SSVEO IFA List **Date:02/27/2003**

STS - 30, OV - 104, Atlantis (4) **Time:04:21:PM**

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Prelaunch	Problem	**FIAR**	**IFA** STS-30-V-01	Atmospheric
EECOM-01	**GMT:** Prelaunch		**SPR** 30RF04	**UA**	Revitalization Subsytem
			IPR 30RV-0256	**PR** ECL-4-04-0337	**Manager:**
					Engineer:

Title: Cabin Pressure Transducer Anomalous Readings (ORB)

Summary: DISCUSSION: On the first launch attempt (April 28) during the 2 psid cabin integrity check, the cabin pressure transducer failed to accurately reflect the 2 psi cabin pressure increase and subsequent decay back to normal cabin pressure. The transducer registered a maximum cabin pressure of approximately 15.2 psi during the test (should have been 16.7 psi), and then maintained this pressure reading when the cabin pressure decayed back down to 14.7 psi. This pressure transducer anomaly was not a constraint to the first launch attempt since the Launch Commit Criteria (LCC)-specified cabin pressure rate-of-change measurement was available as a backup (LCC 6.8.1-04).

Following the scrub, an inspection revealed that a cap had been placed on the cabin pressure transducer outlet port (TP19). No records existed of this cap being placed on the port nor did any procedures exist that required placing a cap on this port. The cap was removed and the cabin pressure transducer operated nominally. CONCLUSION: The cabin pressure transducer provided anomalous readings because of a cap having been inadvertently placed on the transducer outlet port. CORRECTIVE_ACTION: The S0007 launch countdown procedures have been modified to include a visual inspection of the cabin pressure transducer ports during Waste Collection System (WCS) closeout activities. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:**	Problem	**FIAR**	**IFA** STS-30-V-02	OI
A.) MMACS-01,B.)	**GMT:**		**SPR** A.) 30RF05,B)	**UA**	**Manager:**
MMACS-01, C.) MMACS-			30RF06, C.) 30RF07, D)	**PR** B) APU-A-0007, C)	
01, D) BST			30RF08, E)	APU-4-04-0136, D) MPS-	**Engineer:**

IPR 044-05-049

Title: Operational Instrumentation Failures (ORB)

Summary: DISCUSSION: A. The auxiliary power unit (APU) 3 exhaust gas temperature (EGT) 2 (V46T0340A) sensor failed during prelaunch APU startup operations. KSC has removed and replaced the sensor. Failure analysis will be tracked by CAR 30RF05. This is a criticality 3 measurement. This problem is closed.

B. APU 1 EGT 1 (V46T0142A) sensor failed during APU startup operations. KSC has removed and replaced the sensor. Failure analysis will be tracked by CAR 30RF06. This is a criticality 3 measurement. This problem is closed. C. APU 2 EGT 1 (V46T0242A) sensor failed during APU startup operations. KSC has removed and replaced the sensor. Failure analysis will be tracked by CAR 30RF07. This is a criticality 3 measurement. This problem is closed. D. The Space Shuttle main engine (SSME) no. 3 GH2 pressure system temperature (V41T1361A) sensor failed off-scale high. KSC has replaced the failed sensor. Failure analysis will be tracked by CAR 30RF08. This is a criticality 3 measurement. This problem is closed. E. The SSME no. 1 engine LH2 inlet pressure (V41P1100C) sensor failed. KSC has replaced the failed sensor. Failure analysis will be tracked on CAR 30RF09. This is a criticality 3 measurement. This problem is closed. F. Fuel cell no. 2 H2 flowmeter (V45R0270A) shifted high by 0.2 - 0.3 lb/hr (nominal is 0.4 ? 0.2 lb/hr). However, the sensor started working properly toward the end of the mission. Defer maintenance until next flow. KSC PR-FCP-4-05-0107 and IM30RF09 will track maintenance and failure analysis. This is a criticality 3 measurement. This problem is closed. G. APU 1 EGT 2 (V46T0140A) failed during entry. KSC has removed and replaced the failed sensor. Failure analysis will be tracked by CAR 30RF11. This is a criticality 3 measurement. This problem is closed. H. SSME no. 2 LH2 inlet pressure transducer was reading about 10 psi lower than actual pressure during landing. KSC evaluation showed that SSME no. 2 LH2 inlet pressure is typically 10 psi lower than the other two engines. JSC and Rockwell-Downey agree that is nominal operation. Final closeout will be tracked by CAR 30RF11. No further action required. This is a criticality 3 measurement. This problem is closed. CONCLUSION: See above. CORRECTIVE_ACTION: See above. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Prelaunch	Problem	**FIAR**	**IFA** STS-30-V-03	MPS
BSTR-01	**GMT:** Prelaunch		**SPR** 30RF01	**UA**	**Manager:**
			IPR 30RV-0259	**PR** MPS-4-04-0487	
					Engineer:

Title: SSME 1 LH2 Recirculation Pump Failure (ORB)

Summary: DISCUSSION: During the first launch attempt, the Space Shuttle Main Engine (SSME) 1 liquid hydrogen (LH2) recirculation pump shutdown at T-59 seconds. This caused a launch recycle and scrub. Analysis showed that the pump ceased operating because of a power surge in the phase B ground power circuit that tripped a 20-A circuit breaker which controlled ground power to the pump.

Inspection of the pump power connector revealed evidence of short circuit (arcing) condition caused by a metallic contaminant between pin 8 (the phase B power pin), and the motor cover housing. Several other metallic particle samples were collected from the motor cavity and the pump package filter. The particles consisted of aluminum, stainless steel, and lead. The LH2 recirculation pumps are used only to thermally pre-condition the SSME's during prelaunch operations and have no function following lift-off. Similar prelaunch short circuit problems have occurred on STS-1 and STS 51-I. CONCLUSION: The SSME LH2 recirculation pump most probably ceased operating because a conductive contamination particle produced arcing in the pump power connector between the phase B pin and the housing of the motor cover. This tripped the ground-power-supply circuit breaker. CORRECTIVE_ACTION: The recirculation pump package was removed and replaced. The subsequent launch attempt using the new pump was successful. For future missions, an epoxy resin potting material will be applied to the connector surface to reduce the possibility of a similar arcing condition. A launch Commit Criteria change is being submitted that will permit switching to an alternate ground power supply only in the event that an LH2 recirculation pump output pressure loss is attributed to a ground power supply failure. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Prelaunch	Problem	**FIAR**	**IFA** STS-30-V-04A	GFE
None	**GMT:** Prelaunch		**SPR** KB0821	**UA**	**Manager:**
			IPR	**PR** FCS-4-04-0194, LAF-4-04-0086	**Engineer:**

Title: Mission Specialist 1 Seat Right Hand Should Belt Adjuster Loose (GFE)

Summary: DISCUSSION: During the first launch attempt (4-28-89), the Mission Specialist 1 (MS1) seat right-hand shoulder belt adjuster would not maintain tension in the belt. Subsequent inspection showed that the "C" clip, which retained the pressure bar in the adjuster, was mission from the adjuster. A search of the crew cabin failed to find the missing "C" clip.

