

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STS-060 (OV-103,FLT #18) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

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IFA NUMBER> STS-60-V-06

TITLE:INTERNAL LEAKAGE THROUGH WSB 3 GN2 REGULATOR

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 035 : 07.00.00

IFA DATE: 02/04/1994

IFA STATUS: CLOSED : 03/31/1994 ELAPSED TIME: 000 : 18.50.00

PRACA STATUS: CLOSED : 1995-03-21 HOUSTON TIME: 01.00.00

PRCBD NUMBER: S044899F PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
P	CAR 60RF06	P	HYD-3-19-0687
P	IM/60RF06		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: J. SERIALE-GRUSH X39033

2:

0 DESCRIPTION:

On flight day 2, the WSB 3 GN2 regulator demonstrated an internal leak of 25 sccm for about 30 minutes; the WSB 3 reg out pressure increased from 26.4 to 27.3 psia. At that point the leak stopped. Termination of the internal leak suggests transient contamination. This is an old configuration regulator. The above leak could be an indication of on-going problems in the old configuration regulators.

- CLOSURE RATIONALE:

Based on previous failure history, the WSB 3 regulator leakage experienced during STS-60 was most probably the result of extrusion damage to the balance stem O-ring seal. Will remove the WSB 3 regulator (S/N 014), which is a -1 configuration, and replace with a -6 or -7 configuration regulator. The latest regulator design has been modified to eliminate the balance stem O-ring extrusion problem. This opportunity will also be used to replace the WSB 1 regulator (S/N 018), which is a -2 configuration, with a -6 or -7 configuration regulator.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

1

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STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

IFA NUMBER> STS-61-B-01

TITLE:SRB APU TURBINE WHEEL BLADE DAMAGE

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

IFA DATE:

IFA STATUS: CLOSED : 01/13/1995 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1995-01-27 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S044898T PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A15802

0 CLOSURE INITIATED BY: D. WOOD USBI

RESPONSIBLE MANAGERS 1: S.PATTERSON SA45

2:

0 DESCRIPTION:

During refurbishment of the right SRB APU (rock position, S/N 171) at Sundstrand, portions of 62 of the 123 second stage turbine wheel blades were found missing

The concern associated with the loss of turbine blades is potential turbine imbalance and subsequent turbine rupture (identified as a criticality 1 failure). However, the most likely result would be similar to that observed on S/N 171, which supported nominal TVC performance on the STS -61 mission.

A materials analysis determined that the turbine blade damage was precipitated by a unique machining feature which was present on the second stage blades of the turbine wheel. The feature introduces a

stress riser which accelerated growth of the known cracks. The turbine mapping inspection reports verified that no unique manufacturing defects existed which could precipitate turbine wheel damage.

This IFA was baselined on January 31, 1994 on directive #S044898. The Level II IFA closure was granted for STS-60 only. The board assigned an action to the SRB Project to define steps taken during manufacturing/ inspections which ensures this problem does not recur, and permits permanent clossure of the IFA. Subsequently, additional rationale was presented to the PRCB on February 14 to extend the IFA closure to include STS-62 and STS-59. A pedigree of the STS-62 and STS-59 APU turbine wheels was formed to ensure that no flight safety concerns existed with this hardware. Rationale for flight STS-62 and STS-59 is as follows: The STS-62 and STS-59 APUs met visual inspection requirements, passed the turbine wheel mapping criteria, and exhibited no manufacturing defects which could precipitate turbine wheel blade damage.

1

IFA NUMBER> STS-61-B-01

TITLE:SRB APU TURBINE WHEEL BLADE DAMAGE

0

- CLOSURE RATIONALE:

Materials analysis determined that the turbine blade damage was precipitated by a machining groove on the second stage blades introduced during manufacturing. This groove introduced a stress riser which accelerated crack growth. A review of all mapping inspections (including a review of all white light stored images) and vendor MRB

dispositions verified that all turbine wheels currently installed in APUs are acceptable for flight. The review did identify turbine wheels which will require further evaluation prior to use. The SRB project has been clearing turbine wheels on a flight-by-flight basis in the interim before investigation conpletion. There have been no generic concerns with hardware or processes realized during this problem investigation.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 3

IFA NUMBER> STS-61-D-01

TITLE:TELEMETRY DROPOUTS WITH BDA

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

IFA DATE: 12/01/1993

IFA STATUS: CLOSED : 02/28/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 00.00.00

PRCBD NUMBER: S044898K PHASE: PRE-LAUNCH

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M STDN-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: G. EGAN

2:

0 DESCRIPTION:

During the first launch countdown attempt, JSC/MCC experienced dropouts during BDA prelaunch checks using GSFC message switch upgrade (MSU). Problem was not evident during multiple station loading verification test conducted premission. GSFC reconfigured to the old message switch system to support all ground network telemetry. Testing conducted between launch attempts with MSU "Sequence Monitor Option" enabled for BDA was successful.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

IFA NUMBER> STS-61-F-01

TITLE:EMU 3 LOSS OF ORBITER VOICE

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 339 : 03.47.00

IFA DATE: 12/05/1993

IFA STATUS: CLOSED : 01/21/1994

ELAPSED TIME: 002 : 18.20.01

PRACA STATUS: UNKNOWN

HOUSTON TIME: 21.47.00

PRCBD NUMBER: S044898A

PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
E	B-EMU-151-A001	M	EVA-05

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: N. OLSON X31460

2:

0 DESCRIPTION:

Upon EVA-02 egress, EMU 3 could not receive transmissions from in-cabin crewmembers while EMU 3 was using either comm mode A or B. EVA crewmembers chose to relay messages between the two crewmembers rather than using the backup comm mode. About 3 hours 10 min into EVA (340:06:45 G.m.t.), EMU 3 reception was restored with no action. Later, EMU 3 reception was lost again. EMU 3 was still unable to receive when hooked up hardline in the airlock. Similar problems were experienced with EMU 3 comm during EVA-4.

- CLOSURE RATIONALE:

During post-flight troubleshooting at BAO/FEPC the anomaly was isolated to the Item 151 power harness. An intermittent connection exists in the harness between P-3 pin 2 and P-12 pin 32. P-3 attaches to the DCM connector J-3 and P-12 attaches to the EVCA connector J-3. This harness

wire connects the hardline and orbiter radio to the radio volume control mounted on the DCM.

The Item 151 harness in question will be removed and shipped to Hamilton Standard / Windsor Locks for a complete failure analysis.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 5

IFA NUMBER> STS-61-F-03

TITLE:IN-SUIT DRINK BAGS LEAKING FROM FILL PORT

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 338 : 12.24.00

IFA DATE: 12/04/1993

IFA STATUS: CLOSED : 01/21/1994 ELAPSED TIME: 002 : 02.57.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 06.24.00

PRCBD NUMBER: S044898B PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
E	B-EMU-110-F001, 2	M	EVA-02

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: G. LUTZ X39257

2:

0 DESCRIPTION:

Prior to EVA 1 after filling the EMU in-suit drink bag for EMU 2, the bag began leaking from the fill port. After filling the other drink bag prior to EVA 3, this bag developed a similar leak. An IFM consisting of inserting a drink straw into the port, bending the straw, and taping it to the bag was successfully used for EVAs after each leak was discovered. After EVA 4 the crew reported that the bags were no longer leaking and the IFM was no longer necessary.

- CLOSURE RATIONALE:

The drink bags were tested postflight per DR SS330689 and DR SS330690 and both failed the leakage test. FIARs B-EMU-110-F001 and B-EMU-110-F002 were initiated to perform failure analysis and provide final resolution to this problem.

The fill valve contains a septum that closes when the fill tool is removed. The fill valve septum has been susceptible to this type of leak. New septums are installed preflight to minimize the leakage problem. Septum leakages generally occur immediately after removal of the fill tube, which can be corrected using inflight workarounds.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 6

IFA NUMBER> STS-61-F-08

TITLE:TWO IN-SUIT DRINK BAGS NOT STOWED

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 338 : 12.15.00

IFA DATE: 12/04/1993

IFA STATUS: CLOSED : 01/21/1994

ELAPSED TIME: 002 : 02.48.01

PRACA STATUS: UNKNOWN

HOUSTON TIME: 06.15.00

PRCBD NUMBER: S044898D

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EVA-03

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: R. ANDERSON X31272

2:

0 DESCRIPTION:

Two large in-suit drink bags (IDBs) were not stowed. The EVA crews shared the two IDBs that were stowed.

- CLOSURE RATIONALE:

An incident investigation revealed that both (-15) IDBs were in fact not flown and still under bonded stores control. During final locker stowage for close-out and shipment, the BARS 04 Report of the authorized STS-61 CCCD was correctly used as the controlling documentation. However, the line item identifying the (-15) IDBs quantity (2) was voided out and subsequently stamped. This annotation was the result of inadequate communications. This was compounded by the lack of proper procedure follow-up during Quality inspection and verification.

A FPEC Program Management Directive was issued to clarify existing procedure until the final investigation report is completed and a new or revised procedure is issued.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 7

IFA NUMBER> STS-61-F-09

TITLE:EMU 2 FAILED 5 PSI LEAK CHECK PRIOR TO EVA 5

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 342 : 05.00.00

IFA DATE: 12/08/1993

IFA STATUS: CLOSED : 01/21/1994

ELAPSED TIME: 005 : 19.33.01

PRACA STATUS: UNKNOWN

HOUSTON TIME: 23.00.00

PRCBD NUMBER: S044898C

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EVA-10

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: G. LUTZ

2:

0 DESCRIPTION:

EV2 failed the automated leak check performed at 5 psi during airlock

depressurization prior to EVA-5. EV2 passed subsequent leak checks prior to continuing the depressurization. Suit performance during EVA-5 was nominal.

- CLOSURE RATIONALE:

EMU positive pressure relief valve (I-146) was still open. This valve opens during airlock depressurization to maintain suit pressure below 5.5 psid. A second, manual leak check verified that the suit was leak tight and ready to support EVA.

The positive pressure relief valve was tested on the ground and proper operation, including reseat characteristics were verified.

In addition to the potentially open positive pressure relief valve, analysis of the orbiter airlock data indicates that the airlock pressure was rising during the leak check. This causes the leak rate to seem artificially high, in this case by 0.16 psi/min compared to 0.30 psi/min maximum allowed. This airlock pressure rise is typical at the beginning of the 5 psi operations.

A procedural change to the depress checklist will be implemented to preclude a similar anomaly in the future, this would introduce a slight delay prior to starting the leak check. The current procedure does adequately recover from this situation, however, the additional stabilization period is prudent.

The procedural changes which would preclude occurance of this anomaly in the future are considered conservative but necessary.

1

IFA NUMBER> STS-61-I-01

TITLE:MISSING TPS ON FRWRD EDGE OF RSRM RH FRWRD CENTER SEGMENT AFT GEI RUN

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

IFA DATE:

IFA STATUS: CLOSED : 01/26/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 00.00.00

PRCBD NUMBER: S044898E PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

T PFAR 360L023B-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: S. MUNSON

2: L. WILLIAMS WC

0 DESCRIPTION:

During postflgight inspection of the right RSRM forward center segment, missing cork was observed at the forward edge of the aft GEI TPS run (station 1099) at 220 degrees.

The missing cork material measured 0.5" axially by 2.0" circumferentially by 0.2" radially. Evidence of medium-to-heavy sooting on the leading edge of the cork TPS indicated the material was most likely lost during ascent. The RSRM Project determined the loss of cork material was not due to a material and/or processing failure since there was no indication of a cork-to-case failure as experienced on STS-26R, further suggesting an ascent debris impact caused the damage. The cork faiure mode was confirmed to be cohesive, and the cork-to-case bond (adhesive) passed all pull strength tests. The remaining cork conditions and noted sooting indicate that some object impacted the subject area during ascent.

This problem was presented to the PRCB by the RSRM project, however, due

to the unknown source of the impacting object and vehicle implications, the IFA was assigned to the Space Shuttle Engineering Integration office at JSC. Appropriate inputs/coordination were made with the MSFC RSRM and SRB offices relative to the resolution of this anomaly.

NO RH SRB debris sources were identified forward of the damamge site nor were any unusual debris damamge observed on the Orbiter RH lower surface.

The vehicle experienced typical prelaunch ice/debris conditions in the acceptable areas such as the feedline brackets and bellows. Review of the ET TPS anomalies, since the right upper portion of the ET is not in the camera's field of view. Review of the wind tunnel oil flow data indicated a potential transport mechanism of ice/debris particles from the right side of the ET to the RH SRB exists. The Orbiter shock wave causes the flow to be in a downward and outboard direction. Ice particles from the outboard side of the feedline could be transported towards the SRB.

It was concluded that the most probable cause of SRB cork damage

1

IFA NUMBER> STS-61-I-01

TITLE:MISSING TPS ON FRWRD EDGE OF RSRM RH FRWRD CENTER SEGMENT AFT GEI RUN

0 DESCRIPTION: (Continued from previous page).

resulted from an impact from the random shedding of ice along the right side of the ET (LO2 feedline). The loss of GEI cork during ascent due to a debris impact at this location is not considered a debris concern since an impact with the Orbiter lower surface is not expected, and no

evidence of a void induced verical (upward) transport exists.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

IFA NUMBER> STS-61-I-02

TITLE:RH TENSION HDP 1 AND 2 DELTA SLIP LOADS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 336 : 09.26.59

IFA DATE: 12/02/1993

IFA STATUS: CLOSED : 02/23/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 03.26.59

PRCBD NUMBER: S044898H PHASE: ASCENT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

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

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: L. WILLIAMS WC

2:

0 DESCRIPTION:

A postflight HDP loads reconstruction revealed slip loads in post 1 and 2, just prior to SRB ignition.

The reconstruction indicated slip loads in the Y and Z directions on posts 1 and 2. Approximately 30 to 40 KIPS were experienced in the lateral loads near peak SSME buildup (post 1: Y and Z loads, post 2: Y loads only). There was no slip apparent to any of the axial loads or in any compression posts.

Similar tension post loads have occurred before: STS-27R, STS-33R, STS-28, and STS-36. The slips have not been observed since STS-36.

Several possible explanations are being considered for this condition.

-bushing/bearing rotation

-bushing/bearing translation

-HDP installation procedure

-moment relief mechanism

-aft skirt dishing

Although the IFA was initially assigned to KSC, it was later transferred to the Integration office at JSC. The SRB Project and USBI personnel will assist in the investigation to coordinate inputs (if any).

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 11

IFA NUMBER> STS-61-P-01

TITLE:-V3 HIGH GAIN ANTENNA (HGA) FAILED TO BERTH

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 337 : 19.27.00

IFA DATE: 12/03/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 001 : 10.00.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 13.27.00

PRCBD NUMBER: S044898U PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-01

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: D. HASKINS

2:

0 DESCRIPTION:

During the -V3 HGA retract the HGA dish changed position slightly at the end of retract operations. Both redundant and primary hinge microswitches indicated stowed. Berthing (ready-for-latch)

microswitches (all 4) did not indicate enable.

- CLOSURE RATIONALE:

Failure of the -V3 High Gain Antenna (HGA) to seat properly was most likely caused by unintended contact between the counterbalance on the HGA and MLI near the base of the latch, which caused the Two Axis Gimbal (TAG) to backdrive. MLI interference did not exist during integration, and must have developed subsequently. The interference did not inhibit deployment of the HGA.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 12

IFA NUMBER> STS-61-P-02

TITLE:+V3 HIGH GAIN ANTENNA PARTIALLY BERTHED

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 337 : 21.09.00

IFA DATE: 12/03/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 001 : 11.42.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 15.09.00

PRCBD NUMBER: S044898V PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-02

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: D. HASKINS

2:

0 DESCRIPTION:

At the end of the +V3 HGA retract operation both primary and redundant hinge microswitches indicated stow, and the berth (ready-for-latch) microswitches indicated enable only on the slave latch microswitches (both primary and redundant), but not to the drive latch microswitches.

- CLOSURE RATIONALE:

Failure of the +V3 HGA to seat completely was most likely caused by parasitic frictional forces in the HGA assembly, with a possible contribution from temperature effects on the microswitches. The effects did not inhibit fill latch closure or HGA deployment. No latching is planned for STS-82. The loads on the unlatched HGA are acceptable during all planned STS-82 operations. For SM-3 current retraction procedures can be used without threat to the hardware. The contingency procedures have been developed to view latch and then close it if it is in the proper configuration.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 13

IFA NUMBER> STS-61-P-03

TITLE:-V3 AFT SHROUD DOORS DID NOT ALIGN EASILY FOR CLOSURE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 338 : 10.00.00

IFA DATE: 12/04/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 002 : 00.33.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 04.00.00

PRCBD NUMBER: S044898W PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-03

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: T. MASCARO

2:

0 DESCRIPTION:

The DPCs are DC to DC Converters (Isolated, Regulated, Current-limited Power Supplies) which utilize Orbiter power to provide electrical operating power to the HST during on-orbit servicing operations. There

are a total of 12 DPCs, 6 in the Starboard Power Control Unit (SPCU) and 6 in the Port Power Control Unit (PPCU), all located on the Flight Support System (FSS) structure. All DPCs are in parallel with the output of all 12 connected. One of the 12 (DPC No. 5) totally failed, with the output voltage dropping from 31.5V to 0.2V.

- CLOSURE RATIONALE:

Optimal method for door closure is to use two crew members in restrained positions to close the first door fully, then close the second door while holding the first door closed, then latching the door while holding both closed. An enhanced procedure using flight data has been submitted for input to the FDF. The fidelity of the hardware simulators of the aft shroud doors has veen upgradėd. The upgraded simulators are being used for crew training.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 14

IFA NUMBER> STS-61-P-04

TITLE:-V2 SECONDARY DEPLOYMENT MECHANISM RETRACTION ANOMALY

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 338 : 09.44.00

IFA DATE: 12/04/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 002 : 00.17.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 03.44.00

PRCBD NUMBER: S044898Y PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-04

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: D. HASKINS

2:

0 DESCRIPTION:

Visual inspection of the SAs showed a large bowing displacement of the outboard upper bi-stem of the +V2 SA. Retraction of the bi-stem was stopped (approx 30% retracted) by the crew on visual detection of slack in the blanket, and concern that the bi-stem was separating on its way to breaking, which would possibly leave a sharp edge to contend with. A decision was made that no further retraction would be attempted, and the +V2 SA was jettisoned at the start of EVA #2. The +V2 SA was replaced with a new SA as had been scheduled. The new solar array has a thermal shield on the bi-stem designed to preclude recurrence of this anomaly.

- CLOSURE RATIONALE:

A bistem which is not centered in the forward guidance can conceivably rub against the retract microswitches due to wing motion during SDM retraction. The second half of the retraction was uninterupted, probably because the partially retracted wing is stiffer.

