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APOLLO 17

FINAL EXPERIMENTS MISSION RULES

REV A

REVISION INSTRUCTION SHEET

Update this document in accordance with the following instructions:

Remove and replace the following pages:

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Add the following new pages:

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APOLLO 17

FINAL EXPERIMENTS MISSION RULES

ALSEP 5

REV A

PREFACE

THIS DOCUMENT CONTAINS REVISION A TO THE FINAL EXPERIMENTS MISSION RULES FOR ALSEP 5 AS OF NOVEMBER 24, 1972. THIS REVISION IS PRINTED ON YELLOW PAPER AND EACH SUBSEQUENT REVISION WILL BE PRINTED ON A DIFFERENT COLOR OF PAPER FOR EASY RECOGNITION.

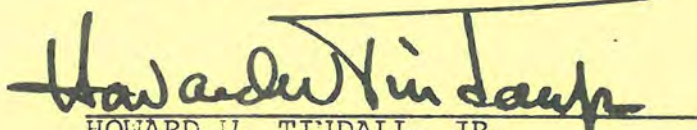
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IT IS SUGGESTED THAT ANY ORGANIZATION HAVING COMMENTS, QUESTIONS, OR SUGGESTIONS CONCERNING THESE MISSION RULES CONTACT MR. JOHN H. TEMPLE, FLIGHT OPERATIONS AND RECOVERY BRANCH, BUILDING 30, ROOM 2052, 713-483-4126.

ANY REQUESTS FOR ADDITIONAL COPIES OR CHANGES TO THE DISTRIBUTION LIST IN APPENDIX B OF THIS DOCUMENT MUST BE MADE IN WRITING TO MR. HOWARD W. TINDALL, JR., DIRECTOR OF FLIGHT OPERATIONS, MANNED SPACECRAFT CENTER, HOUSTON, TEXAS.

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APPROVED BY:

  
HOWARD W. TINDALL, JR.  
DIRECTOR OF FLIGHT OPERATIONS

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## MISSION RULES

### SECTION 3 - ALSEP OPERATIONAL GUIDELINES

R	ITEM	SECTION 3 - ALSEP OPERATIONAL GUIDELINES						
		<div>ALSEP OPERATIONAL GUIDELINES</div>						
	32-1	GENERAL						
		A. THESE ALSEP GENERAL OPERATIONAL GUIDELINES ARE BASED ON OBJECTIVES IN THE FOLLOWING PRIORITIES:						
		1. HFE (HEAT FLOW EXPERIMENT)						
		2. LSP (LUNAR SEISMIC PROFILING)						
		3. LSG (LUNAR SURFACE GRAVIMETER)						
		4. LMS (LUNAR MASS SPECTROMETER)						
		5. LEAM (LUNAR EJECTA AND METEORITES)						
		<div>NOTE</div>						
		RIPPLE-OFF SEQUENCE IS:						
		1. PDR 1 (7W)						
		2. PDR 2 (14W)						
		3. LMS						
		4. LEAM						
		5. HFE						
		6. LSG						
		7. LSP						
		B. THE GATHERING OF SCIENTIFIC DATA WILL NOT BE COMPROMISED FOR ENGINEERING OR TEST PURPOSES.						
		C. REDUNDANT OR BACKUP SYSTEMS WILL NOT BE SELECTED UNLESS A FAILURE WARRANTS SUCH ACTION. SWITCHING TO REDUNDANT SYSTEMS WILL NOT BE ACCOMPLISHED TO SATISFY ENGINEERING TESTS UNLESS ALL SCIENTIFIC MISSION OBJECTIVES HAVE BEEN COMPLETED.						
		D. NORMAL BIT RATE WILL BE USED UNLESS SELECTION OF LOW BIT RATE IS REQUIRED FOR THE COLLECTION OF ALSEP DATA.						
		E. BEFORE IMPLEMENTING ANY MISSION RULE ACTION BASED ON AN APPARENT ALSEP MALFUNCTION, IT WILL BE ASCERTAINED THAT THERE IS NO PROBLEM WITH THE STDN SUPPORTING SITE.						
A		F. UPLINK SWITCH INHIBIT CMD 174 WILL BE SENT TO INHIBIT THE UPLINK SWITCH FUNCTIONS.						
		MISSION	REV	DATE	SECTION	GROUP	PAGE	
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## MISSION RULES