The entire MS1 seat was removed and replaced prior to the next launch attempt. No further anomalies were noted with the belt adjuster. CONCLUSION: The MS1 seat right-hand shoulder belt adjuster failed to maintain tension in the belt because the "C" clip was missing from the adjuster. CORRECTIVE_ACTION: The MS1 seat was removed and replaced prior to the next launch attempt. The removed seat is in rework. A design change is under consideration that will maintain the integrity of the adjuster after the loss of a "C" clip. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:**	Problem	**FIAR** BFCE 210F003	**IFA** STS-30-V-04B	GFE
MMACS-04	**GMT:**		**SPR**	**UA**	**Manager:**
			IPR None	**PR**	
					Engineer:

Title: Arriflex 16mm Camera Operatre Level Failed (GFE)

Summary: DISCUSSION: At approximately 125:23:48 G.m.t. the crew reported that the operate level on the Arriflex 16mm motion picture camera had failed. The crew performed a standard malfunction procedure to regain camera operation which involved bypassing the operate lever and plugging/unplugging the battery package to activate and deactivate the camera.

The plastic operate lever on this camera broke, causing the failure. Similar problems have been encountered previously. Replacement of the plastic camera operate levers with metal levers was in progress on the Arriflex camera inventory during the STS-30 flight. The Arriflex camera flown on STS-30 was not modified prior to the flight. CONCLUSION: Failure of the Arriflex operate lever was a known problem that was being corrected within the Arriflex camera inventory at the time of the failure. CORRECTIVE_ACTION: Modification of the Arriflex inventory to alleviate this problem is under way. All Arriflex cameras presently in FEPC inventory will be inspected to ensure that each plastic operate level has been changed out with a metal operate lever. It is anticipated that all Arriflex cameras will be inspected and modified as required prior to the next flight. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 002:05:01	Problem	**FIAR** BFCE-023-F002,	**IFA** STS-30-V-04C	GFE
EECOM-04	**GMT:** 126:23:48		BFCE-023-F003, BFCE-	**UA**	**Manager:**
			023-F004	**PR**	
			SPR		**Engineer:**
			IPR None		

Title: Galley Failures (GFE)

Summary: DISCUSSION: Three problems involving the galley were encountered during the mission.

1) The rehydration-station water-dispenser output was erratic in the amount of water dispensed for selected quantities of water below 8 ounces. The crew performed an in-flight maintenance procedure and was able to utilize the hygiene station for rehydration for the remainder of the flight. Troubleshooting at JSC repeated the problem which was traced to a bad solder joint that connected the water quantity selector switch to the wire leading to the galley control electronics assembly. The joint was re-soldered and the problem cleared. 2) The crew was unable to separate the chilled water quick disconnect (QD) so that it would be attached to the backup water dispenser. Troubleshooting at Dryden, KSC, and the Flight Equipment Processing Contractor (FEPC) all failed to reproduce the problem. However, this particular QD is wrapped with insulation and therefore requires a slightly different separation technique than other QD's. This technique was not included in the crew training. 3) The package-in-place level stuck in the "in-place" position approximately 80 percent of the time. However, the crew was able to manually reset the level each time it became stuck. This same problem occurred on the last flight of this vehicle but could not be duplicated in ground test. The problem was repeated during troubleshooting after this flight. The

cause of the problem was that the lever return spring jammed in a spot where an interference fit existed. The unique tolerance buildup in the OV-104 unit has caused a problem in only this unit. The remainder of the package-in-place lever units on the other flight units have not exhibited this problem. CONCLUSION: 1) The erratic water quantities that were dispensed resulted from a bad solder joint connecting the water quantity select switch to the galley control electronics. 2) The QD problem could not be duplicated, but may have been caused by unique procedures required to separate this particular QD which the crew had not trained for. 3) The package-in-place lever problem was caused by the lever return spring jamming. CORRECTIVE_ACTION: 1) The solder joint has been re-soldered. 2) Procedural differences for separating the chilled water QD will be delivered to crew training personnel for incorporation into the crew training flow. 3) The OV-104 rehydration station will be replaced with a spare. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 001:18:05	Problem	**FIAR** BFCE-210F002	**IFA** STS-30-V-04D	Hasselblad Camera
MMACS-05	**GMT:** 126:12:52		**SPR**	**UA**	**Manager:**
			IPR None.	**PR**	
					Engineer:

Title: Hasselblad 70mm Camera Failed (GFE)

Summary: DISCUSSION: At 126:12:52 G.m.t., the crew reported that the shutter had jammed on one of the two onboard Hasselblad 70 mm. cameras. The crew then tried to remove the camera's lens and found that the lens was seized to the camera body and could not be removed. The crew used the second Hasselblad camera for the remainder of the flight with no problems.

CONCLUSION: The Hasselblad 70 mm camera suffered mechanical failure which jammed the shutter between the open and closed positions. This failure caused the camera to stall in mid-cycle rendering the camera unusable for the remainder of the flight. CORRECTIVE_ACTION: The camera has been returned to the vendor for repair. This hardware is off-the-shelf hardware therefore, a detailed failure analysis may not be supplied. Even if this problem recurred on a future flight, a second Hasselblad camera is manisfested on every mission. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 001:18:05	Problem	**FIAR** BFCE-029-F011	**IFA** STS-30-V-04E	CCTV
INCO-03	**GMT:** 126:12:52		**SPR**	**UA**	**Manager:**
			IPR None.	**PR**	
					Engineer:

Title: Spots on the Image from Closed Circuit Television Camera A (GFE)

Summary: DISCUSSION: Starting at approximately 126:12:52 G.m.t., two overlapping translucent white spots, each approximately one-eighth inch in diameter, appeared

above mid-screen on the downlinked image from closed circuit television (CCTV) camera A. In addition, five black spots that were all less than one thirty-second of an inch in diameter were noted scattered across the screen. The spots remained stationary when the camera zoom was varied.