Similar microswitch behavior can occur during future retractions; the same contingency responses are appropriate. Mission timeline planning will address the possibility of repeated attempts to achieve full retraction. The SM-2 mission will not retract the solar Arrays. The solare Arrays will be replaced on SM-3.

1

IFA NUMBER> STS-61-P-05

TITLE:MAGNETIC SENSING SYSTEM (MSS 2) BOX DELAMINATION

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 339 : 06.08.00

IFA DATE: 12/05/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 002 : 20.41.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 12.08.00

PRCBD NUMBER: S044898Z PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-05

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: D. HASKINS

2:

0 DESCRIPTION:

As a part of the HST mission new MSSs were to be installed over the old ones at two locations, MSS 1 and MSS 2. During the inspection of old Magnetometer 2, the EVA crew reported the top and bottom of the magnetometer were peeled back. The surface under the plates was exposed, thereby exposing an inner foam material. The concern was that the foam material could outgas and create a contamination problem as it degrades over time if exposed to atomic oxygen and ultraviolet light.

- CLOSURE RATIONALE:

A pouch assembly was made by the crew from MLI blanket material and was installed over the old MSS modules to contain any parts or contamination that may become dislodged. However, the MLI blanket material used to improvise the cover may degrade due to exposure to the space environment. The new MSSs are working fine. Installation of a more durable cover over the old MSSs is planned for SM-2.

1

IFA NUMBER> STS-61-P-06

TITLE:KU-BAND HST 4KB MEMORY DUMP MISCOMPARE AFTER CO-PROCESSOR CHANGEOUT

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 342 : 16.30.00

IFA DATE: 12/08/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 006 : 07.03.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 10.30.00

PRCBD NUMBER: S044898AA PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-10

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: K.BLUMENTRITT

2:

0 DESCRIPTION:

While troubleshooting anomaly pyld-09, false synch pattern in HST T format data, the STOCC performed a memory dump. During dump verification, it was noticed by STOCC that there were memory locations with incorrect data. The STOCC cannot successfully accomplish the memory dump verification via the KU-Band downlink. The problem exists whenever there is an alternating one/zero pattern in the HST 4 KB telemetry stream. This condition was experienced by the HST simulator during ESTL land OPF testing. We have performed troubleshooting and the KU-Band via channel 2 and 3 provided the same signature seen in ESTL and OPF. The 4KB memory dump has been accomplished successfully via TDRS direct. The engineering directorate recommends additional testing of the 4KB link before the next HST servicing mission.

- CLOSURE RATIONALE:

After the HST Co-processor was attached to the computer to replace failed memory and add exta memory, random 4 KB memory dump miscompares were noticed in the data. Further analysis indicated that the random miscompares also occurred before this modification. The HST .5 and 4 kbps telemetry rates did not meet Orbiter specification for the KU-Band bent pipe mode. This is a known condition. A PGSC, with appropriate hardware/software, will be used as a signal conditioner to increase the

data quality through the S-Band system. The HST memory dump data will now flow from the HST to the PI to the PGSC to the PDI. The PGSC will act like a PSP.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

IFA NUMBER> STS-61-P-07

TITLE:FAILURE OF +/-SA PDMS TO DEPLOY WHEN COMMANDED

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 342 : 03.57.00

IFA DATE: 12/08/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 005 : 18.30.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 21.57.00

PRCBD NUMBER: S044898AB PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-11

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: D. GOLDING

2:

0 DESCRIPTION:

The +/-SA PDMs failed to deploy when commanded. Attempts to deploy the -V2 PDM using dual motor operations also failed. Believed to be caused by friction between microswitch guards and latches. PIP pins and microswitch guards were left in the c/o position and could affect SA latch/unlatch on the next SM. The +/-SA PDMs were manually deployed during the EVA.

- CLOSURE RATIONALE:

The EVA crew was unable to return the solar Array aft latch guards to their normal position after installation of solar array II. It is speculated that thermal effects or material degradation prevented PIP

pin removal which is required for guard positioning. In this configuration, the microswitch guards on the SA aft latches can provide sufficient interference and friction to preclude commanded PDM deployment. Thus, the guards are the likely cause of the PDM failure to deploy.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

PAGE 18

IFA NUMBER> STS-61-P-08

TITLE:HST DATA INTERFACE UNIT 2 (DIU-2) FAILURE ON SIDE "A"

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 344 : 12.37.00

IFA DATE: 12/10/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 008 : 03.10.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 06.37.00

PRCBD NUMBER: S044898AC PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-12

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: D. GOLDING

2:

0 DESCRIPTION:

DIU Side "A" began outputting erroneous data during the first 3 minutes of sunrise on orbit 111. The DIU was switched to Side "B" and good data was then received. The DIU was then switched back to side "A" to confirm the failure in side "A" of the DIU. Two cards on Side "A" have failed, resulting in the loss of some telemetry when using the "A" side. This is a partial failure of Side "A" resulting in the loss of some redundancy in DIU 2. Operations will be performed on side "A" or side "B" as determined by GSFC. Change out of the DIU is a possibility on a

future mission.

- CLOSURE RATIONALE:

The Data Interface Unit (DIU) 2 side A failed during the first servicing mission. There had been a previous failure in Power Control Unit (PCU), which allowed full Solar Array power to be applied to the DIU while nominal loads were offline. This over voltage condition destroyed the DIU side A. The PCU failure mechanism combined with the post berthing Electrical Power System (EPS) configuration was not under stood at the time.

The PCU failure mechanism is now fully understood. The post berthing EPS configuration procedures will insure that the solar Array output voltage is now connected. The new DIU has additional over voltage protection.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

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IFA NUMBER> STS-61-P-09

TITLE:SOLAR ARRAY DEPLOYMENT ELECTRONICS (SADE-1) CHANGEOUT

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 342 : 01.47.00

IFA DATE: 12/08/1993

IFA STATUS: CLOSED : 04/22/1996 ELAPSED TIME: 005 : 16.20.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 19.47.00

PRCBD NUMBER: S044898AD PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-13

0 CLOSURE INITIATED BY: JSC-MT2/J. CONWELL |

RESPONSIBLE MANAGERS 1: D. HASKINS

2:

0 DESCRIPTION:

During the original SADE-1 removal, P1 and P4 connector screws and a mounting clip became disengaged and were captured by the crew. While removing the SADE-1, a mounting screw (1 of 6) also came loose and was retained. The off-nominal SADE-1 configuration will be noted in EVA procedures in the event a future SADE-1 changeout is to be performed.

- CLOSURE RATIONALE:

The SADE was not designed as an EVA friendly item. The SADE 1 failed approximately six months prior to the launch. There was insufficient time prior to the SM-1 flight to design an EVA friendly SADE. In addition the crew did not have a clear view of the screw installation area. SADE 1 will be returned to original design configuration using revised procedures and new hardware. The replacement SADE is designed with an extension harness that does not require any screws and allows for an unobstructed view of the connector installaion. The extension harness has been designed to capture any remaining screws. Procedures have been developed to minimize the risk of losing additional screws.

1

IFA NUMBER> STS-61-V-03

TITLE:RCS THRUSTER L2U FAIL OFF

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 337 : 02.34.00

IFA DATE: 12/03/1993

IFA STATUS: CLOSED : 02/28/1994

ELAPSED TIME: 000 : 17.07.01

PRACA STATUS: CLOSED : 1994-06-03

HOUSTON TIME: 20.34.00

PRCBD NUMBER: S044898J

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 59V-0003 M PROP-03

P IM/61RF03

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: D. MCCORMICK X33327

2:

0 DESCRIPTION:

Thruster L2U was deselected by RM at 338:02:34:20 G.m.t. when the thruster was being used during the NH burn. Injector temperatures indicated both oxidizer and fuel flow occurred, but there was no chamber pressure. L2U is among a group of thrusters with a downlist data rate of only 1 sample/sec in format 179, therefore ground data did not capture the actual pressure signature that tripped RM. The thruster was deselected and was not used during the remainder of the mission.

The pod (LP03) is scheduled for removal on 1/18/94. The thruster will be removed and replaced.

- CLOSURE RATIONALE:

The most probable cause of the thruster fail-off was iron nitrate contamination in the oxidizer-valve pilot-stage that prevented its proper operation. KSC will replace thruster L2U, which will be transferred to the WSTF for the thruster-flush program. Results of the thruster flush at the WSTF and any necessary failure analusis will be documented in CAR 61RF03.

1

IFA NUMBER> STS-61-V-05

TITLE:APU 2 FUEL PUMP/GGVM SYSTEM A HEATER FAILURE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 340 : 15.10.00

IFA DATE: 12/06/1993

IFA STATUS: CLOSED : 03/16/1994 ELAPSED TIME: 004 : 05.43.01

PRACA STATUS: CLOSED : 1994-09-28 HOUSTON TIME: 09.10.00

PRCBD NUMBER: S044898N PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 59V-0006 M MMACS-02

P IM/61RF07

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K. BROWN X33891

2:

0 DESCRIPTION:

At apporximately 340:15:10 G.m.t., the APU 2 fuel system "A" heaters did not turn on at the expected cycle-on temperature. Bypass line temperature dropped from 83 deg F to 66 deg F over a 6-hour period and reached a steady decay rate of 1.0 deg F/hr. The lower FDA for this measurement is 60 deg F. The crew switched to the "B" heaters at 341:00:06 G.m.t. and proper operation was observed. The crew switched back to the "A" heaters later in the mission to aid in troubleshooting and again the heater was failed. The crew then returned to the "B" heater.

Troubleshooting is complete and the thermostat will be removed and replaced.

- CLOSURE RATIONALE:

Vibration is the most probable cause of the failure of the thermostat. Ground troubleshooting isolated the cause of the failed-off heater to the thermostat. The thermostat was replaced and verification testing was successfully completed. The thermostat was sent to JATL to determine the cause of the failure.

IFA NUMBER> STS-61-V-06

TITLE:-Y STAR TRACKER NOT ACQUIRING STARS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 340 : 20.11.00

IFA DATE: 12/06/1993

IFA STATUS: CLOSED : 02/23/1994 ELAPSED TIME: 004 : 10.44.01

PRACA STATUS: CLOSED : 1994-03-14 HOUSTON TIME: 14.11.00

PRCBD NUMBER: S044898G PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M GMC-01 P IM/61RF11

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: B. ELIASON X36037

2:

0 DESCRIPTION:

The -Y star tracker (S/N 2) failed to acquire navigation stars for 5 hours between 340:20 and 341:01 G.m.t. At 341:01:18:10 G.m.t., a series of 3 star tracker self tests failed when the test star was not acquired. At 341:01:22:56 G.m.t., the star tracker was powered off for 6 seconds. Following the power cycle, the star tracker successfully passed a self test and functioned nominally for the remainder of the mission.

The cause of the failure is believed to be a single event upset. No special testing is planned.

- CLOSURE RATIONALE:

The time noted for the beginning of the anomalous behavior of the tracker coincides with the Orbiter passing through the South Atlantic anomaly (SAA), an area of high radiation. The high altitude flown on STS-61 resulted in increased radiation exposure when compared with

flights at lower altitudes. When the vehicle entered the SAA on this orbit, other onboard radiation monitoring equipment registered increments in radiation upsets. Review of the radiation experienced during the time of the initial failure indicates three IBM 486 Thinkpad memory errors and four general purpose computer (GPC) memory errors. This is expected when the vehicle passes through the SAA at this altitude. The SSSTs are known to be more susceptible to radiation upsets than the IDT star trackers.

Of the 11 components of the SSST susceptible to radiation-induced upsets, three were identified as candidates for causing this particular signature. They are the random access memory (RAM) used on the processor board, the processor itself, and the analog switches used on the processor board. No troubleshooting is planned. The SSST, serial number 2, will not be removed, nor will the light shade. There is one other SSST in the fleet. It is in the -Y slot on OV-102. All of the SSSTs are susceptible to this type of malfuction, but a power cycle recovers the tracker.

Based on the indications available, the cause of the failure is

1

IFA NUMBER> STS-61-V-06

TITLE:-Y STAR TRACKER NOT ACQUIRING STARS

0 CLOSURE RATIONALE:(Continued from previous page).

radiation particles affecting either the RAM used on the processor board, the processor itself, or the analog switches used on the processor board. Should the problem recur on subsequent missions, a power cycle will restore the SSST to normal operation.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

IFA NUMBER> STS-61-V-07

TITLE:AFT MISSION TIMER CIRCUIT BREAKER (CB12) POPPED

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 338 : 02.50.00

IFA DATE: 12/04/1993

IFA STATUS: CLOSED : 03/04/1994 ELAPSED TIME: 001 : 17.23.01

PRACA STATUS: CLOSED : 1994-06-03 HOUSTON TIME: 20.50.00

PRCBD NUMBER: S044898L PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 59V-0007 M DPS-01

P IM/61RF13

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: W. ARCENEAUX X33335

2: H

0 DESCRIPTION:

The crew reported after waking on flight day 3 that the aft mission timer was blank and cb 12 on panel 015 was popped out. The decision was made to leave the circuit breaker open. There was no mission impact.

Troubleshooting to date has failed to repeat the problem or identify any anomalies.

- CLOSURE RATIONALE:

The cause of the anomaly is currently unexplained but could be an intermittent problem within the aft mission timer that caused the circuit breaker to trip open due to slightly excessive current. The aft mission timer has been removed and will be sent to the NSLD for TT&E. If the fault is isolated and repaired during TT&E of the aft mission

timer there should be no effect on subsequent missions.

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STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

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IFA NUMBER> STS-61-V-12

TITLE:SMALL CABIN AIR LEAKAGE THROUGH WCS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 344 : 04.53.00

IFA DATE: 12/10/1993

IFA STATUS: CLOSED : 02/18/1994 ELAPSED TIME: 007 : 19.26.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 22.53.00

PRCBD NUMBER: S044898F PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EECOM-02

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: M. ENGLE X33300 VF3

2:

0 DESCRIPTION:

During a commode cycle at 345:04:53 G.m.t., cabin dp/dt measured -0.040 psi/min for 2.5 minutes. During a subsequent commode cycle at 345:15:34 G.m.t., cabin dp/dt measured -0.52 psi/min. The events were 70 and 85 seconds longer than normal WCS/commode repressurizations. In both cases the leakage stopped when the crew proceeded through the normal WCS use per the cue card. Symptoms are consistent with repressurization start prior to full vacuum shut off causing a larger-than normal volume of air to flow.

The WCS has been returned to JSC and checked out. No anomalies were noted. At the WCS debrief the crew reported that there were no improper WCS operations.

- CLOSURE RATIONALE:

Postflight inspection of the WCS control valve mechanism at the vendor revealed no hardware problems. The design of the commode control valve will allow leakage to occur while moving the commode control handle from the full vacuum to the repressurization position. Under normal operations, this leakage is minimal and undetected due to the relatively quick operation of the commode control handle. The small leakage observed is consistant with slow operation of the WCS commode control handle, which results in an extended overboard leak to vacuum.

Crew training personnel have been advised that commode control handl operations should be continuous and should be performed as detailed on the WCS Cue Card. This will prevent reoccurrences of this problem. If the commode control handle should become stuck, or if the leak persists, the WCS vacuum valve may be closed. This would eliminate the leakage.

1

STS-061 (OV-105,FLT #5) INFLIGHT ANOMALY REPORT 12/10/96

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IFA NUMBER> STS-61-V-13

TITLE:HIGH LOAD ON APU 3 DURING POSTLANDING SHUTDOWN

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 346 : 05.44.00

IFA DATE: 12/12/1993

IFA STATUS: CLOSED : 03/17/1994

ELAPSED TIME: 009 : 20.17.01

PRACA STATUS: CLOSED : 1994-06-14

HOUSTON TIME: 23.44.00

PRCBD NUMBER: S044898P

PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 59V-0023	P	IM/61RF12

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: V. LEVY X30874

2:

0 DESCRIPTION:

During the postlanding shutdown of the APUs, an unexplained load increase was seen on APU 3. APUs 1,2 and 3 were shutdown, in that order, with approximately 5 seconds between each shutdown. The APU 3 load increase, seen following the APU 1 shutdwon, remained essentially constant until shutdown. An increase in the SSME 3 return pressure was also noted during the same time period.

A troubleshooting test plan has been developed. Testing will begin no-early-than 1/21/94.

- CLOSURE RATIONALE:

Testing confirmed that an actuator placed against its hard stop will cause the actuator power valve to oscillate, thus demanding a high rate. The high demand and high return pressure on hydraulic system 3 was caused by the SSME TVC 1 pitch actuator positioned against its mechanical hard stop due to the thermal gradient and instrumentation error. There are only two inflight scenarios where a SSME TVC acutator can cuase excessive hydraulic demands. Each scenario requires an additional failure of a system. The most likely recurrence will follow the same scenario as STS-61 postlanding. However, a K-load software change can prevent future refurrence. This change is under investigation.

1

IFA NUMBER> STS-61-V-14

TITLE:BROKEN DOGBONE RETAINING ANGLE

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

IFA DATE:

IFA STATUS: CLOSED : 03/14/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 00.00.00

PRCBD NUMBER: S044898M PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K PR STR-1238 P CAR KB2912-010

P IM/KB2912

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K. BROWN X33891

2:

0 DESCRIPTION:

A clip used to retain the dogbone between port payload bay door panels 1 and 2 broke away from the graphite/epoxy retaining angle. The failure resulted in a 1.25 x 0.5 inch missing section of the angle and an area of delamination. The broken section is on panel 2 near the centerline.

RI-Tulsa personnel will repair the retaining angle. Inspections of all payload bay door expansion joints and an evaluation of the joint design are planned.

- CLOSURE RATIONALE:

The STS-61 clip failure was caused by a single compression overload from dogbone contact during door closure. The most probable cause was a friction/binding condition which prohibited normal motion of the dogbone subassembly within its cavity. The damaged PLBD has been repaired on-site by Rockwell-Tulsa. The broken section of GR/E and the clip were sent to Rockewll-Downey for failure analysis. A design team is assembling and that team will address potential engineering changes and future inspection.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-062 (OV-102,FLT #16) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

IFA NUMBER> STS-62-B-01

TITLE:RH FRUSTUM HYPALON OVER BTA BLISTERED (REF STS-51-B-02)

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 063 : 13.53.00

IFA DATE: 03/04/1994

IFA STATUS: CLOSED : 04/01/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1994-12-07 HOUSTON TIME: 07.53.00

PRCBD NUMBER: S062100A PHASE: ASCENT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
A	A15878	A	PV6-262712

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: C. WOODWARD / USBI

2: S. PATTERSON SA45

0 DESCRIPTION:

During postflight inspection of the right SRB frustum, blistering of the hypalon was observed over multiple areas of the BTA closeout material.

