Bendix

Aerospace Systems Division

AUGUST AND SEPTEMBER SYSTEM SAFETY PROGRESS REPORT ALSEP ARRAY E

ATM 1063

DATE 1 October 1971

This ATM documents the progress of the System Safety Program for ALSEP Array E through September 1971.

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1.0 IDENTIFIED HAZARDS

1.1 LSG/Subpack No. 1 Interface

1.1.1 Description

The method of LSG attachment to Subpack No. 1 is through the use of four (4) boyd bolts. These boyd bolts deflect the sunshield to create the possibility of "throwing" boyd bolts with sufficient force to strike an astronaut EMU or to transmit sufficient force through UHT to throw an astronaut off balance.

1,1,2 Status

Evaluation tests were conducted with the LSG at A. D. Little, Inc. on 19 July through 21 July 1971. These tests were conducted by BxA and A. D. Little personnel. An analysis of the test results has been documented in ATM 1057, LSG Boyd Bolt Release Tests Report, currently in the BxA approval cycle.

2.0 DESIGN CHANGES

Array E design changes are reviewed from the safety viewpoint prior to initiating the change. During this report period one design change required safety consideration. The change involved the LSP experiment.

2.1 Description

ECN 2348551-B modifies the Safe/Arm Slide to improve its ability to contain detonation of an EDC while in the safe or resafe position. This is a result of a Safe/Arm Slide failure at NOL during safety testing.

2.2 Status

The change has been incorporated into the Qual/Flight Units and the Safe/Arm Slides will be verified as capable of withstanding EDC detonation by NOL.

3.0 IDENTIFIED SAFETY DISCREPANCIES

No safety discrepancies have been identified during this report period.

4.0 TESTS AND OPERATIONAL PROCEDURES

A total of 25 procedures have been reviewed and four of the procedures contained hazardous sequences. One hazardous sequence has been identified since the last report.

4.1 Description of Hazardous Sequences

TP 2365543, "EDC Bridgewire Measurement with Modified ALINCO," entails connecting an active but current limited source across an End Detonating Cartridge for the purpose of measuring bridgewire resistance. The cartridge at this time is in an unshorted condition.

5.0 SYSTEM SAFETY DOCUMENTS

5.1 LS-11 Field Test Safety Plan was submitted on 17 September 1971 to MSC for approval. The plan provides detailed information to assure controlled conditions during the hazardous field test sequences for the protection of test personnel and to establish criteria for responding to emergency situations which may arise during the tests. An update of this document will be released in late October to reflect changes that will be made in field test planning and procedures.

5.2 ATM 1053 LSP Operational Hazard Analysis was released on 28 September 1971. The analysis is an evaluation of all known hazards identified throughout the operational life cycle of the LSP Experiment.

5.3 ATM 1056 Ground Operations and Safety Plan was released on 28 September 1971. The plan identifies all conditions under which the explosive components of the LSP are manufactured, tested, transported, and stored while under the cognizance of the Bendix Corporation, Aerospace Systems Division. An update of this document will be released in late October.

5.4 2365390A, Safety Requirements - Lunar Seismic Profile (LSP) Experiment Explosive Subassemblies was released on 13 September 1971. This document defines safety precautions to be used in the handling of End Detonating Cartridges, Detonator Assemblies, Electronic/Safe Arm Assemblies, Lead Assemblies and Explosive Packages of the Lunar Seismic Profile Experiment within the BxA Ann Arbor facility.

5.5 ATM 1038, "LSP Timer Overbanking on the Lunar Surface," was completed and issued on 12 August 1971. This report presents the results of the tests performed on LSP timer movements to determine the causes and effects of "overbanking" in order to reduce a potentially Safety Catastrophic hazard to Safety Negligible.

5.6 ATM 1049, "LSP Detailed System Hazard Analysis" was issued on 16 August 1971. The analysis is an evaluation of the hazard potential of the LSP explosives during the full scope of the mission phases of installation, launch, flight and lunar stay.

6.0 RESIDUAL HAZARD LIST

No residual hazards have as yet been identified.

7.0 NARRATIVE

7.1 LSP Manufacturing

A presentation was made on 23 September 1971 to the MSC Quality and Reliability representative and DCAS representatives on the in-house safety precautions that have been provided for LSP manufacturing. It was decided that there was a need for a safety lecture to indoctrinate LSP manufacturing personnel and others who would handle LSP explosives subassemblies. A one-hour presentation is being prepared by System Safety for this lecture which will be presented in early October.