Postflight, the camera was removed and returned to the Flight Equipment Processing Contractor (FEPC) for troubleshooting. Troubleshooting efforts duplicated the problem and traced the spots to a burned silicon-intensifier-target (SIT) tube which serves as the image sensor for the camera. The tube evidently was burned by being exposed to excessive illumination in-flight. The camera has been returned to the vendor for replacement of the SIT tube. CONCLUSION: The spots on the image from CCTV camera A were caused by a burn on the SIT tube that resulted from exposure to excessive illumination. CORRECTIVE_ACTION: The CCTV camera A has been returned to the vendor for replacement of the SIT tube. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:10:07	Problem	**FIAR** BFCE-029-F010	**IFA** STS-30-V-04F	GFE
INCO-02	**GMT:** 125:04:54		**SPR**	**UA**	**Manager:**
			IPR None.	**PR**	
					Engineer:

Title: Illegible Teleprinter Messages (GFE)

Summary: DISCUSSION: During the first day of the mission the crew reported that the top half of the characters on their teleprinter messages were not legible. However, the complete messages were still decipherable by the crew.

Postflight, the teleprinter was returned to the Flight Equipment Processing Contractor (FEPC) for troubleshooting. FEPC found that the teleprinter character hammers were coated with a buildup of ink that slowed their motion, causing some distortion of the character quality. In addition, the paper was found to have threaded incorrectly into the teleprinter prior to the flight, causing further distortion of the print. CONCLUSION: The illegible teleprinter characters were caused by a combination of heavy ink buildup on the character hammers, as well as the paper having been threaded incorrectly into the teleprinter. CORRECTIVE_ACTION: FEPC procedures for pre-mission preparation of the teleprinter will be modified with cautionary notes to inspect the hammers for ink buildup and to verify proper threading of the paper. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Postlanding	Problem	**FIAR** None	**IFA** STS-30-V-04G	GFE
None	**GMT:** Postlanding		**SPR**	**UA**	**Manager:**

IPR None. **PR**

Engineer:

Title: Gas Bubbles in Drinking Water (GFE)

Summary: DISCUSSION: During postflight debriefing, the crew reported excessive gas bubbles in the drinking water. Postflight analysis found a hydrogen concentration of 0.5 percent in drink containers filled in flight. This level of hydrogen is inconsequential, however hydrogen diffuses out of the plastic drink containers so the actual hydrogen concentration in flight is unknown. A foil lined drink container, which retains hydrogen better than standard drink containers, was returned from the STS-28 flight and contained 0.6 percent hydrogen.

The bubble phenomena have been randomly reported by crews on previous flights. Gas has also been reported in the drinking water even when the galley was not on-board. When gas bubbles are encountered in the drinking water, the crew can use the gas-water separator apparatus, which is carried on every flight, to remove the gas. JSC personnel are investigating the possibility of pulling a vacuum on the supply water system and galley prior to loading water onboard for future flights. This procedure may eliminate any trapped air in the system, possibly reducing the bubble problem. In addition, a ground test apparatus, consisting of a simulated supply water system and the galley trainer unit, is being assembled at JSC in an attempt to determine how gas enters the drinking water system. Tests will be performed in late 1989. Should results of this test pinpoint the source of the gas, this information will be considered in any further galley or supply water system redesign efforts or operational changes. Since no conclusive information on the source of the gas is available, and this phenomenon can be compensated for by the crew, the galley and supply water system was loaded and will be flown as-is for STS-34. Drink containers returned from the STS-34 flight will be photographed and analyzed for gas content in order to further quantify the amount and source of gas present. CONCLUSION: Gas bubbles were introduced into the drinking water. CORRECTIVE_ACTION: Fly as-is. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:00:09	Problem	**FIAR**	**IFA** STS-30-V-05	OMS/RCS
PDRS-03	**GMT:** 124:18:56		**SPR** 30RF14	**UA**	**Manager:**
			IPR 34V-0026	**PR**	
					Engineer:

Title: Reaction Control Subsystem Thruster R1U Failed Off After External Tank Separation (ORB)

Summary: DISCUSSION: Reaction control subsystem thruster R1U failed off due to low chamber pressure about 13 seconds after External Tank separation. Trickle current tests on-orbit as well as on the ground confirmed a good electrical path. Data indicate that the oxidizer valve failed to open.

During the STS-30 prelaunch flow, the manifolds on this pod were drained and the propellant tank was cooled down to reduce the leak rate on a leaking quick disconnect and make repairs. Either of these operations could have introduced contamination into the system. CONCLUSION: Since the electrical checks verified proper operation, the most probable cause of the R1U thruster to fail off is contamination. CORRECTIVE_ACTION: Thruster R1U will be removed, replaced, and sent to the vendor for failure analysis. EFFECTS_ON_SUBSEQUENT_MISSIONS: None, pending failure analysis results.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:05:28	Problem	**FIAR**	**IFA** STS-30-V-06	APU
MMACS-02	**GMT:** 125:00:15		**SPR** 30RF15	**UA**	**Manager:**
			IPR 34V-0025	**PR** EPD-4-04-0551	
					Engineer:

Title: Auxiliary Power Unit 2 Gas Generator/Fuel Pump "A" Heaters Failed (ORB)

Summary: DISCUSSION: Following ascent, at about 125:00:15 G.m.t., the auxiliary power unit (APU) 2 gas generator/fuel pump "A" heaters did not respond when the panel switch was placed in the "A auto" position. The panel switch was verified to be in the detent position. The "B" heaters were then selected and responded properly. There was not further mission impact.

These same "A" heaters failed to energize on the previous flight of OV-104. (Refer to Flight Problem Report STS-27-04.) The symptom was repeated postflight by teasing the panel switch into a false detent position. The APU 2 heater gas generator/fuel pump 2 switch on panel A12 was removed and replaced. Following STS-30, troubleshooting indicated that all "A" heaters operated nominally with the vehicle on the ground. Panel A12 was removed and sent to the Rockwell Services Center for evaluation. The unit passed all functional requirements. As a precautionary measure, all applicable electrical components within panel A12 were removed, replaced, and verified functional. (The switch has been replaced after STS-27.) Further investigations determined that either an open circuit or an electrical short-to-ground in a circuit run from panel A12 to the aft load controller assembly (LCA) 2 could cause the problem. All electrical connectors of the cables routing the common circuit that would cause failure of both the fuel pump and gas generator heaters were demated and inspected. Pin 31, carrying the suspect circuit, was recessed by 1/32 inch on the payload bay side of the 576 bulkhead feed-through connector P346, but this was not believed to have caused the anomaly. All wires leading to the connectors were wiggled to identify any intermittent conditions. None were found. The LCA 2 was removed, replaced, and returned to the vendor for failure analysis. The unit was subjected to a complete functional, vibration, and thermal acceptance test. These were followed by a verification of suspect diodes and wiring. In addition, all suspect hybrid drivers were removed and subjected to particle-induced-noise-detection (PIND) testing. The cause for the on-orbit anomaly could not be found within the LCA 2. The APU controller was removed and replaced for the ongoing APU update activity. No single point failures were found within the controller that could have cause the in-flight anomalies. Additional circuit analysis revealed that an electrical short-to-ground within the APU fuel pump heater controlling thermostat or associated wiring could cause the in-flight anomaly. The thermostat was replaced prior to STS-27 with the new high reliability unit, however the new unit was not PIND test prior to installation. This thermostat will be removed, replaced and subjected to a failure analysis should the anomaly recur. Orb. Proj. recommends replacement of thermostat at the earliest convenient time. After the above actions and finding, the cause of the failure of the APU 2 "A" gas generator/fuel pump heater to function in-flight is still unknown. Both