STS-62 was the first flight with BTA applied forward of the ETA ring (region defined as debris concern zone to the vehicle). Blistering of hypalon over BTA was previously observed on the aft skirts of STS-51 (ref IFA No. STS-51-B-2). Based on a series of extensive thermal tests, the STS-51 occurrence was attributed primarily to radiant heating. The rationale for flight of this configuration on forward assemblies was that radiant heating during ascent was not expected. For this reason, this problem was considered a program IFA.

All areas, except one location, exhibited blistering indicative of the

re-entry phase (post ascent). This location is in direct line beneath the forward BSMs and is known as the hottest spot on the frustum. A thin layer of sooting was observed and indicates blistering may have occurred during ascent. The light layer of sooting and other physical characteristics confirm the event occurred during late ascent (probably last 15 to 20 seconds.

The result of aerodynamic heating tests conducted at the MSFC Improved Hot Gas Test Facility revealed that this type blistering does not pose a debris threat to the vehicle. Slow motion video analysis revealed the blisters to bubble up and vaporize with little or no visible trail of debris. This finding coupled with the late ascent time frame of occurrence eliminates the possibility of debris of sufficient mass, as well as a transfer mechanism into the Orbiter. Consequently, this localized condition on the frustum would pose no debris threat or flight safety concerns. Corrective action was not deemed necessary.

- CLOSURE RATIONALE:

Flight Problem Report approved OSB.

1

STS-062 (OV-102,FLT #16) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

PAGE 2

IFA NUMBER> STS-62-F-01

TITLE:SORG DISPENSING RANDOM AMOUNTS OF HOT WATER

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 064 : 15.27.00

IFA DATE: 03/05/1994

IFA STATUS: CLOSED : 06/14/1994

ELAPSED TIME: 001 : 01.34.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 09.27.00

PRCBD NUMBER: S062100L

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EECOM-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: F. BURNS X32161/GA2

2: P.LAMCZYK X37020

0 DESCRIPTION:

The crew reported that when dispensing hot water, the Galley dispensed twice as much as specified. The crew reported the problem as being sporadic.

- CLOSURE RATIONALE:

The flow regulators were removed and disassembled for inspection. No discrepancies were identified. The flow regulators were reassembled and put back in the SORG. Flow rates and quantites were tested. The SORG electronics were also tested, and no discrepancies were identified. KSC was performed the SORG functional and has found that the flow rates and dispences were nominal. No further action should be required.

1

IFA NUMBER> STS-62-F-02

TITLE:GAS IN GALLEY WATER

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

IFA DATE:

IFA STATUS: CLOSED : 10/04/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062100P PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A PV6-258500 K IPR62V0002

0 CLOSURE INITIATED BY: JSC-SP4/G. BRANCH

RESPONSIBLE MANAGERS 1: DELL TAMBLYN SP4

2:

0 DESCRIPTION:

The crew informed FCE/GFE of gas in water dispenses at the crew debrief. Based on the results obtained from ground and inflight maintenance test conducted on STS-59 and STS-62, it seems the problem of gas bubbles in the water were caused by the "Venturi Effect".

- CLOSURE RATIONALE:

Following the problems of gas bubbles noticed on STS-59 and STS-62, changes in the SORG and Contigency Water Dispenser needle configurations have been made to eliminate the "Venturi Effect". In order to get more data and information for the associated IFA PGSD recommends the clear drink bags continue to be flown to look for potential gas bubbles and continued use of the larger diameter needles for both the SORG and the CWD.

1

STS-062 (OV-102,FLT #16) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

PAGE 4

IFA NUMBER> STS-62-L-01

TITLE:LOWER BODY NEGATIVE PRESSURE (LBNP) CONTROLLER FUSE FAILURE

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 076 : 09.22.00

IFA DATE: 03/17/1994

IFA STATUS: CLOSED : 06/14/1994

ELAPSED TIME: 012 : 00.29.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 03.22.00

PRCBD NUMBER: S062100K

PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	SURG-02		

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: D. WOMACK /ID

2: R. JENNINGS X36481

0 DESCRIPTION:

Crew reported a power outage on the LBNP controller. After unsuccessfully cycling the controller power, the controller fuse was changed out. The LBNP device has one slow blow 1/2 amp fuse with one spare fuse). The crew reported that the power outage occurred after the vacuum cleaner was plugged into the same panel. The LBNP controller was plugged in the J4 outlet on panel MO52J and the vacuum cleaner was in the J3 putlet on Mo52J.

- CLOSURE RATIONALE:

Post flight testing duplicated the in-flight anomaly. Testing performed indicated the vacuum cleaner meets the requirements for start-up voltage transients and steady state operation listed in MSFC Spec-521B. However, the line operation does have a steady state ripple which can cause interaction with associated electrical equipment.

The D.C. vacuum cleaner was demanifested and resolution to the problem is in progress. The D.C. vacuum cleaner was an evaluation unit. The problem will be resolved before additional units are fabricated.

1

IFA NUMBER> STS-62-P-01

TITLE:PAYLOAD DATA INTERFACE PANEL (PDIP) DC POWER 2 FAILURE

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 065 : 19.50.00

IFA DATE: 03/06/1994

IFA STATUS: CLOSED : 07/18/1994

ELAPSED TIME: 002 : 05.57.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 13.50.00

PRCBD NUMBER: S062100M PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-13

0 CLOSURE INITIATED BY: JSC-TJ2/R. CLAYTON

RESPONSIBLE MANAGERS 1: R. CLAYTON TJ2

2: B. PAW X30755

0 DESCRIPTION:

The Linhoff camera had been operating while powered from the PDIP DC Power (J3). The crew changed film and the camera stopped operating. Testing indicated that no voltage was present at the PDIP Power 2 outlet (J3) and that the PDIP relays (powered from the same source) were also not operating. Resistance measurements at J3 indicated no electrical shorts and the expected relay coil resistance values.

The indication is an open circuit (possible open 5A fuse F4) in the standard switch panel (SSP). The Linhoff camera was subsequently connected to an AFD utility outlet and performed nominally.

- CLOSURE RATIONALE:

The Linhof had been powered from the DC Power 2 outlet. The Linhof film magazine was changed out and the outlet then failed to provide power. Post-flight testing determined an SSP fuse had been blown, but failed to reproduce the failure. Offline testing of all systems related to the anomaly was performed. No definitive cause of the problem has been found.

1

IFA NUMBER> STS-62-V-01

TITLE:ENGINE 3 GH2 FLOW CONTROL VALVE SLUGGISH

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 063 : 13.53.00

IFA DATE: 03/04/1994

IFA STATUS: CLOSED : 05/26/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1994-06-17 HOUSTON TIME: 07.53.00

PRCBD NUMBER: S062100D PHASE: ASCENT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 62V0003 P IM/62RF01

0 CLOSURE INITIATED BY: JSC-VF3/W. ARCENEAUX

RESPONSIBLE MANAGERS 1: W. ARCENEAUX X 33335

2:

0 DESCRIPTION:

Engine 3 GH2 flow control valve cycled 17 times during the first 35 seconds of ascent (prior to the throttle bucket). A sluggish open response of 0.2 to 0.5 second (s/b less than or equal to 0.3) was noted with possible hesitation on 3 cycles.

- CLOSURE RATIONALE:

The Engine 3 GH2 FCV sluggish response was caused by contaminant-induced valve wear and friction resulting in slowed valve response. The Engine 3 GH2 FCV poppet-sleeve assembly was replaced and sent to R/D for refurbishment. All GH2 FCV poppet-sleeve assemblies on all Orbiters are being removed for cleaning and inspection, and documentation is being processed to require FCV cleaning and inspection at three-flight intervals. The Orbiter Project is considering several design change options including installation of filter elements, physical reorientation of the FCVs, and installation of stroke-limiting shims.

1

TITLE:APU 3 PUMP INLET PRESSURE HIGH (V46P0310A)

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 063 : 16.23.00

IFA DATE: 03/04/1994

IFA STATUS: CLOSED : 05/26/1994

ELAPSED TIME: 000 : 02.30.00

PRACA STATUS: CLOSED : 1994-08-05

HOUSTON TIME: 10.23.00

PRCBD NUMBER: S062100E

PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 65V0006	M	MMACS-01
P	IM/62RF03		

0 CLOSURE INITIATED BY: JSC-VF3/K. BROWN

RESPONSIBLE MANAGERS 1: K. BROWN X33891

2: J. KREYKES X32774

0 DESCRIPTION:

About 2 1/2 hours after liftoff, APU-3 Pump inlet Pressure (V46P0310A) began cycling from approx 250 psi to above OSH (612 psi). At Met 000:05:10 crew opened the fuel tank iso valves in an attempt to relieve the pressure back to the tank. However, the pump inlet pressure showed no decrease, nor was there an increase seen in the fuel tank pressure. After switching to the B string heater, a second iso valve opening was attempted. The inlet pressure sluggishly stabilized to tank pressure. A third iso valve opening was attempted with instantaneous results.

APU 3 was used for FCS checkout and landing with nominal performance. Suspect water intrusion into insulation on the line which cause the hydrazine to freeze. Post landing sniff check indicated no hydrazine leak. No apparent anomalies found with the insulation or heaters. Both were removed and sent to RI Downey.

- CLOSURE RATIONALE:

The most probable cause of the anomalous fuel pump inlet pressure

signature was blockage in the fuel feedline downstream of the fuel isolation valve/test line tee. Data and analysis indicate that the blockage was frozen hydrazine which subsequently thawed. The frozen hydrazine was most likely caused by heat transfer processes associated with pooled water between the fuel line and insulation which froze in the vacuum conditions and subsequently sublimated away. These heat transfer processes overcame the heat input of the fuel line heaters.

After completion of the troubleshooting the APU 3 fuel system, heaters and insulation were reinstaled per drawing specification and all retest was successfully completed.

If water intrusion does occur in the future, Engineering personnel will disposition the problem to determine the extent of water intrusion. If water is suspected to have pooled between the insulationand lines, the insulation will be removed (or opened) at the low point of the affected systems.

1

IFA NUMBER> STS-62-V-02

TITLE:APU 3 PUMP INLET PRESSURE HIGH (V46P0310A)

0 CLOSURE RATIONALE:(Continued from previous page).

1

IFA NUMBER> STS-62-V-04

TITLE:PRSD H2 TANK 6 A HEATER FAILED

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 065 : 22.02.00

IFA DATE: 03/06/1994

IFA STATUS: CLOSED : 06/07/1994 ELAPSED TIME: 002 : 08.09.00

PRACA STATUS: CLOSED : 1994-07-29 HOUSTON TIME: 16.02.00

PRCBD NUMBER: S062100G PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 62V0005 M EGIL-02

P IM/62RF04

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: F. ALANIS X36393

2: L. FOX X32674

0 DESCRIPTION:

EDO Pallet H2 Tank 6 heater 'A' failed off in both auto and manual control modes. Switched H2 Tank 6&7 to 'B' heaters.

KSC verified heater A failed off. KSC troubleshooting found blown fuse in tank 6 cryo control box. Fuse was replaced and unit appears OK. NDE failure analysis on the fuse, shows the fuse blew probably due to slight high current over extended time. Destructive failure analysis to follow.

- CLOSURE RATIONALE:

The cause of the anomaly was an open fuse within the Cryogenic Heater Control Assembly for tank 6. The reason for the fuse failure is unknown, but it is believed that the mechanical forces generated by the cyclic current/thermal nature of this fuse application played a significant role. The IPR will be closed as an unexplained anomaly. The failed fuse was removed and replaced and system retest was successful.

1

IFA NUMBER> STS-62-V-08

TITLE:WCS FAN SEP 1 FAILURE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 077 : 06.19.00

IFA DATE: 03/18/1994

IFA STATUS: CLOSED : 06/03/1994 ELAPSED TIME: 013 : 16.26.00

PRACA STATUS: CLOSED : 1994-09-21 HOUSTON TIME: 12.19.00

PRCBD NUMBER: S062100H PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K PR ECL-2-A0087 M EECOM-04

P 62RF08

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: M. ENGLE X33300

2: M. FITZPATRICK X30758

0 DESCRIPTION:

FAN SEP 1 stalled for 30 seconds and popped all three AC circuit breakers. Earlier in the flight this FAN SEP exhibited an extended startup signature.

- CLOSURE RATIONALE:

The most likely cause of the FAN SEP 1 failure was a carry-over of liquid in the FAN SEP air exhaust that crystallized on the motor shaft. This led to the slow starts that were observed and the motor seizure that occurred on the last day of the flight.

The WCS has been removed and shipped to the vendor for evaluation. The FAN SEPs have been disassembled, cleaned and inspected. A redesigned fan separator will be flown on the STS-68/OV-105 flight.

1

IFA NUMBER> STS-62-V-10

TITLE:NLGD THERMAL BARRIER DEBOND

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 077 : 13.09.22

IFA DATE: 03/18/1994

IFA STATUS: CLOSED : 05/24/1994 ELAPSED TIME: 013 : 23.16.22

PRACA STATUS: CLOSED : 1994-06-24 HOUSTON TIME: 07.09.22

PRCBD NUMBER: S062100C PHASE: ENTRY/LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K PR FWD-2-17-4590 P IM 62RF12

0 CLOSURE INITIATED BY: JSC-VF3/K. BROWN

RESPONSIBLE MANAGERS 1: K. BROWN X33891

2:

0 DESCRIPTION:

Six thermal barriers, total size approximately 36" x 3" x 1.5"', were missing from the nose landing gear doors. Runway infrared cameras recorded these objects falling from the Orbiter when the nose landing gear doors were opened on final approach.

Investigation revealed that the vendor did not sand off the type A coating at the bonding surface. The ceramic cement has poor adhesion to type A coating at high temperature which caused the barrier to debond and fallout of the NLGD's.

- CLOSURE RATIONALE:

The debond of the thermal barriers was the result of the chin panel surface not being sanded per the drawing requirements subsequent to the repair. The OV-102 chin panel was returned to specification. The KSC technicians sanded off the type A sealant at the thermal barrier bond site and new thermal barriers were bonded. The vendor corrective

action consisted of changing the planning paper for the standard chin panel repair to include the incorporation of the removal of the type A sealant from the area where thermal barriers are bonded to the RCC.

1

STS-062 (OV-102,FLT #16) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

IFA NUMBER> STS-62-V-11

TITLE:RCRS CONTROLLER 2 BED PRESSURE B SENSOR DRIFTING LOW

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 056 : 16.38.00

IFA DATE: 02/25/1994

IFA STATUS: CLOSED : 06/01/1994 ELAPSED TIME: 056 : 16.38.00

PRACA STATUS: OPEN HOUSTON TIME: 10.38.00

PRCBD NUMBER: S062100F PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K PR ECL-0968 M ECCOM-05

P IM/62RF16

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K.BROWN X33891

2:

0 DESCRIPTION:

The regenerable CO2 removal system (RCRS) controller 2 bed B pressure sensor was biased about 1 psia from actual pressure in the cabin. The RCRS was operated with controller 2 for the last half of the flight and there were no shutdowns. Postfight evaluation into the sensor's history shows that this sensor was biased .55 psia two years ago during ATP. Since then it seems that the sensor has drifted another .45 psia and it is now 1 psia from actual. The replacement of this sensor was determined necessary because the trip limit for the controller to shut down is based on a biased sensor of 1.8 psia or greater from actual.

- CLOSURE RATIONALE:

The RCRS controller 2 bed B pressure sensor has drifted from 0.55 psia from actual at ATP to 1.0 psia from actual. The cause of the 0.45 psia drift over a two-year period could be a decrease in flexibility of the sensor's diaphragm.

A sensor from a disassembled RCRS at Hamilton Standard will be used to replace the biased sensor. With the RCRS in place, the vendor will remove and replace the biased sensor.

1

STS-062 (OV-102,FLT #16) OFFICIAL INFLIGHT ANOMALY REPORT 08/17/95

PAGE 13

IFA NUMBER> STS-62-V-12

TITLE:CRACKED TPS TILES ON THE VERTICAL TAIL

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

IFA DATE:

IFA STATUS: CLOSED : 06/22/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1995-03-23 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062100J PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

P IM/62RF17

0 CLOSURE INITIATED BY: JSC-VF3/K. BROWN

RESPONSIBLE MANAGERS 1: K. BROWN X33891

2:

0 DESCRIPTION:

Three cracked TPS tiles on the vertical tail were discovered during the postflight inspections. The cracked tiles are located on side of the vertical tail where the vertical tile meets the SILTS pod. The damage

location follows the horizontal stiffener in that area. No strutural damage found beneath the tiles.

- CLOSURE RATIONALE:

The in-plane failure of the tiles (through cracks) was caused by a substrate deflection which was within design requirements. The deflection which caused the cracked tiles could have been caused during ascent burst pressure or by thermal loads during entry. However, the vertical tail ascent strain gage data recorded higher loads than recorded by the descent strain gage data and this indicates the deflection occurred during ascent. The cracked tiles were removed and X-rays were taken of the structure. The results revealed no structural damage. New tiles have been bonded in place.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

1

1

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-63-B-01

TITLE:LH AND RH SRB DAMAGE TO BOTH FORWARD SKIRTS AND BOTH AFT ASSYS

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

IFA DATE:

IFA STATUS: CLOSED : 03/16/1995 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1995-05-01 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062107B PHASE:

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A16385

0 CLOSURE INITIATED BY: MSFC-USBI/L. MORTON

RESPONSIBLE MANAGERS 1: L. MORTON USBI

2:

0 DESCRIPTION:

The LH and RH SRBs sustained significant damage primarily to both forward skirts and both aft assemblies. Both forward skirts were cracked and buckled. The LH forward skirt and LH tilt actuator were lost during towback. Ascent film review has not displayed any anomalies. No identified ascent loads could cause this condition. Similar but less severe damage was sustained to the LH SRB on STS-37 and STS-44. That damage was primarily manifested in the forward skirt. The previous conclusion was that damage occurred during descent.

- CLOSURE RATIONALE:

This occurrence is not a safety of flight concern as the investigation has eliminated ascent and SRB separation phases as possible times of occurrence. It is concluded that the SRB damage is attributed to

splashdown and that the SRBs are at an increased risk of sustaining damage when surface winds in the retrieval area are high.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-63-F-01

TITLE:EV2 EYES IRRITATED DURING REPRESS

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 040 : 17.22.04

IFA DATE: 02/09/1995

IFA STATUS: CLOSED : 04/21/1995

ELAPSED TIME: 006 : 12.00.01

PRACA STATUS: UNKNOWN

HOUSTON TIME: 11.22.04

PRCBD NUMBER: S062107D

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EVA-01

0 CLOSURE INITIATED BY: JSC-EC5/G. LUTZ

RESPONSIBLE MANAGERS 1: F. BURNS X31261

2: DARYL SCHUCK

0 DESCRIPTION:

EV2 experienced a burning sensation in his eyes during repressurization. Irritation was experienced during repress at 5 psi. A funny odor inside the suit was also reported. EV2 suit doffing was expedited. Possible loss of EMU 2. CDR took air sample just after suit doffing. A PMC was conducted. EV2 is fully recovered. Samples of brown flecks were taken. EMU 2 was closed up with no further troubleshooting.