### SECTION 3 - ALSEP OPERATIONAL GUIDELINES

R	ITEM	
	32-1 (CONT)	G. ALSEP EXPERIMENTS WILL NOT BE COMMANDED TO "OFF" UNLESS THE ACTION IS JUSTIFIED BY AN ANOMALY.
A		H. NO COMMAND FUNCTION CAN BE EXECUTED IN AN EXPERIMENT (OTHER THAN "OFF," OR "OPERATE"), BY GROUND COMMAND OR BY ONBOARD TIMER, UNLESS THE EXPERIMENT IS IN THE "OPERATE" MODE.
		I. THE ALSEP SHORTING SWITCH WILL BE ACTIVATED ASAP AFTER CENTRAL STATION DEPLOYMENT.
		J. IF THE GROUND IS UNABLE TO OBTAIN DOWNLINK, THE GROUND WILL REQUEST THE ASTRONAUT TO ROTATE THE RESET POWER SWITCH TO RESET AND THEN TO POWER.
		K. THE CENTRAL STATION APM AND PDR WILL BE USED TO MAINTAIN AN AVERAGE INTERNAL THERMAL PLATE TEMPERATURE GREATER THAN 0 DEGREES F AND LESS THAN 132 DEGREES F UNLESS THERE IS AN ANOMALY REQUIRING THE APM TO BE OFF AND/OR THE POWER IS REQUIRED TO MAINTAIN EXPERIMENT INTEGRITY.
		L. <u>RESERVED</u>
		M. THE HFE BORE HOLES WILL HAVE PRIORITY OVER THE DRILL CORE STEM. THE HFE BORE HOLES WILL BE ATTEMPTED FIRST. IF PROBLEMS ARE ENCOUNTERED, EFFORTS ON BORE HOLES WILL BE TERMINATED AFTER A TOTAL OF 20 MINUTES ACCUMULATED DRILL "ON" TIME.
		N. IF A HARD OBJECT IS ENCOUNTERED THAT REDUCES DRILL RATE TO LESS THAN APPROXIMATELY <u>5</u> INCHES PER MINUTE ON EITHER HFE PROBE HOLE, THE FOLLOWING WILL BE ACCOMPLISHED: <ol style="list-style-type: none"> <li>1. IF THE SECOND STEM SECTION IS NOT ATTACHED, WITHDRAW AND START AT A DIFFERENT LOCATION FOR MAXIMUM OF TWO WITHDRAWALS.</li> <li>2. IF THE SECOND STEM IS ATTACHED, CONTINUE UNTIL APPROXIMATELY <u>10</u> MINUTES OF POWER "ON" TIME FOR THE DRILL STRING HAS ELAPSED.</li> </ol>
A		O. HFE CONDUCTIVITY MEASUREMENTS IN MODE II AND MODE III WILL PLAN TO BE COMPLETED PRIOR TO TERMINATION OF CONTINUOUS REAL-TIME SUPPORT.
		P. IF THE CREW MUST RETURN TO THE LM PRIOR TO COMPLETE ALSEP DEPLOYMENT, THE SHORTING SWITCH WILL BE ACTIVATED "ON" IF THE ANTENNA IS EMPLACED. IF THE ANTENNA IS NOT EMPLACED, THIS SWITCH WILL NOT BE ACTIVATED (PICK UP HERE ON EVA 2).
		MISSION    REV    DATE    SECTION    GROUP    PAGE
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## MISSION RULES