the "A" and "B" heaters are now functional. To completely verify the suspect circuit from panel A12 to the aft LCA 2, a detailed inspection of each segment of the wire run must be accomplished. This will require removal of the payload bay cable tray covers. Therefore, these tasks will be deferred and performed during the next flow of the vehicle, if the anomaly recurs. CONCLUSION: The cause of the in-flight failure of the APU 2 "A" gas generator/fuel pump heaters is unknown. CORRECTIVE_ACTION: All suspect electrical components in panel A12 have been replaced and verified. All electrical connectors that route the suspect circuit have been demated and inspected. The wires leading to each connecotr were wiggled to identify intermittent conditions. The aft LCA 2 has been removed and replaced. The APU 2 controller has been removed and replaced. EFFECTS_ON_SUBSEQUENT_MISSIONS: None expected. The "B" heaters will be used if the anomaly recurs.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:04:05	Problem	**FIAR** JSC-EE-0655	**IFA** STS-30-V-07	TAGS
INCO-01	**GMT:** 124:22:52		**SPR**	**UA**	**Manager:**
			IPR 34V-0029	**PR** COM-4-05-0071	
					Engineer:

Title: Text and Graphics Systems (TAGS) paper jam. (GFE)

Summary: DISCUSSION: At about 124:22:52 G.m.t., while being configured for initial operations, the TAGS hardcopier experienced a paper jam. Eighteen pages had been processed and were in the paper tray at the time. The nineteenth page jammed at the exit of the developer as it was being processed. Attempts by the crew to clear the jam using the TAGS in-flight maintenance tool and procedure were unsuccessful. Use of the TAGS hardcopier was lost for the duration of the mission and the Teleprinter was utilized for all subsequent uplink message traffic. There was no adverse effect on the mission. Postflight examination of the processed pages revealed no evidence of any improper stacking which might have caused the jam. Postflight examination of the hardcopier verified that paper was jammed in the developer, but no defects within the developer assembly itself which could have caused the jam were found. Further examination of the hardcopier revealed that four of the six flathead screws securing the lower portion of the paper try at the exit of the developer were burred and protruding above the lower surface of the chute. The burrs appeared to be workmanship defects due to screwdriver slippage during assembly.

CONCLUSION: The cause of the paper jam was found to be burred and protruding screw heads in the lower surface of the paper tray at the developer exit. The protrusions were of sufficient size to occasionally catch the leading edge of a page and to interfere with its motion out of the developer. CORRECTIVE_ACTION: The TAGS hardcopier, Part No. AV14453, Serial No. 005, was removed, replaced, has undergone failure analysis, and has been repaired. All other flight units are being examined for similar workmanship defects. This effort will be tracked via FIAR JSC-EE-0655. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:00:44	Problem	**FIAR**	**IFA** STS-30-V-08	OMS/RCS
PROP-02	**GMT:** 124:19:31		**SPR** 30RF16	**UA**	**Manager:**

IPR 34V-0027 **PR**

Engineer:

Title: Right Orbital Maneuvering Subsystem Fuel Gauge Erroneous Indication (ORB)

Summary: DISCUSSION: The right orbital maneuvering subsystem (OMS) fuel probe gauge indicated an increasing divergence from the actual fuel quantity during the OMS-1 maneuver. The fuel quantity was about 6.8-percent low at the end of the maneuver. The total channel gauge output during the OMS-2 and OMS-3 maneuvers was essentially static at about 50 percent. The gauge output during the deorbit maneuver decreased at a rate greater than the actual use rate, but was reading approximately 21 percent high at the end of the maneuver.

This fuel probe gauge failed during STS 51-G preflight operations, was flown again on STS 61-C, and read about 22 percent high at the end of both missions. The gauge was removed and the failure was found to be caused by propellant leakage into the probe assembly. The probe assembly was repaired and flown on STS-27 during which the performance was normal. CONCLUSION: The most probable cause of the erroneous fuel gauge output was propellant leakage into the probe assembly. CORRECTIVE_ACTION: Depending on results of troubleshooting, gauge adjustment or replacement will be required to correct the problem. EFFECTS_ON_SUBSEQUENT_MISSIONS: None on flight operations, pending failure analysis results. Ground operations will require alternate loading procedures if gauge is not repaired.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 001:18:58	Problem	**FIAR**	**IFA** STS-30-V-09	OMS/RCS
PROP-03	**GMT:** 126:13:45		**SPR** 30RF17	**UA**	**Manager:**
			IPR 34V-0001	**PR** RP01-11-0355	

Engineer:

Title: Right Reaction Control Subsystem Oxidizer Helium Isolation Valve A Failed Open (ORB)

Summary: DISCUSSION: The right Reaction Control Subsystem (RCS) oxidizer helium isolation valve "A" failed open during reconfiguration of system from the A valve to the B valve. Attempts by the crew to close the valve on-orbit were unsuccessful. Since this valve is normally open on-orbit, this failure did not affect the mission. Attempts to close the valve prior to ferry flight were also successful. During failure analysis at KSC, some loose particles were found in an electrical connector in the valve' s electrical path.

A similar failure with this valve occurred on 8/23/83 with the pod installed on OV-102 prior to STS-8 (reference CAR AC6538). At that time, the failure was considered a one time occurrence and closed as an unexplained anomaly. Initial troubleshooting found that talkback operation, valve position, response time, and electrical resistance were all within specification. Subsequent testing found an intermittent electrical connection in the electrical path to the valve's close coil. The intermittent connection has been repaired. CONCLUSION: The most probable cause of the right RCS oxidizer helium isolation valve A to fail open is an intermittent electrical connection in the electrical path to the valve's close coil. CORRECTIVE_ACTION: The intermittent connection has been repaired. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 001:00:13	Problem	**FIAR**	**IFA** STS-30-V-10	HYD
MMACS-03	**GMT:** 125:19:00		**SPR** 30RF18	**UA**	**Manager:**
			IPR 34V-0028	**PR**	
					Engineer:

Title: Water Spray Boiler 2 Gaseous Nitrogen Pressure Decay (ORB)

Summary: DISCUSSION: Leakage was observed from the water spray boiler (WSB) 2 gaseous nitrogen (GN2) pressure regulator relief valve after the GN2 isolation valve closed following auxiliary power unit shutdown at 123:19:57:45 G.m.t. The regulator pressure exhibited an average rate of 0.0903 psi/hr over the 93 hours from post-APU shutdown to GN2 isolation valve opening prior to the deorbit maneuver. Although no obvious full reseating of the relief valve occurred, the leak rate steadily improved throughout the mission. The calculated allowable leak rate is 0.04 psi/hr. This leak had no impact on the mission.