- CLOSURE RATIONALE:

The most probable cause of this inflight anomaly is contact between the crewmember's face and the inside of the EMU Helmet/EVVA. The anti-fog solution applied prior to each EVA is a modified soap solution which is

suspected in causing the irritation. Memorandum EC5-95-21 has been issued to the MOD Directorate to remind the crew to use a light coating of anti-fog, and to limit contact with the inside of the Helmet/EVVA as much as possible. CTSD will investigate potential formulation change to the anti-fog solution to reduce crew member discomfort.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-63-F-02

TITLE:ELECTRONIC CUFFS UNRESPONSIVE

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 040 : 10.07.04

IFA DATE: 02/09/1995

IFA STATUS: OPEN

ELAPSED TIME: 006 : 04.45.01

PRACA STATUS: UNKNOWN

HOUSTON TIME: 04.07.04

PRCBD NUMBER: S062107

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EVA-02

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: F. BURNS X31261

2: DARYL SHUCK

0 DESCRIPTION:

During EVA, both ECC's were partially unresponsive to touch inputs. EV1's unit only responded in one of six touch areas (bottom middle). EV2's unit did not respond on the right two touch areas. Both units lost displays at a later time during the EVA, and then reappeared prior to repressurization. The EV1 unit resumed normal functionality just prior to repressurization. EV2's unit remained unresponsive as described above. Troubleshooting during repress revealed erratic timer operations and an entirely unresponsive display.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-63-I-01

TITLE:ME-1 EXPERIENCED SINGLE POINT SPIKES ON THREE PRESSURE MEASUREMENTS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 034 : 06.39.53

IFA DATE: 02/03/1995

IFA STATUS: CLOSED : 05/15/1995 ELAPSED TIME: 000 : 01.17.50

PRACA STATUS: UNKNOWN HOUSTON TIME: 12.39.53

PRCBD NUMBER: S062107F PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

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

0 CLOSURE INITIATED BY: JSC-MS5/C. YOUNG |

RESPONSIBLE MANAGERS 1: J.VAUTIN, RKDN AC58

2:

0 DESCRIPTION:

ME-1 experienced single point spikes on three pressure measurements. The MCC Coolant Discharge Pressure spiked at engine start +77.5 seconds, HPOTP Secondary Seal Cavity Pressure CHA spiked at +81.9 seconds, and HPOTP Secondary Seal cavity Pressure CHB spiked at +83.5 seconds. The remainder of the flight showed no additional spikes. The time and amplitude of the spikes match those believed to be caused by ground radar noise. These two sensors have passed screening by the Micro-focus x-ray/PIND technique with excellent scores, which would say they are clean with respect to contamination which could cause spikes.

- CLOSURE RATIONALE:

Flight history shows spikes are never larger than 1.9% of full scale and have never violated an engine limit. The nearest operating pressure has a 4.3% margin from a shutdown limit and 2.4% from an electrical

lock-up limit. In addition, flight history indicates spikes occur on single major cycles. Software limits require 3 consecutive data samples above the redline to be in violation. Even if magnitude and duration limits are exceeded, all SSME redline sensors are redundant. The SSMEC will not shutdown an engine unless limits are violated on both sensors. The SSMEC and all wiring harnesses meet all EME specifications. This is not a flight safety concern because the magnitude, duration, and single channel signature makes this an extremely low probability of impacting engine performance.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-63-P-01

TITLE:TCS Z-AXIS SYSTEM FAILURE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 037 : 19.57.03

IFA DATE: 02/06/1995

IFA STATUS: CLOSED : 04/06/1995 ELAPSED TIME: 003 : 14.35.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 13.57.03

PRCBD NUMBER: S062107C PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	GNC-02	M	GNC-03

0 CLOSURE INITIATED BY: JSC-MT2/M. LEWIS

RESPONSIBLE MANAGERS 1: T.M.BRUCE MT2

2:

0 DESCRIPTION:

During the MIR backaway at a range of 322 feet, the Trajectory Control Sensor (TCS) broke track and issued a "Galvo could not be calibrated" fault message. Subsequent troubleshooting (self test, override and calibration, and power cycle) failed to re-acquire the target and indicated a failure in the TCS Z-axis galvonometer system.

- CLOSURE RATIONALE:

A bad 14-bit AD board caused the erroneous low voltge and temperature indications. The cause of the failure of the 14-bit AD board has not been determined. A bad Z-axis assembly linear translator caused the Z-axis galvonometer calibration failure. The Z-axis galvonometer assembly has experienced a history of failures during testing while under extremely high temperatures but not at the temperatures which were experienced on STS-63. The cause of the Z-axis assembly linear translator failure is believed to be due to induced thermal stresses experienced during thermal testing. The 14-bit AD board ws removed and replaced with a 16-bit AD board. The Z-axis galvonometer assembly was removed and a modified linear translator was installed in place of the failed linear translator. The re-assembled DTO unit was tested in the thermal chamber under high temperatures with the new components and the in-flight anomalies did not duplicate.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-63-P-02

TITLE:LACK OF GLO-2 VIDEO

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 034 : 14.22.04

IFA DATE: 02/03/1995

IFA STATUS: CLOSED : 09/22/1995 ELAPSED TIME: 000 : 09.00.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 08.22.04

PRCBD NUMBER: S062107K PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-04

0 CLOSURE INITIATED BY: JSC-MT2/S. KAMEN |

RESPONSIBLE MANAGERS 1: T.M.BRUCE MT2

2: P. CLARK DO64

0 DESCRIPTION:

The GLO experiment has not been able to obtain its video. The video was to provide high framing of RCS thruster plumes. The frame rate of the CCDs cannot provide the timing resolution of the video, resulting in a 20% loss of science. It has been verified that the wrong TVIP cable was flown. An IFM was performed to reconfigure the flown cable.

- CLOSURE RATIONALE:

There was no hardware problem, only errors in cable identification that could have been caught if the flight cabling had been used for IVT. During all subsequent flight of GLO, use of the flight cables in IVT will be required. The video function for the GLO experiment (part of the IEH-01) on STS-69 operated successfully. The IVT was performed with flight cabling.

1

IFA NUMBER> STS-63-P-03

TITLE:CABIN TEMPERATURE SENSOR

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 035 : 07.22.04

IFA DATE: 02/04/1995

IFA STATUS: CLOSED : 03/05/1996

ELAPSED TIME: 001 : 02.00.01

PRACA STATUS: UNKNOWN

HOUSTON TIME: 01.22.04

PRCBD NUMBER: S062107M

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-03

0 CLOSURE INITIATED BY: JSC-MT/K. ULRICH |

RESPONSIBLE MANAGERS 1: T.M.BRUCE MT2

2: P.CLARK DO64

0 DESCRIPTION:

The SPACEHAB Cabin Sensor temp sensor has been observed to be behaving erratically. Temperature fluctuations have been +/- 2 degrees about the expected. This sensor is an input to the Water Flow Control Valve (WFCV), which is used to control HAB temperature. The POCC has observed that the erratic behavior disappears after the crew puts the SPACEHAB module in its presleep configuration. One action that occurs at this time is the powering off of a PGSC that is mounted directly above the Environmental Control System sensor panel. The PGSC is suspected of causing EMI. The anomaly is minor and will not adversely affect SPACEHAB cabin temperature control.

- CLOSURE RATIONALE:

PGSC induced EMI is the most probable cause of the erratic temperature sensor behavior. When the module is placed in the pre-sleep configuration, the subsystem powers off. This PGSC is mounted directly above the Environmental Control System sensor panel. Since the erratic behavior disappears after the PGSC is powered off, the PGSC is the likely cause of the problem.

This hardware configuration has changed and will not be flown again.

1

IFA NUMBER> STS-63-P-04

TITLE:SPACEHAB VSU INTERFERENCE ANOMALY

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 034 : 14.22.04

IFA DATE: 02/03/1995

IFA STATUS: CLOSED : 03/05/1996 ELAPSED TIME: 000 : 09.00.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 08.22.04

PRCBD NUMBER: S062107N PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-01 M PYLD-02

0 CLOSURE INITIATED BY: JSC-MT/K. ULRICH |

RESPONSIBLE MANAGERS 1: T.M.MCPHERSON

2: T.M.BRUCE MT2

0 DESCRIPTION:

PYLD-01: Astroculture (ASC) serial data downlink to the POCC is unavailable. The crew swapped Serial Converter Units (SCUs), but this action did not correct the problem. Further analysis indicates that there may be a ground loop problem between ASC and the SCU.

PYLD-02: ASC Video produced expected results with video routed through the VSU to the onboard monitor. However, when downlinked through the VSU, the picture contains a horizontal band. The VSU signal downlinked via KU channel 3 corrupted the Hitchhiker 2 MBPS data stream on KU Channel 2. Further analysis by the POCC indicated that the ground loop problem that is suspected of causing the loss of ASC serial data may also be responsible for the loss of video.

- CLOSURE RATIONALE:

Testing revealed that the SYNC Tip portion of the composite video signal did not meet Orbiter interface requirements. An interface incompatibility existed between VSU and Orbiter interface. The voltage level of the signal was outside the range of the ICD specifications.

Spacehab testing procedures at the Spacehab Payload Processing Facility were then modified to verify that voltage levels at the Orbiter interface are within ICD specifications.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-63-P-05

TITLE:GLO DATA RECORDER UNIT (DRU) FAILURE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 040 : 18.56.04

IFA DATE: 02/09/1995

IFA STATUS: CLOSED : 09/22/1995 ELAPSED TIME: 006 : 13.34.01

PRACA STATUS: UNKNOWN HOUSTON TIME: 12.56.04

PRCBD NUMBER: S062107L PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-07

0 CLOSURE INITIATED BY: JSC-MT2/S. KAMEN |

RESPONSIBLE MANAGERS 1: T. BATTEN DO64

2:

0 DESCRIPTION:

The GLO experiment has been unable to record the 880 Kbps data to the DRU. Instead, GLO reduced rate recording has been via the 16 Mb RAM resident in the GLO Instrument and Control Unit (ICU) and taking dumps during KU coverage. Further troubleshooting indicates the DRU may be operational. The RAM contains 16 Mb of data versus 5 Gb of data in the DRU. GLO cannot store as much data during KU LOS periods. Data stored to the DRU may not be valid. GLO is storing data at a reduced rate to the 16 Mb of RAM in the ICU during KU LOS periods. GLO will store data to the DRU until full, but will not be recovered until post mission.

- CLOSURE RATIONALE:

The exact nature of the problem was not troubleshot during post flight activities because it was decided never to fly this reocoder, or style of recorder, again. Instead, a non-tape system, an optical disk

recorder was substituted for future flights. On future flights, GLO will be using an optical disk recorder that will not exhibit the problems associated with the failed tape recorder. In fact, the optical disk system flown on the GLO experiment (part of IEH-1) on STS-69 apparently functioned nominally.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 10

IFA NUMBER> STS-63-V-04

TITLE:RECURRING LOSS OF CRT4 DISPLAY

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 034 : 06.40.00

IFA DATE: 02/03/1995

IFA STATUS: CLOSED : 05/16/1995 ELAPSED TIME: 000 : 01.17.57

PRACA STATUS: CLOSED : 1995-05-21 HOUSTON TIME: 12.40.00

PRCBD NUMBER: S062107E PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 70V-0004	M	DPS-01
P	CAR 63RF04		

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

RESPONSIBLE MANAGERS 1: L. WAGSTER FA2, X33329

2: R MUNOZ EG, X38359

0 DESCRIPTION:

A nominal CRT 4 power-up was noted post insertion. The crew reported that CRT 4 was blank and that the DEU BITE flag was tripped. This failure has recurred with the same failure signature 3 additional times. CRT 4 was recovered each time with a power cycle. A DEU dump was performed after the second occurrence and showed only nominal power cycles. Similar failure signature observed prelaunch resulted in DEU 4 replacement. KSC troubleshooting found FPCA 3 RPC 46 power output intermittent. FPCA 3 replaced.

- CLOSURE RATIONALE:

Postflight troubleshooting determined that the failures were being caused by intermittent power from the remote power controller (RPC) 46 circuit in forward power control assembly (FPCA) 3. FPCA-3 changeout was performed and the unit was sent to NSLD, where further troubleshooting confirmed the problem. Testing of the RPC has further isolated the problem to a leaderless inverted device (LID) within the RPC. Failure analysis, in which the LID's potting will be removed to allow microscopic examination, is in work. The Orbiter condition has been corrected by hardware replacement. Corrective actions for the RPC will be identified after failure analysis is complete.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 11

IFA NUMBER> STS-63-V-06

TITLE:CABIN PRESSURE SENSOR SHIFTED LOW

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 034 : 21.50.00

IFA DATE: 02/03/1995

IFA STATUS: CLOSED : 05/17/1995 ELAPSED TIME: 000 : 16.27.57

PRACA STATUS: CLOSED : 1995-11-06 HOUSTON TIME: 15.50.00

PRCBD NUMBER: S062107H PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 70V-0005 M EECOM-01

P CAR 63RF06

0 CLOSURE INITIATED BY: JSC-FA2/P. OLIVER |

RESPONSIBLE MANAGERS 1: P. OLIVER X33323

2: M. HOY X30265

0 DESCRIPTION:

The cabin pressure transducer shifted low by 0.23 psi from 14.64 to 14.41 psi. All other cues indicate a nominal cabin pressure. At the time, the Spacehab pressure was 14.8 psi. KSC will troubleshoot.

Transducer replaced.

- CLOSURE RATIONALE:

The most probable cause of the cabin-pressure-sensor shift was a failure internal to the sensor. The cabin pressure sensor has been replaced and the failed sensor has been sent to the vendor for failure analysis. The new cabin pressure sensor has been tested and is performing nominally. The replacement sensor is functioning nominally.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 12

IFA NUMBER> STS-63-V-07

TITLE:INADVERTENT FIRING OF L1L, L1U, R4U, F3L AND F3U

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 035 : 11.41.01

IFA DATE: 02/04/1995

IFA STATUS: CLOSED : 05/16/1995 ELAPSED TIME: 001 : 18.37.58

PRACA STATUS: UNKNOWN HOUSTON TIME: 05.41.01

PRCBD NUMBER: S062107G PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M GNC-01

0 CLOSURE INITIATED BY: JSC-FA22/W. ARCENEAUX |

RESPONSIBLE MANAGERS 1: D.SCHULER X31512

2: W.ARCENEAUX X33335

0 DESCRIPTION:

The L1L, L1U, R4U, F3L, and F3U primary RCS jets fired for 80 ms in response to an inadvertant valid +Y/+Z THC command that may have

resulted from application of aft flight control power at 035:11:41:36 G.m.t. No physical deflection of the THC occurred, coincident with the jet firings. This appears to be an occurrence of an inadvertant valid THC command, resulting from a transient response of the THC contacts upon powering the hardware. A similar event may have occurred during STS-66 where a -Y/-Z command was apparently generated by a forward station flight controller powerup.

- CLOSURE RATIONALE:

The inadvertent firing of primary RCS thrusters was probably caused by a power-on transient in the aft station THC circuitry that was induced by application of aft station flight controller power. THC translation command outputs were probably sampled by the GPC at the end of the power-on transient when THC contact outputs were returning to their normal state after being set high by the transient. Flights crews are being trained to disable GN&C switch RM using an ITEM 16 entry on the SPEC 025 page when flight controller power is switched on to inhibit THC command processing. A software change proposal is under review that would allow the THC hotstick logic to be turned on and off as necessary to prevent automatic upmode to primary thrusters for a translation firing in response to a THC power-on transient or a bumped stick.

1

STS-063 (OV-103,FLT #20) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 13

IFA NUMBER> STS-63-V-08

TITLE:SPACEHAB PRESSURE DECAY DURING EVA

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 040 : 11.34.00

IFA DATE: 02/09/1995

IFA STATUS: CLOSED : 05/24/1995 ELAPSED TIME: 006 : 06.11.57

PRACA STATUS: UNKNOWN HOUSTON TIME: 05.34.00

PRCBD NUMBER: S062107J PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 70V-0006 M MMACS-02

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

RESPONSIBLE MANAGERS 1: D. GERLACH X33337

2: M. HOY X30268

0 DESCRIPTION:

Spacehab pressure decayed from 14.80 psia to 14.18 psia during the 5 hour 18 minute period that the airlock was depressurized. No change in Spacehab temperature was noted. Preflight leak check of the D hatch seal was 0 and no preflight PR or MR documentation was taken on the hatch. Tunnel adaptor duct isolation valve and cap assy leak check was double allowable but <1% of on-orbit leak rate. Removal of lint from seat restored isolation valve to spec. Removal of paint chips and replacement of bent pin in marman clamp restored cap to spec. Excessive lint buid-up found in duct. Cause of build-up and potential corrective actions are under evaluation.

- CLOSURE RATIONALE:

The most probable cause for the pressure decay during EVA is leakage across the valve combined with the cap anomalies. The isolation valve and valve cap was cleaned and leak checked. The tunnel adapter ducting was removed, cleaned, and reinstalled. The isolation valve and valve cap have been verified to be within maximum leakage specifications.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-064 (OV-103,FLT #19) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-64-B-02

TITLE:RIGHT HAND FORWARD IEA MATING CABLE CONNECTORS CONTAMINATED

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

IFA DATE:

IFA STATUS: CLOSED : 10/17/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1995-01-27 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062104A PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A16232

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: L. MORTON USBI

2:

0 DESCRIPTION:

The RH forward IEA had two connectors with contamination. M & P evaluation identifed contamination as IEA chassis paint, connector insert phenolic and connector aluminum in J4 connector. Contamination in J21 identified as white Hypalon topcoat paint. This contamination had no adverse effect on IEA function. The J4 connector provides Orbiter bus B voltage and J21 connector provides IEA code plug B connection. Recurrence control is in work. Any contamination introduced during assembly would be retained in place and identified during testing of any effect on function. A review of pin to pin short concerns identified no Criticality 1 items.

- CLOSURE RATIONALE:

The contamination of the J4 connector was verified to be black epoxy

paint from the IEA chassis, aluminum and stainless particles from the two mating connectors, and a blue phenoic chip from the mating cable insert. The black epoxy paint flakes were most probably introduced by inadvertent contact between the mating cable connector and the IEA chassis just prior to final connector mate. The metallic particles and the blue phenolic chip were most probably introduced prior to final mate and are attributed to normal wear of connector mating and are an expected condition for reusable cable assemblies. The white forward skirt epoxy paint on the J21 connector was most probably intrduced prior to final mate since there is no requirement to wipe down adjacent surfaces prior to connector mate. Nonconformance data for connectors was examined and no indication of an existing or increasing trend of connector contamination was noted.

