SSVEO IFA List

Date:02/27/2003

STS - 93, OV - 102, Columbia (26)

Time:03:55:PM

Tracking No	Time	Classification	Documentation		Subsystem
MER - 1	**MET:** 000:00:00:05	Problem	**FIAR**	**IFA** STS-93-V-01	EPDC
EGIL-001	**GMT:** 204:04:31:05		**SPR**	**UA**	**Manager:** Richard Phan
			IPR 107V-0003	**PR** OEL-2-27-2436	562-922-4232
					Engineer: Mark Fugitt
					281-282-5458

Title: AC1 Phase A Short (ORB)

Summary: At approximately 5 seconds into the launch of STS-93, a momentary short occurred on AC1 phase A. The duration of the short was approximately 500 ms. A current spike in excess of 20 amps and a voltage drop from 114 to 21 VAC was observed on AC1 phase phase A. Coincident with the short, the SSME 1 (center) controller A and SSME 3 (right) controller B failed. Additionally, the H2O loop light on the C/W F7 panel was momentarily activated and a FC 1 pH BFS message was received. After MECO, the crew looked at the circuit breakers on panel L4 and reported that no circuit breakers were out of position.

Data evaluation determined that there was no loss of function in any of the Orbiter equipment that was powered by AC1 during ascent. Both the H2O loop light and the FC 1 pH message were determined to be symptoms of the undervoltage on AC1 phase A resulting from the short. There was no restriction on the use of AC1 for the remainder of the mission. During flight day 3, the crew reported that the AC1 phase A circuit breaker for SSME 1 controller A was actually open. With this information, the source of the short could be isolated between the circuit breaker and the SSME 1 controller A. The AC1 phase B and C circuit breakers for SSME 1 controller A were opened for entry to protect against an inadvertent powering of the controller. A postflight troubleshooting plan was developed and it was determined early on that the short was on the Orbiter side of the SSME 1 interface panel. The short was isolated to a damaged wire in the port wire tray at the midbody bay 11/12 frame. Analysis of the damaged wire indicated that the damage was the result of a single mechanical event. It was initially suspected that the damage was caused by vibration induced chaffing against the head of a torque-set screw used to secure the wire tray to the frame. At the short location, the screw head showed obvious signs of arcing. Wire damage at a second screw head (about 2 inches away) was also observed, but there was no evidence of arcing. Additional inspections found damage on a wire at the same location in the starboard wire tray. This damage appeared to be caused by wear. As a result of this failure, the decision was made to inspect and protect the wire harnesses in the vehicles throughout the fleet.