The nitrogen pressure tank is isolated by the GN2 shutoff valve when the water spray boiler is not functioning. This assures retention of the nitrogen source pressure should manifold leaks such as this occur. Currently, the Operations and Maintenance Requirements and Specification Document (OMRSD) specifies a 0.6 psi/hr maximum leak rate. Although this requirement is based on the shutoff valve being open, the OMRSD does not specify this condition. Using similar criteria with the valve closed and the 118 lb water tank load present on this mission, the equivalent allowable leak rate is calculated to be 0.04 psi/hr. This condition has been seen on previous missions (STS-8, STS 51-J, STS 51-A, STS-26, and STS-29) and, in each case, the leakage was attributed to the GN2 relief valve not properly seating after ascent. CONCLUSION: The water spray boiler 2 GN2 regulator pressure most probably decayed because the relief valve did not properly seat after ascent. CORRECTIVE_ACTION: The water spray boiler 2 relief valve will be leak-tested during turnaround operations. Out-of-specification leakage will result in the removal and replacement of the valve. A File III OMRSD change will be submitted to perform leak checks with the shutoff valve closed, for which allowable leak rates will be 0.3 psi/hour on the high-pressure side and 0.06 psi/hour on the low-pressure side. A File IX OMRSD change that will allow a leak rate of 0.1 psi/hr during the mission will be submitted. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 003:00:59	Problem	**FIAR**	**IFA** STS-30-V-11	DPS - GPC
DPS-02	**GMT:** 127:19:46		**SPR** 30RF02 (CPU 36),	**UA**	**Manager:**
			30RF03 (IOP 24)	**PR** DIG-4-05-0134	
			IPR 34V-0030		**Engineer:**

Title: General Purpose Computer (GPC) 4 failed common set sync on-orbit. (ORB)

Summary: DISCUSSION: At 127:19:46:14 G.m.t., GPC 4 (CPU S/N 36 and IOP S/N 24), which was processing Systems Management (SM) software, failed common set sync and was voted out of the set by GPC's 1 and 2. A Hardware Initiated Standalone Memory (HISAM) dump was performed on GPC 4 and a software controlled dump was performed on GPC 1. The dump data indicated that GPC 4 experienced a machine check interrupt, due to a memory data parity error in sector 5 of IOP memory. An In-flight Maintenance (IFM) procedure was performed to replace GPC 4 with the on-orbit spare (CPU S/N 7 and IOP S/N 26). The installed spare passed all check-out tests and no further problems were encountered for the remainder of the mission.

The failed GPC was sent to IBM for failure analysis. A memory scan revealed a parity error in sector 6 indicating an error occurred after the GPC was reinitialized (GPC 4 was reinitialized twice on-orbit after the failure). Extensive box level testing (temperature, vibration, pressure, factor acceptance, and flight software testing) was unsuccessful in replicating the failure. Subassembly testing to date has resulted in the failure of three parts on IOP memory page S/N 18. One part was a memory driver which failed at high temperature (190?F). The two other parts were memory drivers which failed the particle impact noise detection (PIND) test. These devices will be removed from the board and will undergo detailed failure analysis. The failure of these parts can be correlated to the sector 5 parity errors, but not to the sector 6 parity error. Subassembly testing is continuing. Finally, KSC performed a "wiggle" test on the interconnect cables. With the GPC (the spare GPC installed on-orbit) running in SM OPS 2, each of the interconnect cables was wiggled individually. A subsequent dump of the GPC revealed no errors. CONCLUSION: The cause of the failure is unknown at this time. The part failures on IOP memory page S/N 18 can only explain the parity errors in sector 5. The memory in sector 6 involves different pages (i.e. multiple failures in the GPC required to explain all the errors). Test is continuing on subassemblies which are common for all of IOP memory.
CORRECTIVE_ACTION: Remove and replace the failed GPC. GPC 4 was removed and replaced during an IFM procedure on-orbit.
EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:**	Problem	**FIAR**	**IFA** STS-30-V-12	MPS
BSTR-05	**GMT:**		**SPR** 30RF19	**UA**	**Manager:**
			IPR 34V-0031	**PR** MPS-4-05-0503	
					Engineer:

Title: MPS SSME 3 Helium Regulator Outlet B Check Valve Leakage (ORB)

Summary: DISCUSSION: The main propulsion system (MPS) space shuttle main engine (SSME) 3 helium check valve (CV45), located downstream of the 750 psi B helium regulator, experienced reverse leakage that exceeded specifications during entry MPS purge/repressurization operations. This occurrence, however, had no impact on the mission.

When the MPS SSME 3 helium isolation valve A was opened 25 minutes prior to the deorbit maneuver, the pressure reading in the 18 cubic inch volume enclosed by the MPS SSME 3 helium isolation valve B and CV45 began increasing from 0 psia. This indicated a reverse leakage condition in CV45. During entry, the leakage reached a maximum rate of 0.35 psi/sec (27 scim). The Operational Maintenance Requirements and Specifications Document (OMRSD) specifies a maximum leak rate of 15 scim. The pressure upstream of CV45 reached 768 psia. CV45 is similar to the check valves used in the helium fill systems on all orbiters. Some of these check valves have experienced severe degradation due to usage, but CV45 has never been replaced on OV-104. Postflight leak tests on CV45 did not reproduce the leak. CONCLUSION: The CV45 reverse leakage was most probably due to contamination on the valve O-ring that prevented the poppet from seating properly. The contamination apparently cleared before the postflight leak checks were performed. CORRECTIVE_ACTION: Due to the age of CV45, it will be removed and replaced. A failure analysis will be performed at the vendor to determine the cause of the leak. EFFECTS_ON_SUBSEQUENT_MISSIONS: None

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Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Postlanding	Problem	**FIAR** JSC-EC-0393	**IFA** STS-30-V-13	GFE
None	**GMT:** Postlanding		**SPR** None	**UA**	**Manager:**
			IPR None	**PR**	
					Engineer:

Title: Mission Specialist 3 Launch Escape System Communications Headset failed during Entry (GFE)

Summary: DISCUSSION: Mission Specialist 3 (MS-3) lost all voice communications when the launch entry suit (LES) communications headset was plugged into the headset interface unit (HIU) for entry. The MS-3 LES headset failed communications checks during postflight testing. Additional testing plus x-ray results revealed that all of the wires, including wire shields, were twisted and broken inside the interface connector of the short pigtail on the interface cable. These same conditions were also found in a second interface cable that had failed during troubleshooting of the in-flight problem. Subsequent investigation and inspection of several flight interface cables showed that the connector backshells were only hand-tightened during the manufacturing process. This condition allowed the connector insert to rotate with respect to the connector backshell and thus, the wires could be twisted and broken.