1

STS-064 (OV-103,FLT #19) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 2

IFA NUMBER> STS-64-D-01

TITLE:DATA/COMM LOSS DURING ASCENT AT TDRS EAST HANDOVER

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 252 : 22.33.00

IFA DATE: 09/09/1994

IFA STATUS: OPEN ELAPSED TIME: 000 : 00.10.06

PRACA STATUS: UNKNOWN HOUSTON TIME: 17.33.00

PRCBD NUMBER: S062104R2 PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M STDN-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: J.WELLS X36873

2:

0 DESCRIPTION:

On the handover from the Wallops GSTDN site to TDRS-E, the orbiter downlink telemetry (TLM) and air-to-ground (A/G) communication was lost for approximately 5 minutes. WSGT reported good signal level. Investigation has revealed that the data coming off the orbiter was good. The data at NASA Ground Terminal (NGT) and MCC was unusable; the forward link to the orbiter was good. Investigation continuing and focusing on RF and White Sands Ground Terminal.

1

STS-064 (OV-103,FLT #19) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 3

IFA NUMBER> STS-64-F-01

TITLE:DRINK BAG SEPTUM INSTALLATION MANUFACTURING PROBLEM

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 255 : 18.09.00

IFA DATE: 09/12/1994

IFA STATUS: CLOSED : 10/13/1995 ELAPSED TIME: 002 : 19.46.06

PRACA STATUS: UNKNOWN HOUSTON TIME: 13.09.00

PRCBD NUMBER: S062104J PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M MMACS-03

0 CLOSURE INITIATED BY: JSC-FA44/F. BURNS |

RESPONSIBLE MANAGERS 1: F. BURNS X31261

2:

0 DESCRIPTION:

The crew reported under fill of the drink bags. The crew was briefed generically preflight at KSC concerning the potential for underdispense problems with some of the beverage bags. The dispense problem was due to the partial collapse of the channel in the septum adapter assembly. The collapse of the channel occurred from improper manufacturing (overheating of the septum and seal). Testing has determined 50% of the suspect containers will have the collapsed channel.

- CLOSURE RATIONALE:

The crew reported under fill of the drink bags. The crew was briefed generically preflight at KSC concerning the potential for underdispense.

The dispense problem was due to the partial collapse of the channel in the Septum Adapter Assembly. The collapse of the channel occurred from improper manufcturing (overheating of the septum and seal). Testing has determined 50% of the suspect containers will have the collapsed channel. SP replaced the drink bag septums starting with STS-68 and had modified the manufacturing process to prevent overheating.

1

STS-064 (OV-103,FLT #19) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-64-F-02

TITLE:SIDE HATCH LOCKING DEVICE OBSTRUCTION

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 257 : 14.07.00

IFA DATE: 09/14/1994

IFA STATUS: CLOSED : 10/13/1995 ELAPSED TIME: 004 : 15.44.06

PRACA STATUS: UNKNOWN HOUSTON TIME: 09.07.00

PRCBD NUMBER: S062104K PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M MMACS-02

0 CLOSURE INITIATED BY: JSC-FA44/F. BURNS |

RESPONSIBLE MANAGERS 1: F. BURNS X31261

2:

0 DESCRIPTION:

Following post-insertion procedures, the crew reported that the side hatch locking device could not be installed because of an obstruction.

This device is carried up by one of the crew members in a pocket on his LES, and installed as one of his first post-ascent activites. Potential causes that have been proposed are: something loose on the handle that is preventing installation, or: part or parts of the lock guard are out of tolerance. The position of the latch handle is not suspect, since this is checked after the hatch is closed using an inspection mirror through a small port that is subsequently plugged for flight. FCE is working on a postflight plan - so far this consists of visual inspection & dimensional tolerance checks, The crew downlinked the video of the side hatch and locking device.

- CLOSURE RATIONALE:

Following post-insertion procedures, the crew reported that the side hatch locking device could not be installed because of obstruction. The cause of the STS-64 inflight anomaly was due to an out of tolerance condition of two doublers which extend from the locking device body to engage a reinforcement bar on the hatch. Correction of the out of tolerance condition was performed at Boeing FECP per instructions on discrepancy report # BK430045.

1

STS-064 (OV-103,FLT #19) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 5

IFA NUMBER> STS-64-F-03

TITLE:TCS (DTO-700-5) RS-422 Y CABLE PROBLEM

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 256 : 21.00.00

IFA DATE: 09/13/1994

IFA STATUS: CLOSED : 10/13/1995 ELAPSED TIME: 003 : 22.37.06

PRACA STATUS: UNKNOWN HOUSTON TIME: 16.00.00

PRCBD NUMBER: S062104L PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

F STS-64-F-4 M GNC-01

0 CLOSURE INITIATED BY: JSC-FA44/F. BURNS

RESPONSIBLE MANAGERS 1: F. BURNS X31261

2:

0 DESCRIPTION:

At 256:21:00 G.m.t. during Trajectory Control System (TCS) activation, the TCS failed to track SPARTAN. During troubleshooting, TCS was recovered when the TCS PGSC was connected directly to the PDIP using a straight cable instead of a Y-cable. Subsequent troubleshooting revealed that the Y-cable ends had been mislabeled. Switching Y-cable connections yielded successful TCS operation during SPARTAN retrieval.

- CLOSURE RATIONALE:

One leg of Y cable was data and command and the other leg was data only. Cable was mislabeled.

Standard label nomenclature has been adopted and is annotated on cable drawing and label drawings. Each end of the cable now shows what the other end is doing as well as where each end interfaces. Additionally, we have initiated a cable review in the trainers. This review shows cable routing and what cable goes where and to what hardware.

1

IFA NUMBER> STS-64-K-01

TITLE:RH AFT IEA CABLE CONNECTOR CONTAMINATED (TRANSFERED FROM STS-64-B-01)

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

IFA DATE:

IFA STATUS: CLOSED : 10/24/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1995-01-27 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062104C PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A16231 A A16232

0 CLOSURE INITIATED BY: R. SIECK

RESPONSIBLE MANAGERS 1: L. MORTON USBI

2:

0 DESCRIPTION:

The RH aft IEA cable connector had one contact cavity with contamination. Contamination was verified to be grease applied for corrosion protection with graphite particles dispersed in it. The graphite was identified as pencil lead. A problem report had been generated during aft skirt buildup due to foreign material in the same cable connector contact cavity. This cable contact provides TVC tilt servoactuator channel D delta pressure measurement and the contamination had no adverse effect on the cable function. Any contamination introduced during assembly would be retained in place and identified during testing if there were any effect on function. A review of pin to pin short concerns identified no Criticality 1 items.

1

IFA NUMBER> STS-64-P-01

TITLE:SPIFEX COMMUNICATION LOSS AT INITIAL POWERUP

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 253 : 20.52.00

IFA DATE: 09/10/1994

IFA STATUS: OPEN ELAPSED TIME: 000 : 22.29.06

PRACA STATUS: UNKNOWN HOUSTON TIME: 15.52.00

PRCBD NUMBER: S062104R2 PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-05

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: P. VINSAND X47804

2:

0 DESCRIPTION:

During powerup, the SPIFEX PGSC received data then lost data system data and was not able to communicate with the SPIFEX data system. Message on PGSC indicated a power problem. On panel L12U, cb BUS 1 SW PWR was cycled. Once the comm link was reinitialized via an <ALT><F5> on the PGSC, the SPIFEX data system is now able to communicate with the PGSC. This problem recurred at MET 1/18:05 with no indication of a power problem. It is believed that the problem is actually with a microprocessor within the SPIFEX hardware. Power cycling SPIFEX and reestablishing communications again solved the problem. This problem occurred a third time at 2/13:56. Power cycling of the SPIFEC PLB hardware and power cycling of the SPIFEX PGSC were required to regain communications.

1

STS-064 (OV-103,FLT #19) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-64-P-02

TITLE:UNABLE TO OBTAIN GOOD PLAYBACK OF HDRR DATA

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 253 : 03.34.00

IFA DATE: 09/09/1994

IFA STATUS: OPEN

ELAPSED TIME: 000 : 05.11.06

PRACA STATUS: UNKNOWN

HOUSTON TIME: 22.34.00

PRCBD NUMBER: S062104R2

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-07

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: M.MEYER X47811

2:

0 DESCRIPTION:

Playbacks of data from the LITE HDRR to the JSC POCC through the MCC Payload Data Recording Equipment (PDRD) do not contain valid frame sync patterns. Real-time data flow to POCC, playbacks of pre-recorded bits (KSC), and playbacks of PDRE pre-flight data have all been performed successfully. Anomaly impact is potential corruption of high rate science data recorded on HDRR. Good LITE science data can be obtained real time, based on Ku-Band availability. Extensive troubleshooting has taken place to isolate the problem. It is currently believed that there is a problem with the onboard high rate system. Either in the HDRR IU or the LITE Digital Data Handling Unit (DDHU).

1

IFA NUMBER> STS-64-P-03

TITLE:SFMDM WARMSTART

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 259 : 07.00.00

IFA DATE: 09/16/1994

IFA STATUS: CLOSED : 02/02/1996 ELAPSED TIME: 006 : 08.37.06

PRACA STATUS: UNKNOWN HOUSTON TIME: 02.00.00

PRCBD NUMBER: S062104M PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-09

0 CLOSURE INITIATED BY: JSC-MT2/J. WILLIAMS |

RESPONSIBLE MANAGERS 1: T MASCARO X48074

2:

0 DESCRIPTION:

The SFMDM warmstarted itself due to a task creation error. The condition which causes the task creation error is a known error in the SFMDM software where a task tries to recreate itself before completion of the previous task. This causes the SFMDM to go into an unknown state, and warmstart. To date, fifteen warmstarts have occurred due to a task creation errror. Two SFMDM warmstarts have occurred due to an I/O controller error. An I/O controller error occurs when the FVOS statement tries to re-initiate the I/O controller which it is already running. As a result of all the warmstart occurrences, the SFMDM was commanded to regular format with no impact to LITE operations. Warmstarts which occur during LITE data takes, cause minimal science loss; SFMDM can be recovered within minutes. A SFMDM patch file UPSF.TLM was loaded in the LITE PGSC ram and was ready for execution if required.

- CLOSURE RATIONALE:

The warmstarts were caused by two independent software operating conditions presumed to be initiated by external events generated by the integrated configuration. The two conditions are 1.) Task creation error (task tries to recreate itself before completion of the previous task; 2.) I/O controller error (software tries to re-initiate the I/O controller while it is running; minor frame of zero passed to the applications code).

A software patch has been implemented to preclude warmstarts from occurring due to the software operating errors identified above.

1

TITLE:AFT MCA 1 STATUS 4 WENT TO 0

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 254 : 11.55.42

IFA DATE: 09/11/1994

IFA STATUS: CLOSED : 01/06/1995 ELAPSED TIME: 001 : 13.32.48

PRACA STATUS: CLOSED : 1994-12-19 HOUSTON TIME: 06.55.42

PRCBD NUMBER: S062104G PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 63V0002 M EGIL-01

P CAR 64RF04

0 CLOSURE INITIATED BY: B. SWAN JSC-FA2

RESPONSIBLE MANAGERS 1: B.ELIASON X36037

2: B. SWAN X32528

0 DESCRIPTION:

At G.m.t. 254:11:55:42 Aft Motor Control Assembly 1 Operational Status Blk 4 transitioned from a "1" to "0". At G.m.t. 254:15:03:37 the status bit returned to "1". No drive currents were detected on the supplying AC bus. No position changes of the controlled motors were noted. No change in Aft Power Controller 4 voltage and current measurements occurred during the transition times. This measurement, V76X2254E, is down linked at 1 sample per second through MDM OA1 Card 7 Channel 00. No other measurements on that channel changes states during the period in question. MDM OA1 Card 7 Channel 00 was looked at to determine if any other measurements had been affected. The AMCA1 Ops status 4 (V76X2254E) is the only measurement effected. Of the motors controlled by AMCA 1 string 4, only the ET Umbilical Door Centerline Latch 1 Motor 1 DPLY B and Latch 2 Motor 1 STW B were not verified either during Entry or post landing. All other motors on this string performed nominally. KSC performed troubleshooting on 10-07-94. Resisitance of M CA circuit was nominal 5.1 k. Cable was wiggled with no anomalies.

- CLOSURE RATIONALE:

This anomaly has not been isolated to a particular line replaceable unit (LRU). The most probable cause is within the op stat measurement V76X2254E circuitry (criticality 3). Circuit components include AMCA 1, MDM OA1, and interconnecting wiring. Closed as an unexplained anomaly, to be revisited in the event of a recurrence of this condition.

1

STS-064 (OV-103,FLT #19) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 11

IFA NUMBER> STS-64-V-05

TITLE:KU-BAND RADAR FAILED TO ACQUIRE AT LOW RANGE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 256 : 21.29.00

IFA DATE: 09/13/1994

IFA STATUS: CLOSED : 12/15/1994 ELAPSED TIME: 003 : 23.06.06

PRACA STATUS: CLOSED : 1995-03-18 HOUSTON TIME: 16.29.00

PRCBD NUMBER: S062104D PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 63V-0012	M	INCO-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: B. SWAN X32526

2:

0 DESCRIPTION:

Following the deploy of the SPARTAN satellite, the Ku-band radar system failed to acquire the satellite. Ku-band radar acquired the SPARTAN about 1 hour later, when the target was located at -21.3 roll and -15.5 pitch and a range of 2700 ft on scan 37. The radar continued to track the SPARTAN to a range of 9100 ft when the Ku-band system was switched back to comm mode. For rendezvous phase, the Ku-band radar was turned on at 253:16:14 G.m.t. when SPARTAN was at an estimated range of 123 kft. Radar immediately acquired and tracked the payload all of the

way into about 80 ft. KSC performed contingency Ku-band radar OMRS. Troubleshooting was performed on 10-31-94 which did not confirm failure of EA2.

- CLOSURE RATIONALE:

The anomaly has been isolated to the EA-2 (s/n 104). EA-2 has been removed for further troubleshooting. The loss of the Ku-Band radar may result in increased propellant usage during a rendezvous. The functional integrity of the Ku-Band is verified during ground turnaround testing. The loss of the Ku-Band radar on-orbit will not affect crew safety or vehicle performance.

1

STS-064 (OV-103,FLT #19) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 12

IFA NUMBER> STS-64-V-07

TITLE:PDI/LITE DECOM 4 BITE DISCREPANCY

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 256 : 13.54.00

IFA DATE: 09/13/1994

IFA STATUS: CLOSED : 12/15/1994 ELAPSED TIME: 003 : 15.31.06

PRACA STATUS: CLOSED : 1995-01-16 HOUSTON TIME: 08.54.00

PRCBD NUMBER: S062104E PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 63V-0010	M	INCO-04

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: B. WAGSTER X33329

2:

0 DESCRIPTION:

The crew selected the "quiescent" format whose decom format (17) is loaded into PDI Decom 4. The BITE bits for Decom 4 went high and those for Decom 1 went low as expected. About 2 minutes later, the crew

reselected the "regular" format. The bite bits for decom 1 went high again, but only the Bit Rate Accuracy bit for the Decom 4 BITE went low. The Bit Lock, Word Lock and Master Frame Lock bits for Decom 4 went low approximately 22 minutes later at about 256:14:20:00G.m.t No payload data was lost by this occurrence, nor is any data loss anticipated if the event occurs again. KSC will perform troubleshooting

- CLOSURE RATIONALE:

The cause of the condition is unknown. Because the PDI and Decoms continued to function nominally despite the incorrect Decom 4 BITE indications, this is believed to have been a transient problem involving only the BITE circuits. There have been no previous failures of any PDI where unexpected bit, word or frame lock was indicated. Determination of a probable cause is made difficult because of this lack of failure history, and the infrequent use of this configuration (in which a single input source is tied to multiple PDI Decoms expecting different bit rate data). Potential causes include unknown generic PDI BITE circuit design characteristics, transient BITE hardware failure, or an unforseen BITE response to a unique sequence of payload data.

Because of the nominal system performance despite the incorrect BITE indications, and the inability to repeat the condition, no hardware corrective action is planned. Both the KSC problem report and the CAR will be closed as an unexplained anomaly, to be revisited in the event of a recurrence of this condition.

1

IFA NUMBER> STS-64-V-08

TITLE:R&L MAIN LANDING GEAR DOOR THERMAL BARRIER ASSY FELL AT DOOR OPENING

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 263 : 21.12.32

IFA DATE: 09/20/1994

IFA STATUS: CLOSED : 12/16/1994 ELAPSED TIME: 010 : 22.49.38

PRACA STATUS: CLOSED : 1995-01-20 HOUSTON TIME: 16.12.32

PRCBD NUMBER: S062104F PHASE: ENTRY/LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K PR LWING-3-20-5466 K PR RWING-3-20-4896

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: K.BROWN X33891

2:

0 DESCRIPTION:

Two thermal barrier assembles separated from their respective base plates on the aft edge of each main gear well. The barrier assemblies were found 100 yards from the perimeter fence. One barrier was frayed. No carrier plate damage was evident. Each barrier assembly was clipped in place for ferry flight. KSC will perform troubleshooting and repair the hardware.

- CLOSURE RATIONALE:

Improper installation of the thermal-barrier assemblies was the cause of the assemblies separating from their baseplates and falling out of the MLGD wells at gear deploy. The barrier assemblies were refurbished and installed correctly. The training and installation procedures are being updated to prevent the incorrect installation of the barrier assemblies. Also, an inspection technique was developed during the failure analysis to insure that incorrect installations are identified and corrected.

1

IFA NUMBER> STS-64-V-09

TITLE:SLOW PC RISE ON PRIMARY THRUSTER F4D

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 256 : 16.01.00

IFA DATE: 09/13/1994

IFA STATUS: CLOSED : 01/06/1995 ELAPSED TIME: 003 : 17.38.06

PRACA STATUS: CLOSED : 1995-03-11 HOUSTON TIME: 11.01.00

PRCBD NUMBER: S062104H PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

P CAR 64RF09

0 CLOSURE INITIATED BY: D. GERLACH JSC-FA2

RESPONSIBLE MANAGERS 1: D.GERLACH X33337

2:

0 DESCRIPTION:

Primary thruster F4D exhibited slow Pc ramp-up on 0.080 second pulses (16 of 122 total pulses). The longer pulse on F4D also appeared to indicate slow Pc Rise. Detailed review of data from the deorbit prep period of 10 of 13 flights since return-to-flight indicates a steadily increasing number of slow Pc rise indications. The exact cause of the failure is unknown and the signature is outside the experience base. KSC borescope found Pc tube unblocked. KSC will R/R thruster.