### SECTION 3 - ALSEP OPERATIONAL GUIDELINES

R	ITEM	
	32-1 (CONT)	<p>Q. THE LSP IS THE ONLY EXPERIMENT THAT WILL BE COMMANDED WHILE IN LSP FORMAT.</p> <p>R. THE ALSEP WILL BE IN LSP FORMAT DURING LM LIFT-OFF AND LM ASCENT STAGE IMPACT.</p> <p>S. FOR ANY MALFUNCTION DURING A SURFACE TASK, A MAXIMUM OF 10 MINUTES WILL BE SPENT ON THE CONTINGENCY PROCEDURE BEFORE THE TASK IS ABANDONED, WITH THE FOLLOWING EXCEPTIONS:</p> <ol style="list-style-type: none"><li>1. <u>RTG FUELING</u> UP TO 20 MINUTES WILL BE ALLOWED IN EXERCISING RTG FUELING CONTINGENCY PROCEDURES.</li><li>2. <u>ALSEP PACKAGE 1 TO PACKAGE 2 CABLE CONNECTIONS</u> UP TO 20 MINUTES WILL BE ALLOWED FOR MAKING THE CABLE CONNECTION.</li><li>3. <u>ALSEP ANTENNA</u> UP TO 30 MINUTES WILL BE ALLOWED FOR ERECTION AND ALIGNMENT.</li></ol> <p style="text-align: center;"><u>NOTE</u></p> <p>MOVING ALSEP DEPLOYMENT TO LATER EVA WILL BE CONSIDERED IF ADDITIONAL TIME SPENT ON CONTINGENCY PROCEDURES ARE REQUIRED TO ATTAIN AN OPERATIONAL ALSEP.</p> <p>T. FOR EVA TERMINATION OR OTHER INTERRUPTIONS DURING ALSEP DEPLOYMENT, THE FOLLOWING PREFERRED DEPLOYMENT INTERRUPTION POINTS WILL BE OBSERVED IF PERMITTED BY CREW SAFETY CONSIDERATION:</p> <ol style="list-style-type: none"><li>1. REMOVE ALSEP PACKAGES 1 AND 2 / CLOSE SEQ BAY DOOR / REPOSITION ALSEP PACKAGES WITH HANDLES UP AND WITH EXPERIMENTS FACING THE SUN WITHIN <u>+15</u> DEGREES.</li><li>2. TILT FUEL CASK (DOME NOT REMOVED).</li><li>3. TILT FUEL CASK / REMOVE DOME / DO NOT DEFUEL.</li><li>4. FUEL RTG / THEN CARRY ALSEP TO DEPLOYMENT SITE / REMOVE SUBPALLETES FROM PACKAGE 2 / CARRY PACKAGE 1 TO EMPLOYMENT SITE / DO NOT ACTUATE SWITCHES.</li><li>5. CONNECT RTG, HFE, AND LEAM CABLES CS / REMOVE LSP TO G/M, LSG, AND LMS FROM SUB-PACKAGE 1 /ALIGN CS AND RAISE SUNSHIELD / RAISE ANTENNA MAST / MOUNT GIMBAL, AND ANTENNA / LEVEL AND ALIGN ANTENNA / ROTATE SHORTING SWITCH ON WAY BACK TO LM.</li><li>6. DEPLOY ALSEP EXPERIMENTS AND COMPLETE TASKS / A HOLD POINT EXISTS AFTER EACH EXPERIMENT IS DEPLOYED / ROTATE SHORTING SWITCH ON WAY BACK TO LM.</li></ol>
A		
A		
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## MISSION RULES