CONCLUSION: The loss of MS-3 LES communications was caused by broken wires that occurred because of an improperly torqued connector backshell on the HIU interface cable. CORRECTIVE_ACTION: The following steps will be performed on all flight LES communications cables: 1. An electrical continuity test will be performed to detect any open or short circuit conditions. 2. X-rays will be taken of all cable connectors to determine any wire damage. 3. Cable connector backshells will be torqued to 35 to 40 inch-pounds to prevent cable rotation. EFFECTS_ON_SUBSEQUENT_MISSIONS: None expected. A spare LES communication cable is available should the problem recur.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Postlanding	Problem	**FIAR**	**IFA** STS-30-V-14	OMS/RCS
None	**GMT:** Postlanding		**SPR** 30RF20	**UA**	**Manager:**
			IPR 34V-0003	**PR**	
					Engineer:

Title: Right Orbital Maneuvering Subsystem Gaseous Nitrogen Regulator Regulating Low (ORB)

Summary: DISCUSSION: The right orbital maneuvering subsystem (OMS) gaseous nitrogen (GN2) regulator outlet pressure was below the specification band of 325 ? 10 psia during the purges following all four OMS maneuvers. The lowest pressure of 302 psia was recorded after the OMS-1 maneuver. Since the 2-second duration of these post-firing purges does not allow sufficient time for a definitive evaluation of the regulator performance, a final evaluation was made during postflight orbital maneuvering engine (OME) safing procedures. When performing the OME safing procedures, the residual pressure in the GN2 tank was dumped through the purge valves over an approximate 30-second time period, during which time the regulator performance was evaluated. Evaluation showed that the outlet pressure during the GN2 tank venting for STS-30 was 307 to 311 psia, and that the pressure for STS-27 was within the normal band.

CONCLUSION: The GN2 regulator outlet pressure has shifted lower from STS-27 to STS-30. Since the pressure transducer downstream of the regulator was found to have been biased, the regulated pressure was within specifications. CORRECTIVE_ACTION: None required. EFFECTS_ON_SUBSEQUENT_MISSIONS: None.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Postlanding	Problem	**FIAR**	**IFA** STS-30-V-15	MECH
None	**GMT:** Postlanding		**SPR** 30RF21, 30RF22	**UA**	**Manager:**
			IPR	**PR** HYD-4-05-0197, HYD-4-05-0198	**Engineer:**

Title: Main Landing Gear Fluid Leak (ORB)

Summary: DISCUSSION: During the postlanding inspection at Edwards Air Force Base approximately four to eight ounces of red fluid were discovered to have leaked

onto the right-hand drag brace and door drive linkage. Fluid was also discovered on the left-hand strut. The source of the fluid was not apparent, possibly strut fluid or hydraulic actuator fluid. The right-hand and left-hand struts were diapered for a week at KSC, and then the diapers were weighed to determine the individual strut leak rates. The right and left main landing gear strut leak rates were calculated to be 0.90 drop per hour and 0.36 drop per hour, respectively. The maximum allowable leak rate is 1.0 drop per hour.

CONCLUSION: The leaked fluid is from the main landing gear struts and the leakage rate is within specification. The strut dynamic seals may have partially dried out due to inactivity of the strut, and this condition resulted in an increased leak rate. CORRECTIVE_ACTION: The struts have been cycled to lubricate the dynamic seals and this should decrease the fluid leak rate. As long as the leak rate is within specification (1.0 drop per hour), the main landing gear struts will be flown as is. EFFECTS_ON_SUBSEQUENT_MISSIONS: None

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Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 004:00:56	Problem	**FIAR**	**IFA** STS-30-V-16	MECH
None	**GMT:** 128:19:43		**SPR** 30RF23	**UA**	**Manager:**
			IPR	**PR** MEQ-4-05-0238	
					Engineer:

Title: Delayed Nosewheel Steering Activation (ORB)

Summary: DISCUSSION: During the STS-30 landing and rollout, nosewheel steering was not enabled until approximately 5 seconds after nosewheel touchdown. Data indicate that after nosewheel touchdown, one of the two nose landing gear (NLG) no-weight-on-wheels (NWOW) switches deactivated. The vehicle then pitched up slightly, thus preventing the second NWOW switch (NWOW 2) from deactivating within the required 320 milliseconds. When NWOW 1 and NWOW 2 do not deactivate within 320 milliseconds of each other, a software dilemma occurs. With this dilemma, the landing subsystems operating program (SOP) does not set ground-speed-enable and therefore, nosewheel steering was not activated. The crew enabled nosewheel steering by depressing the External Tank (ET) separation initiate pushbutton approximately 5 seconds after nosewheel touchdown.

An inspection at KSC revealed the NWOW 2 switch deactivation point was out of specification. NWOW 1 deactivated at 1.499 inches of NLG strut stroke while NWOW 2 deactivated at 2.162 inches (specification requires both NWOW sensor deactivate between 0.875 and 1.75 inches). Further, a measurement of the distance between the sensor and the target indicated both NWOW switches did not meet the rigging specification. The distance between the NWOW 1 sensor and target was 0.169 inch and the distance between the NWOW 2 sensor and target was 0.175 inch (specification requires the distance to be 0.188 inch +0.030 or -0.000 inch). Both NWOW switches were rerigged to specification and the result is NWOW 1 deactivates at 1.15 inches of strut stroke and NWOW 2 deactivates at 1.22 inches. CONCLUSION: The cause of the delay in nosewheel steering activation was a slight vehicle pitch up after NWOW 1 deactivation resulting in NWOW 2 not deactivating within 320 milliseconds. The

excessive time between NWOW 1 and NWOW 2 deactivation caused a dilemma in the landing SOP preventing nosewheel steering. It is highly probable, however, that had the NWOW switches been rigged according to the specifications both would have deactivated within the required time and nosewheel steering enabled. CORRECTIVE_ACTION: The NWOW switches were rerigged according to specification. In addition, the landing SOP has been modified to increase the allowable time between NWOW 1 and NWOW 2 deactivation to 3.04 seconds before a dilemma is declared. EFFECTS_ON_SUBSEQUENT_MISSIONS: None. OV-102 has been checked and is within specification and a Test Preparation Sheet (TPS) will be opened on OV-103 as a result of the findings on OV-104.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Postlanding	Problem	**FIAR**	**IFA** STS-30-V-17	STR
None	**GMT:** Postlanding		**SPR** 30RF24	**UA**	**Manager:**
			IPR	**PR** STR-4-05-1575	
					Engineer:

Title: Orbiter Window Number 6 Chipped (ORB)

Summary: DISCUSSION: During the postflight inspection at Edwards Air Force Base, an impact crater was discovered in the right-hand side windshield thermal pane. After return of the vehicle to KSC, the chip was measured using a mold impression and a microscope. The maximum diameter dimension of the pit was 0.1017 inch with a maximum depth of 0.0115 inch, both of which exceeded the allowable specifications (calculated margin of safety was -0.70). The window was removed and replaced. The pitted window will be returned to JSC for further evaluation to determine the origins of the projectile that caused the damage.