- CLOSURE RATIONALE:

At WSTF the thruster was found to have a loose piece of metal contamination was partially blocking the Pc tube, thus causing the slow Pc rise. The thruster was removed and replaced. The thruster was sent to WSTF for repair and failure analysis.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

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STS-065 (OV-102,FLT #17) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-65-B-01

TITLE:RH RSS SAFE AND ARM DEVICE LOOSE MOUNTING FASTENERS

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

IFA DATE:

IFA STATUS: CLOSED : 08/29/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1994-12-07 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062102B PHASE: ASCENT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A16157

0 CLOSURE INITIATED BY: MSFC-SRB/C. RUTLAND

RESPONSIBLE MANAGERS 1: L. MORTON USBI

2:

0 DESCRIPTION:

RH RSS S&A device had two of four mounting fasteners that were not properly seated. Gaps under the fastener heads measured 0.006 inch and 0.078 inch with the safety wire intact. Stress analysis shows flight loads insufficient to cause the gap. Fail safe analysis shows two remaining fasteners sufficient to retain S&A device on panel. The S&A device mounting fasteners to be inspected to verify no loose washers or gaps.

- CLOSURE RATIONALE:

The cause of the gap in the RSS S&A device fastener could not be determined. Physical evidence shows the fastener had seated with the same amount of thread protrusion through the insert locking feature as the remaining fasteners on the S&A device. The potential for the insert

nut element to rotate behind the tang may have contributed to a portion of the gap but could not account for the remainder of the 0.078 inch. However, the high system reliability demonstrates that fail-safe conditions and vibration qualification limits will not be exceeded.

Due to the high system reliablility, the only corrective action to be taken on assembled hardware will be to reinspect the fastener assemblies. For hardware to be assembled, a procedural change is being evaluated to reduce the potential for insert nut elements to rotate behind the tang.

1

IFA NUMBER> STS-65-B-02

TITLE:BROKEN FASTENER ON LH AFT IEA END COVER

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

IFA DATE:

IFA STATUS: CLOSED : 08/29/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1994-10-12 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062102C PHASE: ASCENT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A16158

0 CLOSURE INITIATED BY: MSFC-SRB/C. RUTLAND

RESPONSIBLE MANAGERS 1: L. MORTON USBI

2:

0 DESCRIPTION:

LH aft IEA end cover has one broken fastener on the systems tunnel side of the cover. There is no evidence of water impact damage in this area. Loss of this fastener does not cause loss of the cover, however generic

implications to other cover fasteners will be investigated.

- CLOSURE RATIONALE:

Based on the lack of sooting on the fracture surfaces, the physical location of the bolt relative to the cover hole, the witness marks on the covers and the close proximity to the water geyser hit, the most probable cause of this failure is water impact.

1

STS-065 (OV-102,FLT #17) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 3

IFA NUMBER> STS-65-K-01

TITLE:LEAK DETECTORS 56/57 OPERATING AT REDUCED FLOW RATE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 189 : 13.43.00

IFA DATE: 07/08/1994

IFA STATUS: CLOSED : 11/01/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 08.43.00

PRCBD NUMBER: S062102G PHASE: PRE-LAUNCH

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR-65V-0092

0 CLOSURE INITIATED BY: R. THARPE KSC-TM-LLP

RESPONSIBLE MANAGERS 1: C. ABNER KSC-PEO

2:

0 DESCRIPTION:

During the hold at T-3 hours, leak detectors 56/57 were reported to be operating at a reduced flow rate. Further troubleshooting indicated blockage in the sample gas line. Continued countdown utilizing the Primary Haz Gas System and the HUMS (Hydrogen Umbilical Mass Spectrometer).

- CLOSURE RATIONALE:

Initial troubleshooting during STS-65 count verified that there was definite sample line blockage that was common to Leak Detectors 56, 57, and HUMS. Post Launch inspections and testing failed to find anything definitive that would have caused the flow restriction. The cause of the flow restriction is unknown. It has been determined by Engineering that this was an isolated event on this system and that no further testing overview is required. The IPR will be closed as an Unexplained Anomaly. The existing design is sufficient and no changes need to be incorporated.

Inspections of the Purge Shrouds on the other MLP's verified that the aluminum tape and the insulation was within specification and acceptable condition. Review of the system design does not allow for any feasible changes to the existing configuration. This is also the known first occurrence of this phenomenon since STS-1.

1

STS-065 (OV-102,FLT #17) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 4

IFA NUMBER> STS-65-K-02

TITLE:ROOF DAMAGE TO NEW ECL GROUND COOLANT UNIT STORAGE FACILITY

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

IFA DATE:

IFA STATUS: CLOSED : 12/05/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062102L PHASE: ASCENT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

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

0 CLOSURE INITIATED BY: B. HARRIS KSC-TM

RESPONSIBLE MANAGERS 1: C.ABNER KSC-PEO

2:

0 DESCRIPTION:

Post launch pad inspection revealed roof damage to the new ECL Ground Coolant Unit storage facility. Permanent concrete roof will be in place for STS-68.

- CLOSURE RATIONALE:

The cause of the anomaly is attributed to the pressure from SRB/SSME ignition that became trapped inside the building and over-pressured the roof panels. A pad configuration review team was established to review current KSC configuration management practices and policies. The review concentrated on launch pad systems/facilities and associated configuraiton management systems to ensure current practices and policies were adequate to minimize risk to flight hardware and ground personnel.

1

IFA NUMBER> STS-65-M-01

TITLE:AFT SEGMENT STIFFENER STUB CRACK

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

IFA DATE:

IFA STATUS: CLOSED : 08/12/1994 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1994-08-16 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062102A PHASE: ASCENT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
A	A16159	A	DR4-5/255
A	PFAR 360T039A-06		

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

RESPONSIBLE MANAGERS 1: C. RALSTON-THIOKOL

2:

0 DESCRIPTION:

A crack was observed on the LH aft segment forward stiffener ring stub extending radially inward from the outer diameter of the stub. Located at 90.5 degrees approximately 1/4 inch deep.

Damage occurred during splashdown and was located at the cavity collapse centerline. Splashdown damage to this stub and stiffener rings was more extensive than is typically seen. Cracks are typically seen at the centerline of cavity collapse, however this crack was unusual in that it occurred between holes.

The cracked section was excised and the preliminary examination results indicate that the crack was caused by stress corrosion after splashdown, with no indication of any preexistent flaw. The final geometry appears to be a half moon shaped crack with a maximum depth of approximately 1/2 inch.

- CLOSURE RATIONALE:

The fracture surface had an intergranular structure indicating hydrogen assisted stress corrosion cracking (SCC). The probable crack initiation location was on the aft outer flange corner and was approximately 0.060 in. long by 0.012 inch deep from which it grew inward approximately 0.25 inch.

The crack initiated during water impact damage and grew during towback due to SCC. All necessary conditions for SCC are present, i.e. residual tensile stress due to water impact cavity collapse loads, probable initiation location, damage to protection system (primer, paint, K5NA, Instafoam, etc.), corrosive environment (saltwater) during towback, presence of zinc in primer to help accelerate crack growth, and the

susceptibility of the D6AC material to stress corrosion cracking.

1

IFA NUMBER> STS-65-P-01

TITLE:RAMSES POWER CONTROL AND INTERFACE SYSTEM (PCIS) FUSE BLOWN

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 201 : 00.38.00

IFA DATE: 07/19/1994

IFA STATUS: OPEN ELAPSED TIME: 011 : 07.55.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 19.38.00

PRCBD NUMBER: S062102 PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-28

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: F.MORENO JSC-TC

2:

0 DESCRIPTION:

During RAMSES operations, the POCC saw the RAMSES facility suddenly shutdown. RAMSES FO4 Cross Visualization experiment was not performed. The crew performed malfunction procedure MP-03, which indicated the Power Control and Interface System fuse had blown. Review of the current levels on fuel cells 1 and 3 showed a 40 ampere spike had occurred concurrent with a shutdown of the RAMSES facility. The crew was instructed to open the circuit breakers to the RAMSES facility. They then performed a continuity test on the PCIS fuse which confirmed it was blown. The POCC generated an IFM which was performed on red flight day 14 and was unsuccessful. POCC suspects a problem with an open diode on the power supply filter ground circuit.

1

IFA NUMBER> STS-65-P-02

TITLE:TEMPUS AUTOSTOP

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 191 : 07.39.00

IFA DATE: 07/10/1994

IFA STATUS: OPEN

ELAPSED TIME: 001 : 14.56.00

PRACA STATUS: UNKNOWN

HOUSTON TIME: 02.39.00

PRCBD NUMBER: S062102

PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PYLD-10

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: F. MORENO JSC-TC

2: R. HUNKINS JSC-TC

0 DESCRIPTION:

The TEMPUS Facility automatically stopped. There was no sample being processed at the time, therefore, no loss of science. POCC controllers determined that this probably occurred due to an internal voltage drop within TEMPUS which caused the unit to stop. A similar condition was seen during KSC testing. The POCC performed a restart and recovered the facility.

- CLOSURE RATIONALE:

The under voltage condition is attributed to an experiment power distribution problem and has been rectified on MSL-1 by providing mulitple power distribution to the experiment from a 60 amp feed from EPDB1/DC11 through EPSP3 DC5, a 60 amp feed from EPDC1/DC13, and a 35 amp feed from EPSP10 DC4.

The system redesign will prevent an under voltage condition leading to premature shutdown of the facility. The facility has successfully

passed all integration testing including KCS-135 flight testing of sample levitating and heating system.

1

IFA NUMBER> STS-65-V-02

TITLE:SUPPLY WATER DUMP NOZZLE ICING

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 192 : 08.00.00
IFA DATE: 07/11/1994

IFA STATUS: CLOSED : 03/22/1995 ELAPSED TIME: 002 : 15.17.00

PRACA STATUS: CLOSED : 1995-04-18 HOUSTON TIME: 03.00.00

PRCBD NUMBER: S062102N PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 73V-0017 M EECOM-02

P IM 65RF02

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

RESPONSIBLE MANAGERS 1: D.GERLACH X33337

2:

0 DESCRIPTION:

During the third supply water dump, the supply and waste water dump nozzle temperatures dropped indicating icing. The supply water dump was terminated and nozzle heaters were used to evaporate ice until nozzle temperatures returned to normal, then a waste water dump was performed. Supply water dumps were performed using the FES for the remainder of the flight. Detailed nozzle and TPS inspections showed evidence of RTV deterioration as well as differences in TPS configuration between vehicles. Flow rate and spray pattern verifications are planned.

- CLOSURE RATIONALE:

The most likely cause for the supply water dump nozzle icing is

improper nozzle position. Corrective action is to update current Orbiter supply water nozzle drawing specifications. The supply water nozzle is being repositioned to prevent icing. Should the supply water system fail, the supply water can be dumped through the flash evaporator system (FES). Should the FES be unavailable, two contingency waste containers are available.

1

STS-065 (OV-102,FLT #17) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-65-V-04

TITLE:IMU 1 REDUNDANT RATE BITE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 199 : 12.36.00

IFA DATE: 07/18/1994

IFA STATUS: CLOSED : 12/08/1994 ELAPSED TIME: 009 : 19.53.00

PRACA STATUS: CLOSED : 1995-04-15 HOUSTON TIME: 07.36.00

PRCBD NUMBER: S062102M PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	PR GNC-2-18-0102	M	GNC-01
P	IM 65RF04		

0 CLOSURE INITIATED BY: B. ELIASON JSC-FA2

RESPONSIBLE MANAGERS 1: W. ARCENEAUX

2:

0 DESCRIPTION:

Numerous transient redundant rate BITE messages were generated when the IMU-1 (S/N 204) azimuth gyro experienced spikes exceeding 0.7 deg/hr. Resolver offset and platform drift were observed during transients. No KSC troubleshooting required. IMU removed and shipped to ISL. Symptons reproduced at ISL.

- CLOSURE RATIONALE:

Excessive noise was found on the DC to DC converter card output and the Resistance buildup at one of the press-fit connectors which serve as chassis grounding terminals for the DC/DC card contributed to the failure of IMU s/n 204. Further analysis will be performed to determine any other contributing factors. IMU 1 s/n 204 was removed and replaced. DC to DC card s/n 19 will have a jumper installed around the failed press-fit connector to create a different grounding terminal. The three DC/DC cards with known press-fit connector problems are currently not available for flight; they are at the vendor for further failue analysis and possible repair. A data review was performed on the HAINS units in spares and across the fleet with no symptoms indicating this failure mode observed.

1

STS-065 (OV-102,FLT #17) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-65-V-05

TITLE:VERNIER THUSTER R5D FAILED OFF

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 199 : 09.14.00

IFA DATE: 07/18/1994

IFA STATUS: CLOSED : 11/17/1994 ELAPSED TIME: 009 : 16.31.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 04.14.00

PRCBD NUMBER: S062102H PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 73V-0004	M	PROP-02

0 CLOSURE INITIATED BY: D.GERLACH JSC-FA2

RESPONSIBLE MANAGERS 1: D. GERLACH X33337

2:

0 DESCRIPTION:

R5D was failed off by RM. The jet was hot-fired successfully, then

reselected. Subsequent performance was nominal. Data indicates a possible intermittent loss of the R5D command B (enable) signal. The MDM FA2 BSR was polled and indicated that no faults were recorded. KSC troubleshooting using trickle current capability planned.

- CLOSURE RATIONALE:

The cause of the vernier thruster R5d being deselected by redundance management is most likely caused by a loss of the Command B logic. The vernier thruster R5D was fired 1613 successfully for 5 days post RM deselect. All possible causes of the vernier jet deselection have been investigated. IFA closed as a unexplained anomaly.

1

STS-065 (OV-102,FLT #17) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-65-V-06

TITLE:LOW WASTE DUMP FLOW

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 198 : 07.06.00

IFA DATE: 07/17/1994

IFA STATUS: CLOSED : 11/17/1994 ELAPSED TIME: 008 : 14.23.00

PRACA STATUS: CLOSED : 1994-10-17 HOUSTON TIME: 02.06.00

PRCBD NUMBER: S062102J PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 73V-0016	M	EECOM-07
P	IM 65RF05		

0 CLOSURE INITIATED BY: D. GERLACH JSC-FA2

RESPONSIBLE MANAGERS 1: D. GERLACH X33337

2:

0 DESCRIPTION:

The second waste water dump was initiated at 198:06:33 G.m.t. (08:13:50

MET) and was performed in three segments. The dump rate degraded during the second segment of the dump and was nominal during the third segment. A third waste water dump was performed at 202:05:39 G.m.t. (12:12:56 MET) in 7 segments, all with degraded dump flow rate. Urine solids filter removal, nozzle inspection, water flow check and flush, and citric acid flush planned.

- CLOSURE RATIONALE:

The urine solids filter was removed by KSC personnel. Inspection of the filter at NSLD revealed a large amount of urine solids that prevented an adequate flow of fluid through the filter. An on-orbit urine pretreatment is being considered to reduce the possibility of solids forming in the WMS plumbing and collecting on the urine solids filter and blocking the flow. A citric acid flush has been developed to clean any residual solids out of the system preflight. A contingency filter is available to bypass the urine solids filter in the event of blockage.

1

IFA NUMBER> STS-65-V-08

TITLE:LH2 MANIFOLD PRESSURE FOLLOWING VACUUM INERT

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 189 : 17.23.00

IFA DATE: 07/08/1994

IFA STATUS: CLOSED : 09/06/1994 ELAPSED TIME: 000 : 00.40.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 12.23.00

PRCBD NUMBER: S062102D PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 73V-0014

0 CLOSURE INITIATED BY: JSC-VF3/D. MCCORMACK

RESPONSIBLE MANAGERS 1: D. MCCORMACK X33327

2:

0 DESCRIPTION:

The LH2 manifold rose to an unexpected high peak pressure of 17 psia following vacuum inert. After reaching the peak pressure, the LH2 manifold pressure decreased faster than expected. First use of OI-23 software which included MPS dump and vacuum inert sequence automation. OI-23 software was verified to have performed as designed and LH2 system responses to software commands was nominal.

LH2 manifold large volume decay check failed at 0.696 psi/hr (max: 0.601 psi/hr). Manifold relief valve leak check planned.

- CLOSURE RATIONALE:

The pressure increase following vacuum inert is now considered to be the expected pressure response for a dump performed with te current OI-23 dump procedure. All MPS hardware performed as expected and commanding during the dump and vacuum inert was as designed. The post-dump hydrogen residual was less than the OI-22 average; however, it was greater than the expected residual for OI-22. As a result, the 5-minute bakeout period between dump termination and vacuum inert initiation was not long enough to vaporize the hydrogen residual in the manifold. This resulted in a post vacuum inert residual estimated at just less than 1 lbm which caused the subsequent manifold pressure rise to 17 psia. The pressure decay seen following the LH2 mainifold pressure rise was greater than expected. The decay may be the result of leakage past seals which were exposed to cryogenic fluid. Postflight manifold decay tests could not repeat the leakage of the magnitude seen on onbit.

The OI-23 MPS dump procedure will be modified with the following major changes. The LH2 I/B F&D valve will be open throughout the dump, the

LH2 RTLS repressurization system will not be used during nominal mission dump to preclude operating the isolation and relief vavles outside of th eir certification (no helium pressurization), the bakeout period prior to the vacuum inert will be extended to 15 minutes, and the manual switch throw to inert the high point bleed system will be reinstated. These modifications are targeted for implementation on STS-67. Note

1

IFA NUMBER> STS-65-V-08

TITLE:LH2 MANIFOLD PRESSURE FOLLOWING VACUUM INERT

0 CLOSURE RATIONALE:(Continued from previous page).

that STS-68 (OV-105) will fly with OI-22 software and therefore, the manual MPS dump will be used.

1

IFA NUMBER> STS-65-V-09

TITLE:HIGH MPS HELIUM USAGE DURING ENTRY

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 204 : 10.29.00

IFA DATE: 07/23/1994

IFA STATUS: CLOSED : 09/06/1994 ELAPSED TIME: 014 : 17.46.00

PRACA STATUS: UNKNOWN HOUSTON TIME: 05.29.00

PRCBD NUMBER: S062102E PHASE: ENTRY/LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 73V-0015

0 CLOSURE INITIATED BY: JSC-VF3/D. MCCORMACK

RESPONSIBLE MANAGERS 1: D. MCCORMACK X33327

2:

0 DESCRIPTION:

59.7 lbs of Helium were used during the system blowdown performed during entry. Nominal usage is 55.7 +/- 1.1 lbs for OV-102.

- CLOSURE RATIONALE:

The cause of the greater-than-expected helium usage during entry on STS-65 was the configuration of the MPS helium system during entry. STS-65 was the first flight of OI-23 software which has an MPS helium system configuration that is different from that of past flights. In OI-23, three regulators are on line to provide helium flow for the entry blowdown and manifold repressurization as opposed to only one regulator being used with OI-22. As a result of this additional supply, the pressure provided for the blowdown was approximately 100 psi greater than the average for previous flight, and the resultant helium consumption increase was calculated at approximately 4 lbm. The increase accounts for the additional consumption seen on this mission.