### SECTION 3 - ALSEP OPERATIONAL GUIDELINES

R	ITEM													
A	32-1 (CONT)	U. IF ALL SPOTS ON TEMP LABEL ON HORSE COLLAR ARE BLACK AFTER FUELING RTG, CREW MUST REMOVE HORSE COLLAR WITH UHT AND SET IT ASIDE. CREW MUST NOT TOUCH HORSE COLLAR UNTIL IT HAS COOLED SUFFICIENTLY (10 MINUTES).												
A		V. ALSEP DEPLOYMENT WILL NOT BE STARTED IF IT IS KNOWN THAT LESS THAN 1 HOUR 15 MIN IS AVAILABLE FOR ALSEP IN EVA 1.												
A	32-2	LMS												
A		A. THE LMS WILL BE TURNED ON ASAP AFTER DEPLOYMENT TO VERIFY HIGH VOLTAGE AND EMISSION OFF AND SET BAKE-OUT HEATER FLAG TO OFF.												
A		B. THE DUST COVER WILL BE REMOVED AFTER THE LAST LSP CHARGE HAS DETONATED OR HAS BEEN SAFED OR AM-41 EXCEEDS 160 DEGREES F.												
A		C. THE LMS WILL BE BAKED-OUT UNTIL THE ION SOURCE TEMP (AM-6) IS GREATER THAN 210 DEG C FOR 9 HOURS.												
A		D. THE HV AND FILAMENT WILL NOT BE COMMANDED ON UNTIL AM-05 IS LESS THAN 0 DEG C AND AM-03 IS LESS THAN 0.3 MICROAMPERES.												
A	32-3	LEAM												
A		A. THE LEAM MIRROR COVER WILL BE REMOVED ASAP AFTER THE LAST LSP CHARGE HAS DETONATED OR HAS BEEN SAFED, AND SENSOR COVER WILL BE REMOVED 48 HOURS AFTER SUNSET.												
		B. THE LEAM CAL COMMANDS WILL BE INITIATED DAILY OR DURING EACH SUPPORT PERIOD BY GROUND COMMAND IF THE SEQUENCE TIMER FAILS OR IS INHIBITED.												
		C. THE LEAM WILL BE IN OPERATE MODE (FOR 2 HOURS) ASAP AFTER DEPLOYMENT UNLESS AJ-11 IS GREATER THAN OR EQUAL TO <u>150 DEG F</u> AT WHICH TIME THE LEAM WILL BE COMMANDED TO OFF.												
		D. IF AJ-011 REACHES 167 DEG F IN THE OFF MODE, THE MIRROR COVER WILL BE RELEASED.												
A	32-4	LSG												
		A. THE LSG WILL BE COMMANDED "ON" ASAP AFTER DEPLOYMENT.												
		B. THE CREW WILL REPORT RECHECK OF LEVEL AND ALIGNMENT AND FREEDOM OF GIMBAL AFTER EXPERIMENT IS MANUALLY UNCAGED.												
<table border="1"> <thead> <tr> <th>MISSION</th> <th>REV</th> <th>DATE</th> <th>SECTION</th> <th>GROUP</th> <th>PAGE</th> </tr> </thead> <tbody> <tr> <td>APOLLO 17</td> <td>A</td> <td>11/24/72</td> <td>ALSEP OPS GUIDELINES</td> <td>GENERAL</td> <td>3-4</td> </tr> </tbody> </table>			MISSION	REV	DATE	SECTION	GROUP	PAGE	APOLLO 17	A	11/24/72	ALSEP OPS GUIDELINES	GENERAL	3-4
MISSION	REV	DATE	SECTION	GROUP	PAGE									
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### SECTION 3 - ALSEP OPERATIONAL GUIDELINES

NASA — MSC

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## MISSION RULES

### SECTION 3 - ALSEP OPERATIONAL GUIDELINES

SECTION 5 - ALSEP OPERATIONAL GUIDELINES

R	ITEM
	32-5
A	(CONT)
	3. LSP TRANSMITTER PULSES ENABLE CMD (OCTAL 156) RECEIVED BY LSP CENTRAL ELECTRONICS.
A	4. LSP FORMAT ON CMD (OCTAL 003) RECEIVED BY THE ALSEP CENTRAL STATION DDP.
A	5. SAFE/ARM SLIDE TO THE ARM POSITION.

NOTE

STATUS OF EACH OF THE PRECEEDING FIVE SAFETY FEATURES IS AS FOLLOWS:

	FEATURES SAFED	TOTAL NUMBER SAFED
ALSEP DEPLOYMENT	1,2,3,4,5	5
CHARGE DEPLOYMENT	2,3,4,5	4
LSP PASSIVE LISTENING*	3,5	2

\*NOT PLANNED WHILE CREW IS ON SURFACE.

BATTERY TIMER AND CIRCUIT ACTIVATION IS NOT CONSIDERED IN THE ABOVE SAFETY FEATURES BECAUSE NO STATUS INDICATIONS EXISTS AFTER THE PIN HAS BEEN PULLED.

F. DO NOT ACTIVATE LSP ANTENNA UNLESS DEPLOYED GREATER THAN 6 METERS FROM THE CENTRAL STATION.

32-6 HFE

A	SEQUENTIAL COMMAND UPLINKED TO THE HFE WILL BE SEPARATED BY AT LEAST 54 SECONDS IN NORMAL BIT RATE AND 108 SECONDS IN LOW BIT RATE.
B	A CONDUCTIVITY MEASUREMENT WILL NOT BE INITIATED UNLESS THERE WILL BE SUFFICIENT POWER TO COMPLETE THE MEASUREMENT WITHOUT INTERRUPTION. ONCE A PROBE HEATER IS TURNED ON FOR AN EXPERIMENT, IT WILL NOT BE TURNED OFF UNLESS THE CONDUCTIVITY MEASUREMENT IS TO BE TERMINATED, OR OTHER ALSEP CONTINGENCIES ARE TO BE CORRECTED.
A	C. WHEN OPERATING IN MODE I, HEATER STATE "OFF" WILL BE SELECTED.
A	D. HFE WILL BE IN MODE I WHEN SELECTING PCU'S.