CONCLUSION: The window chip was probably caused by particle impact in orbit. CORRECTIVE_ACTION: Remove and replace the window. EFFECTS_ON_SUBSEQUENT_MISSIONS: None

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Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Postlanding	Problem	**FIAR**	**IFA** STS-30-V-18	MECH
None	**GMT:** Postlanding		**SPR** 30RF25	**UA**	**Manager:**
			IPR	**PR** PYR-4-05-0075,PYR-4-05-0073	**Engineer:**

Title: Debris in External Tank Liquid Oxygen Umbilical Cavity (ORB)

Summary: DISCUSSION: During the postflight inspection of the runway surface at Edwards Air Force Base, separation hardware was found on the runway under the LO2 External Tank (ET) doors. The hardware was identified as a yoke from the right-hand ET umbilical plate separation bolt assembly.

Two LO2 umbilical detonators were missing and were not found on the runway. One was missing from the right-hand aft location and one from the right-hand inboard location. CONCLUSION: The aft umbilical plate debris canisters can allow debris to escape. CORRECTIVE_ACTION: Fly-as-is based on the following rationale: The probability of a fragment preventing ET door closure is considered remote, because the vehicle moves away from any escaping debris during the ET separation phase. The escaped debris must abruptly change direction perpendicular to the original trajectory and then find its place in the clevis/rod to create a jam. Door mechanisms are almost totally enclosed with a minimum amount of linkage exposed. The doors can be recycled in-flight, if closing or latching is impeded.
EFFECTS_ON_SUBSEQUENT_MISSIONS: A long term fix being developed is a blast container with blade valves which will contain all of the umbilical separation debris (modification kits are scheduled to be delivered in November 1990).

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:**	Problem	**FIAR**	**IFA** STS-30-V-19	D&C - Panels
None	**GMT:**		**SPR** 30RF26	**UA**	**Manager:**
			IPR None.	**PR**	
					Engineer:

Title: Incorrect Alpha/Mach Indicator Indication (ORB)

Summary: DISCUSSION: The crew reported that during the on-orbit dedicated display drive "LOW" test, the left-hand Alpha/Mach Indicator (AMI) mach/velocity scale indicated 20,600 feet per second. The expected value is 20,000 feet per second.

During this test, the flight software sends a predefined set of test values to both the left and right display driver units which drive the appropriate instruments. No anomalies were observed on the right-hand instrument or on the left instrument during the "HIGH" test, which drives the instrument to a point at the opposite end of the display tape. The dedicated displays were tested at KSC on June 20, 1989, in accordance with Operations and Maintenance Instruction (OMI) V1028. During this test, the AMI was exercised in a similar manner as the on-orbit test. The anomaly could not be reproduced. A similar problem occurred on OV-103 during STS-26 (reference Flight Problem Report STS-26-20). This anomaly could not be reproduced on the ground, and it did not repeat on the subsequent flight of OV-103 (STS-29). CONCLUSION: The cause of this anomaly is not known. It is most probably related to the physical properties of the tape material and is manifested the first time the tape is cycled following a period of inactivity. Environmental factors may also be a contributing cause. It is believed that cycling the tape by re-executing the "HIGH" and "LOW" test may clear the problem. CORRECTIVE_ACTION: None. EFFECTS_ON_SUBSEQUENT_MISSIONS: Should the problem recur on subsequent missions, the crew will be requested to re-execute the "HIGH" and "LOW" tests.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Postlanding	Problem	**FIAR**	**IFA** STS-30-V-20	TPS
None	**GMT:** Postlanding		**SPR** 30RF27	**UA**	**Manager:**

IPR **PR** TCS-4-05-0515

Engineer:

Title: Aft Bulkhead Thermal Blankets Degraded. (ORB)

Summary: DISCUSSION: During the postlanding inspection at Edwards Air Force Base, two 1307 bulkhead blankets adjacent to those that had been recently modified sustained cover damage (Reference IFA STS-29-25). Further inspection revealed three loose blankets and open snaps in six places. A total of 13 blankets were removed from the upper center section of the 1307 bulkhead for inspection and 6 of the 13 blankets sustained damage requiring replacement.

In preparation for STS-30, the blankets in the problem area identified after STS-29 were modified to use beta cloth for the back cover for additional strength. CONCLUSION: The exact cause of this problem has not been determined even though several hypotheses have been investigated by test and analysis. The redesigned blankets flown on STS-30, STS-28 and STS-34 demonstrated their compatibility with the existing environment. The loose snaps have no flight effect. CORRECTIVE_ACTION: The anomalous blankets and all others in the area have now been replaced with the redesigned blankets. This redesign adds vent screens and beta cloth material to the blanket backsides for additional strength. The beta cloth addition will minimize the wear during ascent, and if the material is damaged, all of the aluminized Kapton particles will be contained. The condition of the modified blankets will be determined by inspection after each flight to assure that the blanket redesign is effective. EFFECTS_ON_SUBSEQUENT_MISSIONS: None

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Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Prelaunch	Problem	**FIAR**	**IFA** STS-30-V-21	HYD
None	**GMT:** Prelaunch		**SPR** 30RF28	**UA**	**Manager:**
			IPR NONE	**PR**	

Engineer:

Title: Water Spray Boiler Vent Temperatures Lower on Launch Day Than Scrub Day (ORB)

Summary: DISCUSSION: The vent/nozzle temperature of all three water spray boilers (WSB's) were cooler on the day of launch (May 4, 1989) than on the day when the launch attempt was scrubbed (April 28, 1989). The temperatures were approximately 10?F cooler during the final 3 hours of the launch countdown.