The OMRSD File IX Volume II requirement, DV41BAO.150 will be revised for each vehicle to specify the expected helium consumption with the MPS helium system entry configuration using OI-23 software. There were no MPS hardware anomalies and therefore, no hardware corrective action is required.

1

STS-065 (OV-102,FLT #17) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-65-V-10

TITLE:LEFT FLIGHT DECK SMOKE DETECTOR TRANSIENTS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 197 : 15.52.00

IFA DATE: 07/16/1994

IFA STATUS: CLOSED : 10/26/1994 ELAPSED TIME: 007 : 23.09.00

PRACA STATUS: CLOSED : 1995-07-11 HOUSTON TIME: 10.52.00

PRCBD NUMBER: S062102F PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 73V-0007 M EECOM-06

P IM 65RF08

0 CLOSURE INITIATED BY: K. BROWN JSC-VF3

RESPONSIBLE MANAGERS 1: K.BROWN X33891

2:

0 DESCRIPTION:

The left flight deck smoke detector concentration indication dropped off-scale-low for two seconds followed fourteen seconds later by negative spikes for a period of five seconds. After landing, a master alarm was received from the left flight deck smoke detector with no concentration change observed in data.

Troubleshooting planned.

- CLOSURE RATIONALE:

The cause of the failure signature for the smoke detector is unknown. The smoke detector failure signature is not similar to any past smoke detector problem. The failure analysi that will be performed at NSLD will be documented in CAR 65RF08-010.

The smoke detector was removed and replaced with s/n 040. The replacement smoke detector passed the self tests. The removed smoke detector was sent to NSLD for testing, and the failure analyisi will be documented.

1

TITLE:WCS PROBLEM COMMODE FAULT DURING COMPACTION CYCLE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 193 : 06.06.00

IFA DATE: 07/12/1994

IFA STATUS: CLOSED : 11/29/1994 ELAPSED TIME: 003 : 13.23.00

PRACA STATUS: CLOSED : 1994-12-13 HOUSTON TIME: 01.06.00

PRCBD NUMBER: S062102K PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K V070-2-18-0326 M EECOM-01

P IM 65RF10

0 CLOSURE INITIATED BY: P.OLIVER JSC-FA222

RESPONSIBLE MANAGERS 1: P.OLIVER X33323

2:

0 DESCRIPTION:

Compactor piston stopped at the midway point during piston retraction during the third compaction cycle resulting in a Commode Fault Indication. Crew manually retracted piston and found no problems during compactor, piston, and transport tube inspection. Compactor operations were nominal for remainder of mission. Possible operation error identified by crew during debrief. Parts of a sheared roll pin found inside the outer edge of piston during OMRDSD cleaning.

No KSC action.

- CLOSURE RATIONALE:

The cause of the commode fault light and imcomplete compaction cycle was the interruption of the cycle by the premature pressing of the compactor release button. No corrective action is required as the system performed as designed and intended. The EDO WCS will not be refurbished or manifested for flight until such time as funding for the program is reinstated to allow completion of the failure analysis and refurbishment

of the hardware. There is no history of a build-up of urine solids on the regular WCS fan separator outlet check valves. The regular WCS units do not make use of a commode plenum filter.

1

IFA NUMBER> STS-65-V-3B

TITLE:WCS PROBLEM COMMODE FILTER ANOMALIES

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 193 : 06.06.00

IFA DATE: 07/12/1994

IFA STATUS: CLOSED : 11/29/1994 ELAPSED TIME: 003 : 13.23.00

PRACA STATUS: CLOSED : 1994-12-16 HOUSTON TIME: 01.06.00

PRCBD NUMBER: S062102K PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M ECCOM-05 M EECOM-03

P IM 65RF03

0 CLOSURE INITIATED BY: P.OLIVER JSC-FA222

RESPONSIBLE MANAGERS 1: P.OLIVER X33323

2:

0 DESCRIPTION:

The first replacement commode odor bacteria filter (S/N TBD) did not fit and the original (ascent) filter was reinstalled. The filter was successfully installed on flight day 12 after a lubricant was applied to the grommet. Other replacement filters did not encounter interference. Plenum filter replacement and installation of an additional ARS charcoal canister were required to control odors.

Used plenum filter was clean and dry but retained odors. No KSC action.

- CLOSURE RATIONALE:

The cause of the difficulty in installing the commode odor/bacteria filter was the result of the improper assemby of the filter canister and a failure of the manufacturer's inspection process to identify improperly assembled filter canisters. The cause of the commode odors is unknown. The EDO WCS will not be refurbished or manifested from flight until such time as funding for the program is reinstated to allow completion of the failure analysis and refurbishment of the hardware. The regular WCS fan-separator outlet-check valves are of a different design with no history of a significant build-up of urine solids on the Teflon poppets or sealing areas. The regular WCS units do not make use of a commode-plenum filter.

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STS-065 (OV-102,FLT #17) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-65-V-3C

TITLE:WCS PROBLEM FAN SEPARATOR 1 STALL AND LIQUID BACKFLOW

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 193 : 06.06.00

IFA DATE: 07/12/1994

IFA STATUS: CLOSED : 11/29/1994 ELAPSED TIME: 003 : 13.23.00

PRACA STATUS: CLOSED : 1994-12-16 HOUSTON TIME: 01.06.00

PRCBD NUMBER: S062102K PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
M	EECOM-08	P	IM 65RF03

0 CLOSURE INITIATED BY: P.OLIVER JSC-FA222

RESPONSIBLE MANAGERS 1: P.OLIVER X33323

2:

0 DESCRIPTION:

Crew reported gurgling noises and odor from fan sep 1 during operation on flight day 13. Data indicated normal fan startup but low separator

drum speed. Liquid backflow may have occurred through the dual fan sep 1 outlet check valves after the previous use for 10 seconds resulting in flooding of the fan separator. The fan sep 1 bowl was still pumping liquid at normal shutdown time. Crew attempted to clear fan sep 1 by restarting without success. Fan sep 2 was used for remainder of mission. Liquid backflow through the check valves occurred on day after landing when the waste tank was repressurized for supply water sampling resulting in a 4-gallon waste tank quantity reduction and over flow into the middeck area. Accessible plumbing will be drained prior to WCS removal.

- CLOSURE RATIONALE:

The fan separator 1 stall was caused by a backflow of liquid from the waste water tank into the fan separator. The liquid backflow was caused b y urine solids coming out of suspension in the WCS lines and collecting on the check valves, which in turn caused the valves not to be able to seal. The EDO WCS will not be refurbished or manifested for flight until such time as funding for the program is reinstated to allow completion of the failure analysis and refurbishment of the hardware. The regular WCS fan-separator outlet-check valves are of a different design with no history of a significant build-up of urine solids on the Teflon poppets or sealing areas. The regular WCS units do no make use of a commode-plenum filter.

-JFDPO12: NORMAL TERMINATION OF PROCESSING

1

1

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-66-B-01

TITLE:RIGHT HAND FRUSTUM MSA-2 NOT ADHERING TO PAINTED SURFACE

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

IFA DATE:

IFA STATUS: CLOSED : 01/13/1995 ELAPSED TIME: 000 : 00.00.00

PRACA STATUS: CLOSED : 1995-01-27 HOUSTON TIME: 00.00.00

PRCBD NUMBER: S062105A PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

A A16300

0 CLOSURE INITIATED BY: L. MORTON USBI

RESPONSIBLE MANAGERS 1: LISA MORTON - USBI

2:

0 DESCRIPTION:

The right hand frustum had MSA-2 that did not adhere to painted surface adjacent to PR-1422 sealant over fastener unbonds. No material loss was associated with the unbonds. Potential contributors are 1) Microballoons were lower in moisture content than previous lots (moisture content still within specification), 2) Pump return flow rate on low side (normally spray parameters could be adjusted to compensate for dryness of microballoons)

- CLOSURE RATIONALE:

The STS-66 RH frustum unbonds are attributed to adhesive failure between MSA-2 and the painted surface/sealant due to lack of adhesive contact (dry spray) between the MSA-2 and the substrate. The anomaly is most probably the result of decreased pump performance which did not allow

the atomizing air pressure to be decreased to compensate for the dry spray. The only remaining hardware sprayed before the pump rebuild is STS-63 LH forward skirt. Loss of MSA-2 from this forward skirt is not expected for the following reasons:

1). No MSA-2 was lost on STS-66 RH frustum

2). The material properties for the STS-63 LH forward skirt MSA-2 were improved over those for the STS-66 RH frustum

3). These unbonds are isolated to locations where there is sealant over fasteners

4). The number of fasteners with sealant is significantly less on the forward skirt (42) versus the frustum (2200)

5). The severity of thermal and aerodynamic loading for the forward skirt is less than for the frustum

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 2

IFA NUMBER> STS-66-F-01

TITLE:WRIST ROLL JOINT ANGLE EXCEEDANCE AT POWERUP

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 307 : 20.19.00

IFA DATE: 11/03/1994

IFA STATUS: OPEN ELAPSED TIME: 000 : 03.19.17

PRACA STATUS: UNKNOWN HOUSTON TIME: 14.19.00

PRCBD NUMBER: S062105 PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PDRS-01

0 CLOSURE INITIATED BY:

RESPONSIBLE MANAGERS 1: J. PECK X31264

2:

0 DESCRIPTION:

When the RMS was selected for initial powerup, the value of the wrist roll joint angle was 1.1 deg prior to MRL release. This value exceeds the tolerance identified in the crew procedures (0.5 deg). A data review indicates the wrist roll was in tolerance (o deg +/- 0.2 deg) when the MRLs were latched in the OPF. However, the wrist roll was 0.9 deg on the pad.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

PAGE 3

IFA NUMBER> STS-66-K-01

TITLE:AIR (7%) DETECTED IN THE GUCP AND T-0 CAVITIES, AT APPROX T-6 HOURS

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: S062105C PHASE: PRE-LAUNCH

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR MLP-3-0455	K	IPR 66V-0323

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

RESPONSIBLE MANAGERS 1: C. ABNER - KSC-PEO

2:

0 DESCRIPTION:

At approximately T-6 hours, air (7%) was detected in the GUCP and T-0 cavities. Initial concern was contaminated Helium. Team sent to pad to connect a known Helium bottle to the HUMS system for evaluation; HUMS determined to be faulty. Initiation of cryo tanking was delayed approximately one and a half hours.

- CLOSURE RATIONALE:

It has been determined by Engineering that the Helium leak-check method

of detecting leaks in the HUMS system does not disclose all possible leakae within the sample delivery system of the HUMS. All subsequent leak checks to be perfomed o the HUMS system (and Prime/Backup HGDS systems) will be by means of a vacuum leak test. The IPR was upgraded to a GSE PR against the HUMS ststem on MLP-3. The inlet leakage problem has been corrected and the GSE PR has been closed. THe existing design is sufficient and no changes need to be incorporated. THe OMRSD for the HUMS system was met.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-66-V-01

TITLE:AFT THRUSTER L1A FAILED OFF

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 307 : 17.09.00

IFA DATE: 11/03/1994

IFA STATUS: CLOSED : 04/07/1995 ELAPSED TIME: 000 : 00.09.17

PRACA STATUS: CLOSED : 1995-07-11 HOUSTON TIME: 11.09.00

PRCBD NUMBER: S062105G PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M PROP-01 P CAR 66RF01

P PR LP03-18-0478

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

RESPONSIBLE MANAGERS 1: D. MCCORMACK X33327

2:

0 DESCRIPTION:

During the maneuver to photograph the External Tank after separation, reaction control subsystem (RC) aft-firing thruster L1A (S/N 218) failed off due to low chamber pressure. The redundancy management (RM) deselected the thruster 320 msec into the firing. The peak chamber

pressure was 11.3 psia over 160 msec (four data samples). Injector temperatures verified at least partial opening of both the fuel and oxidizer valves. This is the first flight of thruster S/N 218 since vendor refurbishment. The thruster will be removed and replaced. The vendor will perform a failure analysis on the oxidizer valve.

- CLOSURE RATIONALE:

The cause of the thruster fail-off was metallic-nitrate contamination in the oxidizer-valve pilot-stage that prevented its proper operation. KSC removed and replaced thruster L1A and the thruster was transferred to the WSTF for failure analysis. System redundancy is adequate to support the failure rate of the primary RCS thrusters. There have been no changes to the thruster design or to the RCS turnaround processing procedures that would adversely affect this failure rate.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-66-V-02

TITLE:STARBOARD PLBD AFT RTL 3 AND CLOSE 2 INDICATIONS FAILED ON

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 307 : 18.30.00

IFA DATE: 11/03/1994

IFA STATUS: CLOSED : 03/22/1995 ELAPSED TIME: 000 : 01.30.17

PRACA STATUS: CLOSED : 1995-04-15 HOUSTON TIME: 12.30.00

PRCBD NUMBER: S062105E PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 71V-0003	M	MMACS-01
P	CAR 66RF02		

0 CLOSURE INITIATED BY: JSC-FA22/D. MCCORMACK

RESPONSIBLE MANAGERS 1: D. MCCORMACK X33327

2:

0 DESCRIPTION:

Payload bay door opening was completed at 307:18:30. When the starboard PLBD was opened, the ready-to-latch switch 3 and close switch 2 did not transfer off as they should have. Approximately 38 and 44 minutes later, respectively, the ready-to-latch and close switches both transferred to their correct state. The most likely cause of the anomalous condition is the starboard aft bulkhead ready-to-latch switch module internal rigging. The other three switch modules on OV-104 have undergone a rework that included potting of the adjustment set screw and the use of PIND tested limit switches. The switch module will be removed and replaced with a switch module from OV-102 which is being reworked. The OV-104 switch module will be reworked and used on OV-102.

- CLOSURE RATIONALE:

The cause of the anomaly was improper rigging in the starboard aft bulkhead PLBD switch module. The Aft starboard PLBD switch module was removed and replaced with a reworked switch module. This rework, which was first implemented in January 1986, is done with clarified rigging instructions and requires the potting of set screws after adjustment as well as the replacement of all microswitches with PIND-tested limit switches. The replacement of switch modules with reworked modules was being down on an attrition-only basis.

1

IFA NUMBER> STS-66-V-03

TITLE:FC 2 ALTERNATE H2O LINE CV LEAKAGE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 307 : 18.00.00

IFA DATE: 11/03/1994

IFA STATUS: CLOSED : 04/13/1995 ELAPSED TIME: 000 : 01.00.17

PRACA STATUS: CLOSED : 1995-11-28 HOUSTON TIME: 12.00.00

PRCBD NUMBER: S062105L PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 71V-0005 M EGIL-02

P CAR 66RF04

0 CLOSURE INITIATED BY: JSC-FA22/W. ARCENEAUX

RESPONSIBLE MANAGERS 1: H.ARCENEAUX X33335

2:

0 DESCRIPTION:

The fuel cell 2 alternate water line temperature increased from 84 to 138 deg F in one hour. The temperature remained steady in the 130 to 140 deg F range throughout the flight. The temperature should have cycled (as the line heater cycle) in the 70 to 90 deg F range. This indicated that warm fuel cell water was flowing through the alternate water line check valve at a high enough rate to keep the alternate water line temperature almost equal to the product water line temperature, which is 140 to 145 deg F. This signature was different than previous occurrences of alternate water line check valve leaks. In the past, the temperatures were erratic, going from 70 to 130 deg F, with varing temperature rise and fall rates, which indicated the check valve was just leaking a small amount of warm fuel cell water. The temperature from STS-66 indicated a higher flow rate through the check valve. Leakage has been seen through this CV on previous flights of OV-104. Troubleshooting performed at Dryden verified that the alternate H2O line CV leaks. The CV will be removed and replaced.

- CLOSURE RATIONALE:

Preliminary findings of the failure analysis indicate that leakage through the FC 2 alternate water line check valve ocurred because the valve's O-ring seating surface had deteriorated over time. Failure analysis is continuing in an attempt to determine what caused the

valve's elastometric seating material to deteriorate. The FC 2 alternate water line check valve was replaced and satisfactorily retested. The removed valve was sent to Rockwell-Downey for failure analysis.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-66-V-04

TITLE:WSB 3 GN2 REGULATOR OUTLET PRESSURE DECAY

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 309 : 17.00.00

IFA DATE: 11/05/1994

IFA STATUS: CLOSED : 03/31/1995 ELAPSED TIME: 002 : 00.00.17

PRACA STATUS: CLOSED : 1995-05-08 HOUSTON TIME: 11.00.00

PRCBD NUMBER: S062105F PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 71V-0023	M	MMACS-02
P	CAR 66RF05		

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

RESPONSIBLE MANAGERS 1: K.BROWN X33891

2:

0 DESCRIPTION:

The WSB 3 GN2 regulator outlet pressure began decreasing following WSB deactivation post ascent. At deactivation, the regulator outlet pressure was 27.5 psia and by 309:14:00, the pressure had decayed to 21.9 psia. This corresponds to a leak rate of approximately 0.124 psi/hour. This reg (S/N 016) was installed on OV-102 prior to STS-5 and flew eight flights through STS-50. After STS-50, the WSB (S/N 009) was removed due to a pinhole leak through the heat exchanger core. STS-66 is the first flight since STS-50 (6/92) for this WSB and regulator.

This is a -4 regulator. The leak continued at a decreasing rate throughout the flight. The pressure was 15.3 psia when the WSB was activated for entry. KSC will troubleshoot.

- CLOSURE RATIONALE:

The most probable cause of the regulator outlet presssure decay is the compression set taken by the relief valve poppet seal. The silicone seal experienced a constant spring load for 4 years and 8 months.

KSC troubleshooting included a crack and reseat test of the GN2 regulator. A decay test was also perfomed with indeterminate results. The decision was made to replace and upgrade the WSB 3 regulator along with the other two WSB regulators. The exposure to spring force on the three replacement regulators's relief valve poppet seals was approximately 2 months when installed in the Orbiter.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-66-V-06

TITLE:FES PRI A OSCILLATIONS AT LOW HEAT LOADS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 308 : 23.20.00

IFA DATE: 11/04/1994

IFA STATUS: CLOSED : 04/13/1995 ELAPSED TIME: 001 : 06.20.17

PRACA STATUS: CLOSED : 1995-08-28 HOUSTON TIME: 17.20.00

PRCBD NUMBER: S062105J PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 71V0020	M	EECOM-02
P	CAR 66RF07		

0 CLOSURE INITIATED BY: JSC-FA22/P. OLIVER

RESPONSIBLE MANAGERS 1: P.OLIVER X33323

2:

0 DESCRIPTION:

During several periods of FES operation while on the Pri A controller during flight day 2, slight oscillation in the FES outlet temperatures were noted. These oscillations were 2 to 3 deg F in magnitude and occurred only at low heat loads (radiator outlet temperatures in the 40 deg to 45 deg F range). The FES Pri B controller was powered on at 311:13:25 G.m.t. No low heat load oscillations in the FES outlet temperatures were observed while using the FES Pri B controller G.m.t. The FES Pri A controller was enabled at 316:16:55 G.m.t. and similar outlet temperature oscillations recurred at low heat loads. As a result of the FES Pri B controller problems, the Pri A controller was used during entry and its performance was nominal (high heat loads). KSC will troubleshoot.