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## MISSION RULES

### SECTION 3 - ALSEP OPERATIONAL GUIDELINES

R	ITEM	
	32-7	INSUFFICIENT POWER FOR SIMULTANEOUS SUPPORT OF ALL EXPERIMENTS
A		AUTO THERMAL CONTROL OF THE EXPERIMENTS WILL BE INHIBITED IF ADEQUATE POWER IS NOT AVAILABLE. THERMAL CONTROL WILL BE MANUALLY MANAGED TO PRECLUDE RIPPLE-OFF OF EXPERIMENTS. INDIVIDUAL EXPERIMENT COMMANDS THAT REQUIRE CENTRAL STATION HEATER POWER WILL BE HELD TO A MINIMUM. CENTRAL STATION AVERAGE TEMPERATURES WILL BE
A		ALLOWED TO GO AS LOW AS -10 DEG F IF THE HEATER POWER IS REQUIRED FOR OPERATION OF AN EXPERIMENT.
	32-8	EXPERIMENT INTERFERES WITH ANOTHER EXPERIMENT OR THE CENTRAL STATION
		IF IT IS DETERMINED THAT ANY EXPERIMENT IS A STEADY SOURCE OF INTERFERENCE TO ANOTHER EXPERIMENT, OPERATION OF THE INTERFERING EXPERIMENT WILL BE CURTAILED (BUT NOT TERMINATED) AS LONG AS THAT EXPERIMENT IS STILL RETURNING DATA. IN NO CASE, HOWEVER, WILL ANY EXPERIMENT BE REMOVED FROM ITS DESIRED OPERATIONAL CONFIGURATION FOR MORE THAN 80 PERCENT OF ANY LUNAR DAY (29.5 EARTH DAYS).
	32-9	THE EXPERIMENT STATUS WHILE ALSEP IS IN LSP FORMAT FOR LM ASCENT, LM ASCENT STAGE IMPACT, AND EP DETONATION IS:
		HFE - ON
		LSG - ON
		LEAM - OFF
		LMS - OFF
		RULE 32-10 IS RESERVED.
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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES

	RULE	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
A	32-11	AVG THERM PLATE - T GREATER THAN OR EQUAL TO 132 DEG F		A. CMD 7W PDR ON. B. CMD 14W PDR ON. C. CMD BOTH 7W AND 14W PDR ON	A. CMD 017 B. CMD 022 C. CMDS 017 AND 022.
A	32-12	AVG THERM PLATE - T LESS THAN OR EQUAL TO - 10 DEG F		CMD ARM OFF	CMD 5A031 APM 1 OFF OR CMD 5A113 APM 2 OFF
A	32-13	AVG THERM PLATE- T LESS THAN OR EQUAL TO ZERO DEG F OR GREATER THAN OR EQUAL TO 125 DEG F		SELECT REDUNDANT APM/PCU SYSTEM	CMD 5A060 PCU 1 CMD 5A062 PCU 2
		RULE NUMBERS 32-14 THROUGH 32-20 ARE RESERVED.			