On the day of launch, the WSB 2 vent/nozzle temperature was below the 130 +/- 3 ?F limit required to set the WSB ready signal. The lack of this signal caused the auxiliary power unit (APU) 2 ready-to-start talkback on panel R2 to show barberpole rather than the gray condition required for APU start. The payload bay purge temperature was increased 6?F and the aft fuselage purge temperature was increased 4?F in an effort to increase the WSB 2 vent/nozzle temperature. Postflight data show that this effort had a negligible affect on the vent/nozzle temperature, since the WSB system is enclosed in an insulated "cocoon" which isolates it from Orbiter environmental influences. The vent nozzle face is located on the exterior of the Orbiter and, thus, is subject to the external environment. During STS-27, launched on

December 2, 1988, the WSB 2 vent temperature response was very similar to that observed on the STS-30 launch day. The air temperature at the pad when STS-27 launched was 57?F. The launch pad weather on the day of the scrub was clear skies and 81?F ambient temperature, whereas, the day of launch weather was early morning showers with partly cloudy skies and 79?F. Therefore, the difference in WSB nozzle/vent temperatures is attributed to rain on the nozzle face as well as partly cloudy skies on launch day. A 5?F drop in nozzle temperature approximately 30 minutes prior to the actual launch resulted from the Orbiter being switched to internal power with the subsequent drop in voltage. This condition has been seen on previous missions. A Launch Commit Criteria change has been approved that will allow vent temperatures below 123?F (lower limit of the temperature signal conditioning) if a trend of the temperature prior to reaching 123?F is consistent with the other WSB vent temperatures. This verifies that the heater is functional, but cannot maintain the desired temperature. CONCLUSION: The temperature response of the WSB vents during the STS-30 scrub and launch day prelaunch periods was nominal. Differences were most probably caused by the different weather conditions existing on the two days. CORRECTIVE_ACTION: NONE. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	MET:	Problem	FIAR	IFA STS-30-V-22	MPS
None	GMT:		SPR 30RF29	UA	Manager:
			IPR	PR MPS-4-05-0535	
					Engineer:

Title: LO2 Manifold Pressure Lag During Entry (ORB)

Summary: DISCUSSION: When helium repressurization of the main propulsion system (MPS) liquid oxygen (LO2) and gaseous oxygen (GO2) manifolds was initiated during entry, the pressure rise in the GO2 prepressurization/pressurization manifold lagged the pressure rise in the LO2 manifold by approximately 1 minute. These pressures should increase concurrently. This anomaly had no impact on the mission.

Post-flight troubleshooting determined the cause of the anomaly to be a restriction in the filter/orifice assembly (RP1) located in the helium repressurization line upstream of the GO2 manifold. When this component was removed, contamination was found within the manifold. Historically, the time required to repressurize the GO2 line in OV-104 has been longer than that required in the other Orbiters. It is suspected that this was due to the contamination which may have been present since the original installation on OV-104. CONCLUSION: The slow rise in pressure in the MPS GO2 prepressurization/pressurization manifold when compared to the rise in the LO2 manifold was most probably caused by contamination in the helium repressurization line filter/orifice assembly (RP1). CORRECTIVE_ACTION: The filter/orifice assembly was removed and replaced. Testing has shown that flowrates through the new orifice assembly meet analytical predictions. The remaining components/lines downstream of the repressurization regulator in the GO2/LO2 repressurization system were removed, cleaned to specification levels, and reinstalled in the vehicle. The system upstream of the repressurization regulator was verified clean to specification levels by blowdown through millipore filters.
EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	MET:	Problem	FIAR	IFA STS-30-V-23	GFE
None	GMT:		SPR 30RF30	UA	Manager:
			IPR None.	PR	
					Engineer:

Title: High Iodine Concentration in Drinking Water (GFE)

Summary: DISCUSSION: A number of crews who have flown prior to STS-30 have commented on the strong iodine concentration in the drinking water. On STS-30, the crew measured the iodine concentration in the drinking water at different times throughout the flight. Results showed that the iodine concentration was erratic throughout the flight and reached a maximum of 13 ppm by the end of the flight. Concentrations of 2 to 5 ppm are normally expected. These high concentration levels do not pose any direct medical risks to the crew. The primary concern of these elevated iodine levels is water palatability to the crew which can produce indirect medical risk if the crew does not drink sufficient amounts of water.

The original design assumption of the microbial check valve (MCV) was that the water leaving the fuel cells at 140-150?F would cool to approximately 70?F before reaching the MCV. Consequently, each of the MCV's in the drinking water system was designed to maintain a level of 2 ppm of iodine in the water at a temperature of 70?F. However, the amount of iodine injected increases with increasing water temperature. STS-29 data established that the water temperature at the MCV was over 110?F. The STS-30 high iodine concentration levels were caused by similar elevated water temperatures. Further crew testing of the iodine concentration will be performed on STS-28, -34, and -33. In addition, the temperature of the water flowing through the MCV's will be measured on STS-34 and -33. These data will be used to better characterize the present interactions between the water temperature and the MCV, and provide a basis for redesign of the MCV's. CONCLUSION: A high iodine concentration was experienced in the drinking water because the supply water was warmer than the temperature used for the design of the MCV's, causing them to inject excess iodine into the water. CORRECTIVE_ACTION: Further data will be taken on STS-28, 34, and 33 to support a redesign of the MCV's. EFFECTS_ON_SUBSEQUENT_MISSIONS: High iodine concentrations will exist until the redesigned MCV's become operational.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	MET: Prelaunch	Problem	FIAR	IFA STS-30-V-24	PV&D
None	GMT: Prelaunch		SPR None	UA	Manager:
			IPR	PR	
					Engineer:

Title: Electrical Disconnect Purge Port Protective Tape Not Removed (ORB)

Summary: DISCUSSION: During the STS-30 postflight inspections, protective tape was found on the liquid oxygen electrical disconnect purge port. The STS-30 KSC Ice/Frost/Debris Assessment Report listed the purge port as being inadvertently taped closed during Orbiter/ET mate operations. However, a prelaunch check showed that there was purge flow at the disconnect.

KSC investigation confirmed that the tape had not been removed as planned during Orbiter/ET Mate (S0004). KSC has taken action in S0004 Rev. X (SEQ 22, steps 4&5 and SEQ 23, steps 4&5) to assure that the tape is removed. This action will preclude any repeat of this problem. This procedure change was incorporated by permanent deviation prior to STS-28 and STS-34 mate operations. An analysis has been completed by Rockwell/Downey that confirmed the lower qualification temperature limit of the connectors was not exceeded. The OV-104 connectors were inspected and satisfactorily checked out in accordance with OMRSD requirements. The OV-104/STS-34 umbilicals have been mated satisfactorily using the revised procedure. CONCLUSION: The Orbiter/ET Mate procedure (S0004) was not specific enough to ensure removal of the tape from this purge port. CORRECTIVE_ACTION: KSC has revised the Orbiter/ET Mate procedure (S0004X) to include specific steps (SEQ 22, steps 4&5, and SEQ 23, steps 4&5) to insure that anything covering the purge port is removed. EFFECTS_ON_SUBSEQUENT_MISSIONS: None