- CLOSURE RATIONALE:

The cause of the temperature oscillations observed during the flight at low heat loads was a leaking primary A water spray valve. The valve was removed and replaced. The replacement valve passed a leak check. The leaking valve was returned to the vendor for failure analysis.

1

IFA NUMBER> STS-66-V-07

TITLE:NSP 2/KU-BAND INTERFACE CHANNEL 1 FAILURE

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 311 : 20.59.00

IFA DATE: 11/07/1994

IFA STATUS: CLOSED : 05/10/1995

ELAPSED TIME: 004 : 03.59.17

PRACA STATUS: CLOSED : 1995-03-18

HOUSTON TIME: 14.59.00

PRCBD NUMBER: S062105T PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 71V-0024 M INCO-02

P CAR 66RF08

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

RESPONSIBLE MANAGERS 1: D. GERLACH X33337

2:

0 DESCRIPTION:

On orbit 61W with the network signal processor-2 (NSP-2) configured for two-way Ku-band, both White Sands and Second TDRS Ground Terminal (STGT) observed channel 2 and channel 3 data on the downlink but did not observe modulation on channel 1 for several passes. NSP-2 was configured for S-band with coding OFF to observe Ku-band channel 1 and to maintain the link simultaneously. Ku-band channel 1 modulation was not observed. On Orbit 66W, the link was configured using the second string NSP, NSPS-1. Both White Sands and STGT observed Ku-band channel 1 modulation. Symptoms indicate a problem in the interface or the logic driving the interface between NSP-2 was reselected at 317:22:27 G.m.t. and nominal Ku-band channel 1 modulation was observed with and without coding. KSC will troubleshoot.

- CLOSURE RATIONALE:

Postflight, both S-band and Ku-Band systems were powered on and wiggle checks were performed on the NSP-2 to the signal processor assembly (SPA) data and data-select lines. Also, a total of five Ku-Band standby-to-on system power cycles were performed. The anomaly, however, was not reproduced. Since the cause of the anomaly can only be attributed either to ground terminal errors or hardware/wiring failures within the Orbiter, analysis of this anomaly was focused on those areas. To determine the most probable cause of the anomaly, each of the following areas were evaluated: NSP-2, Ku-Band system, forward load control assembly (FLCA)-3, ground control interface logic (GCIL), and

Ground terminals and TDRSS's. The most probable cause for the anomaly is intermittent operaton of the NSP-2 line driver or the SPA data source selection relays. This anomaly is being closed as an unexplained event.

1

IFA NUMBER> STS-66-V-08

TITLE:ENGINE 1 LH2 INLET PRESSURE RESPONSE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 307 : 17.03.00
IFA DATE: 11/03/1994
IFA STATUS: CLOSED : 02/24/1995 ELAPSED TIME: 000 : 00.03.17
PRACA STATUS: CLOSED : 1995-05-21 HOUSTON TIME: 11.03.00
PRCBD NUMBER: S062105B PHASE: ASCENT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER
K IPR 71V-0007 P CAR 66RF09

0 CLOSURE INITIATED BY: JSC-FA2/B. ELIASON
RESPONSIBLE MANAGERS 1: B. ELIASON X36037
2:

0 DESCRIPTION:

Approximately 2.5 minutes after liftoff, the engine 1 LH2 inlet pressure (V41P1100C) dropped from approximately 24.5 psia to 22 psia by 4 minutes after liftoff. A signature similar to the engine 1 LH2 inlet pressure signature seen during STS-66 has been present on every OV-104 flight since installation of the current pressure transducer (9 flights). KSC will troubleshoot with probable removal and replacement of the pressure transducer.

- CLOSURE RATIONALE:

The most likely cause of this signature is the pressure transducer. The pressure drop signature after SRB separation was first observed on the flight immediately following this transducer being installed and has been present during every flight since that time. The pressure transducer (s/n 138) was removed and replaced. Data review will resume after the next flight of this vehicle to confirm that there is no recurrence of the failure.

1

IFA NUMBER> STS-66-V-09

TITLE:GPC 4/MMU 1 INTERFACE PROBLEM

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 315 : 13.20.00

IFA DATE: 11/11/1994

IFA STATUS: CLOSED : 04/24/1995 ELAPSED TIME: 007 : 20.20.17

PRACA STATUS: CLOSED : 1995-06-30 HOUSTON TIME: 07.20.00

PRCBD NUMBER: S062105N PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 71V-0010 M DPS-01

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

RESPONSIBLE MANAGERS 1: B.ELIASON X36037

2:

0 DESCRIPTION:

During an SM checkpoint GPC 4 annunciated I/O ERROR MMU 1 and CHECKPOINT FAIL messages. Recovery procedures were unsuccessful and troubleshooting steps indicated a problem with the GPC 4 to MMU 1 interface. The GPC 1 to MMU 1 interface was verifed as was the GPC 4 to MMU 2 interface. MMU 2 was selected. A software dump of GPC-4 showed no additional or contradictory symptoms. Following CHRISTA/SPAS retrieval, SM was moved to GPC 3 and GPC 4 was placed in a redundant set

with GPC 1 for monitoring. GPC 4 was used in the G3 redundant set for entry with nominal stringing. KSC will troubleshoot.

- CLOSURE RATIONALE:

The cause of the failure was two open pins on a transformer in the MIA. These may have resulted from a broken wire in the transformer. GPC 4 was removed and replaced with another. Failure analysis is on-going at the vendor.

1

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IFA NUMBER> STS-66-V-10

TITLE:ICE FORMATION DURING SUPPLY WATER DUMP

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 315 : 15.56.00

IFA DATE: 11/11/1994

IFA STATUS: CLOSED : 03/22/1995 ELAPSED TIME: 007 : 22.56.17

PRACA STATUS: CLOSED : 1995-04-18 HOUSTON TIME: 09.56.00

PRCBD NUMBER: S062105D PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 71V-0013 M EECOM-06

P CAR 66RF10

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

RESPONSIBLE MANAGERS 1: D. GERLACH X33337

2:

0 DESCRIPTION:

During video downlink a finger of ice was observed growing toward the supply water being dumped at the time. The ice initially formed on the port PLBD. The dump was terminated on time before the ice reached the nozzle. The dump was a simultaneous waste and supply water dump. The

waste water dump had been terminated earlier. KSC will troubleshoot.

- CLOSURE RATIONALE:

The supply water dump nozzle spray steam was canted above the horizontal by 5 deg toward the PLBD causing the supply water spray stream to impinge upon the door during supply water dumps. The supply water nozzle was rotated 180 deg to direct the supply water spray stream away from the PLBD. All other orbiters will have a spray test performed to verify proper supply water spray nozzles prior to their next flight.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-66-V-11

TITLE:LEFT RCS 3/4/5 CROSSFEED FUEL VALVE OPERATION

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 317 : 05.42.00

IFA DATE: 11/12/1994

IFA STATUS: CLOSED : 05/22/1995 ELAPSED TIME: 009 : 12.42.17

PRACA STATUS: CLOSED : 1995-10-24 HOUSTON TIME: 23.42.00

PRCBD NUMBER: S062105U PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 71V-0008 M PROP-02

P CAR 66RF14

0 CLOSURE INITIATED BY: JSC-FA2/W. ARCENEAUX |

RESPONSIBLE MANAGERS 1: H. ARCENEAUX X33335

2:

0 DESCRIPTION:

The RCS was reconfigured from interconnect to straight feed. Telemetry indicated ac motor-valve current on the AC 1 bus and a toggling closed valve position indicator on the left RCS 3/4/5 fuel crossfeed valve after the valve switch controlling both the oxidizer and fuel valves was

moved to the close position. The valve continued to drive until the switch was cycled and then taken to GPC to remove the close commands. At the time of the switch cycle, data indicate that 2 of 3 ac 1 phases had dropped off due to a thermal cutoff in the motor. The valve's ac motor was allowed to cool, and the crew repeated the valve cycle attempt. Nominal movement occurred on both the fuel and oxidizer valves. The valve again failed to indicate closed during entry when the switch was in GPC. During the nominal post landing valve test, the valve cycled as expected. KSC will troubleshoot.

- CLOSURE RATIONALE:

The most probable cause is an intermittent open circuit in the left RCS 3/4/5 fuel crossfeed valve (LV273) closed valve position indication circuitry for control logic and telemetry between the ACMV and AMCA 1. The problem is probably located the left pod wiring, which has not been fully tested due to access restrictions with the pod installed. Vehicle troubleshooting and ACMV failure analysis activities were unable to reproduce or find a cause for the anomaly. A replacement ACMV actuator was installed and successfully retested. Testing of left pod wiring between the ACMV actuator and the pod interface has been deferred until pod removal permits access.

1

IFA NUMBER> STS-66-V-12

TITLE:APU 1 SUPPLY LINE TEMPERATURE DECREASE

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 318 : 16.00.00

IFA DATE: 11/14/1994

IFA STATUS: CLOSED : 05/01/1995 ELAPSED TIME: 010 : 23.00.17

PRACA STATUS: CLOSED : 1995-05-15 HOUSTON TIME: 10.00.00

PRCBD NUMBER: S062105P PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 71V-0011 M MMACS-08

P CAR 66RF15

0 CLOSURE INITIATED BY: JSC-FA2/K. BROWN |

RESPONSIBLE MANAGERS 1: K. BROWN X33891

2:

0 DESCRIPTION:

During entry, about 8 minutes after APU 1 start, the APU 1 supply line temperature decreased from 80 to 52 deg F over a 35 minute period. Just prior to touchdown, the temperature began to increase. All other APU 1 parameters were nominal. As a precaution, APU 1 was shut down immediately after wheel stop. A sniff check and visual inspection of the APU were performed at Dryden. No evidence of a fuel leak was found. KSC will troubleshoot prior to returning the APU to Sundstrand for planned work.

- CLOSURE RATIONALE:

The cause for the APU 1 GGVM fuel supply line temperature decrease observed during entry is believed to be the TRJ. The TRJ was considered suspect and was replaced. It was sent to the KSC Failure and Analysis Lab with no anomalous condition found. With the replacement TRJ in place, the in-flight signature did not manifest itself but a 25 deg F bias was observed. The splices were replaced and the signal conditioner and multiplexer-demultiplexer (MDM) were tested again with no cause for the bias determined. A new TRJ was installed and a nominal temperature measurement reading was noted. The original and replacement TRJs were sent to the KSC Failure Analysis Lab. Both TRJs will be removed from the flight spares regardless of the testing and failure analysis results.

1

IFA NUMBER> STS-66-V-13

TITLE:FES PRI B SHUTDOWNS AND OSCILLATIONS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 311 : 13.26.00

IFA DATE: 11/07/1994

IFA STATUS: CLOSED : 04/13/1995 ELAPSED TIME: 003 : 20.26.17

PRACA STATUS: CLOSED : 1995-09-11 HOUSTON TIME: 07.26.00

PRCBD NUMBER: S062105K PHASE: ON-ORBIT

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 71V-0020	M	EECOM-04
M	EECOM-07	P	CAR 66RF16

0 CLOSURE INITIATED BY: JSC-FA22/P. OLIVER

RESPONSIBLE MANAGERS 1: P.OLIVER X33323

2:

0 DESCRIPTION:

The FES experienced an over-temperature shutdown during its first start up on the primary B controller. The primary B controller power was cycled and a normal start-up was seen. The most probable cause of this shutdown was a small amount of air in the water system. Similar shutdowns have been seen on past flights which had FES change-outs prior to flight. The FES B controller experienced an under-temperature shutdown. The primary B controller power was cycled and the FES operated normally until radiator bypass was selected. Following radiator bypass/FES checkout, several large transients occurred on the primary B controller. The evaporator outlet temperature oscillated between 34 deg F and 47 deg F and the primary A controller was selected. KSC will troubleshoot.

- CLOSURE RATIONALE:

The most probable cause of the FES shutdown on the initial primary B controller start-up was trapped air being expelled. The cause of the FES under-temrperature shutdown and the temperature oscillations while using the primary B controller was a failure of the primary B mid-point temperature sensor. The midpoint control sensor failure caused over-cooling and under-temperature shutdowns in topping mode. If the full-up mode, the failed sensor caused "controller confusion" and temperature oscillations.

1

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IFA NUMBER> STS-66-V-14

TITLE:THRUSTER R3R FUEL INJECTOR TEMPERATURE FAILED OSH

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 318 : 15.26.00

IFA DATE: 11/14/1994

IFA STATUS: CLOSED : 04/07/1995 ELAPSED TIME: 010 : 22.26.17

PRACA STATUS: CLOSED : 1995-05-21 HOUSTON TIME: 09.26.00

PRCBD NUMBER: S062105H PHASE: ENTRY/LANDING

0 TYPE	TRACKING NUMBER	TYPE	TRACKING NUMBER
K	IPR 71V-0009	M	PROP-04
P	CAR 66RF17		

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

RESPONSIBLE MANAGERS 1: D. MCCORMACK X33327

2:

0 DESCRIPTION:

During entry the primary thruster R3R fuel injector temperature went off-scale high. The initial indication was followed by two dips in temperature after which it remained off-scale high. The loss of this sensor did not affect entry operations. KSC to troubleshoot. If problem is with the transducer, the thruster will be removed and

replaced.

- CLOSURE RATIONALE:

The cause of the anomaly was a failed-open circuit in the variable-resistor leg of the primary thruster R3R fuel injector temperature transducer. Thruster R3R was removed and replaced and sent to the WSTF for failure analysis. Failure history suggests that the anomaly is not generic. Loss of a primary-thruster injector-temperature sensor (fuel or oxidizer) results in the loss of leak detection for the affected thruster. However, the thruster would be placed in last priority and could be used, if required.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-66-V-15

TITLE:DAMAGED TILE ALONG AFT EDGE OF WINDOW 8

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 308 : 22.09.00

IFA DATE: 11/04/1994

IFA STATUS: CLOSED : 04/21/1995 ELAPSED TIME: 001 : 05.09.17

PRACA STATUS: CLOSED : 1995-01-27 HOUSTON TIME: 16.09.00

PRCBD NUMBER: S062105M PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EECOM-01 P CAR 66RF18

0 CLOSURE INITIATED BY: JSC-FA2/K. BROWN

RESPONSIBLE MANAGERS 1: K BROWN X333891

2:

0 DESCRIPTION:

The inboard straight tile along the aft edge of the port overhead window (W8) was damaged during flight. The tile (V070-390068-059) is in the

same location as the tile that failed during STS-68. During that mission, the tile fractured along a plane at the tile densified layer and therefore the majority of the tile was lost. On this mission, the damage is located along the lip of the tile facing the window and the damaged area is approximately 3 1/2 inches long and 3/4 inch deep.

- CLOSURE RATIONALE:

The most probable cause of the tile damage is ground handling because of the high frequency of overhead window replacements that have occurred and the low probability of debris contact as indicated by Orbiter flow fields. The missing tile was replaced with an upgraded 12-lb tile in accordance with the attrition modification because of the damage-prone nature of the carrier panel tile. Workmanship meetings with engineering, quality, and shop personnel have been held to ensure proper techniques when repairing tiles in this area.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

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IFA NUMBER> STS-66-V-16

TITLE:AV BAY 2 SMOKE DETECTOR A NEGATIVE EXCURSIONS

0 MISSION CONSTRAINT: SUBS IFA TIME GMT: 314 : 03.18.00

IFA DATE: 11/09/1994

IFA STATUS: CLOSED : 05/23/1995 ELAPSED TIME: 006 : 10.18.17

PRACA STATUS: CLOSED : 1995-06-28 HOUSTON TIME: 21.18.00

PRCBD NUMBER: S062105V PHASE: ON-ORBIT

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

M EECOM-05 P CAR 66RF19

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

RESPONSIBLE MANAGERS 1: D. MCCORMACK X33327

2:

0 DESCRIPTION:

The AV bay 2 smoke detector concentration sensor A showed a shift in the concentration to about -400 to -500 microgram/m3. It remained at this level for about 14 hours and exhibited intermediate shifts until the end of the mission. The redundant detector in av bay 2 indicated nominal values (-100 to 100 microgram/m3) throughout this period. Smoke detector self tests were performed on-orbit and the indication was that the detector was functioning nominally. This same detector experienced negative excursions to -700 microgram/m3 on the previous flight of OV-104. KSC will troubleshoot with probable removal and replacement.

- CLOSURE RATIONALE:

The cause of the negative excursions in the avionics bay 2 smoke detector A indicated smoke concentrations is unknown. Thermal stress testing on the smoke detector at NSLD indicates that the detector output drops off when operated at the upper end of its certified operational temperature range. Based on the vehicle and NSLD testing, the problem is believed to be within the smoke detector.

1

STS-066 (OV-104,FLT #13) INFLIGHT ANOMALY REPORT 10/19/98

IFA NUMBER> STS-66-V-17

TITLE:BIT FAILURE ON MDM FA3 CARD 3

0 MISSION CONSTRAINT: SUBS

IFA TIME GMT: 318 : 15.58.00

IFA DATE: 11/14/1994

IFA STATUS: CLOSED : 05/23/1995

ELAPSED TIME: 010 : 22.58.17

PRACA STATUS: CLOSED : 1995-04-08

HOUSTON TIME: 09.58.00

PRCBD NUMBER: S062105Q

PHASE: POST LANDING

0 TYPE TRACKING NUMBER TYPE TRACKING NUMBER

K IPR 71V-0026

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

RESPONSIBLE MANAGERS 1: B. ELIASON X36037

2:

0 DESCRIPTION:

About 20 minutes after the postlanding ET umbilical door opening, the ET umbilical door aft centerline latch 2 locked indication 2 (V56X1365X) transferred on for 8 seconds and then off. The two stow indications remained on and the locked indication 1 stayed off throughout the entire time, indicating that the centerline latch could not have moved. This discrete goes through MDM FA3 card 3 channel 1 bit 14. After the vehicle was powered up in the OPF, BITE testing of MDM FA3 confirmed that the failure was in the MDM. Troubleshooting is continuing with probable removal and replacement of MDM FA3.

- CLOSURE RATIONALE:

The most likely cause of the failure is degradation of the circuit board due to voltage and temperature cycles. The MDM, was removed and replaced. The circuit board will be repaired by installing a jumper wire and the MDM will be returned to flight spares after undergoing acceptance test procedures. Based on the failure history, this is not believed to be a generic failure.

-JFDPO12: NORMAL TERMINATION OF PROCESSING