## MISSION RULES

SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED																													
RULE		CONDITION/MALFUNCTION		PHASE		RULING		CUES/NOTES/COMMENTS																					
32-21		FAILURE OF AUTO SWITCHOVER TO REDUNDANT PCU				SELECT REDUNDANT PCU.		AUTO SWITCHOVER TO PCU SHOULD OCCUR AT +12 VDC. OUT-OF-LIMITS (LESS THAN 10.8 VDC/GREATER THAN 13.2 VDC), PCU 2 SEL - CMD 062, PCU 1 SEL - CMD 060.  THE FOLLOWING TM WILL BE OUT-OF-LIMITS:  <table border="1"> <thead> <tr> <th>TM</th> <th>NOMINAL</th> <th>HI</th> <th>LO</th> </tr> </thead> <tbody> <tr> <td>AE-9</td> <td>+12</td> <td>+13.0</td> <td>+11.0</td> </tr> <tr> <td>AE-7</td> <td>+29</td> <td>+31.3</td> <td>+25.7</td> </tr> <tr> <td>AE-10</td> <td>+ 5</td> <td>+ 5.4</td> <td>+ 4.6</td> </tr> <tr> <td>AE-11</td> <td>-12</td> <td>-11.0</td> <td>-13.0</td> </tr> </tbody> </table> VERIFY AE-2 CAL VOLTAGES WITHIN LIMITS.		TM	NOMINAL	HI	LO	AE-9	+12	+13.0	+11.0	AE-7	+29	+31.3	+25.7	AE-10	+ 5	+ 5.4	+ 4.6	AE-11	-12	-11.0	-13.0
TM	NOMINAL	HI	LO																										
AE-9	+12	+13.0	+11.0																										
AE-7	+29	+31.3	+25.7																										
AE-10	+ 5	+ 5.4	+ 4.6																										
AE-11	-12	-11.0	-13.0																										
A	32-22	RESERVE POWER LESS THAN 2.0 W.				A. VERIFY PDR'S OFF  B. COMMAND EXPERIMENTS TO LOWER POWER MODES BEGINNING WITH THE LOWEST PRIORITY EXPERIMENTS.		CUES:  CS 60 FOR PCU 1  CS 61 FOR PCU 2																					
		RULE NUMBERS 32-23 THROUGH 32-30 ARE RESERVED.																											

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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

RULE		CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS		
A	32-31	ALSEP FAILS TO RESPOND TO A COMMAND.		A. REINITIATE THE COMMAND. B. REMOVE MODULATION AND REAPPLY MODULATION. REINITIATE THE COMMAND. C. IF UNSUCCESSFUL, SELECT REDUNDANT COMMAND SYSTEM AND REINITIATE THE COMMAND. D. IF UNSUCCESSFUL, WAIT FOR UPLINK SWITCH TO REDUNDANT COMMAND SYSTEM.	CUE: NO FUNCTIONAL VERIFICATION AND/OR NO FUNCTIONAL VERIFICATION WORD (CVW)  C. CMD 122 OCT  D. UPLINK SWITCH OCCURS EVERY 61 HR, 49 MIN, 35 SEC.		
	RULE NUMBERS 32-32 THROUGH 32-34 ARE RESERVED.						
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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

R	RULE	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS			
	32-35	WEAK TM SIGNAL		A. COMMAND XMTR OFF SELECT REDUNDANT XMTR  B. SELECT LOW BIT RATE	A. XMTR A OFF - CMD 013 XMTR A SEL - CMD 012 XMTR B OFF - CMD 014 XMTR B SEL - CMD 015  B. LOW BIT RATE SEL-CMD 007			
A	32-36	LOSS OF SYNC OR BAD DECODED DATA		A. SELECT REDUNDANT DDP  B. SELECT REDUNDANT ADP  C. SELECT LOW BIT RATE  D. CMD XMTR OFF. SELECT REDUNDANT XMTR.	A. PROC X SEL - CMD 034 PROC Y SEL - CMD 035 AB-10 D/P STATUS  B. CMD 024 OR 025  C. LOW BIT RATE SEL-CMD 007			
A								
A								
	32-37	LOSS OF TM MODULATION		A. SELECT REDUNDANT DPP B. COMMAND XMTR OFF. SELECT REDUNDANT XMTR.	A. CMD 024 OR 025  B. XMTR A OFF - CMD 013 XMTR A SEL - CMD 012 XMTR B SEL - CMD 014 XMTR B SEL - CMD 015			
	32-38	GROUND UNABLE TO COMMAND HIGH BIT RATE OFF		A. SEE RULE 32-31 B. CHANGE DDP, THEN CMD DP FORMAT C. COMMAND UPLINK SWITCH (122) D. SWITCH PCU'S				
		RULE NUMBERS 32-39 THROUGH 32-45 ARE RESERVED.						
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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

RULE		CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS		
A A	32-46	FAILURE OF TIMER INITIATED CAL		MANUALLY COMMAND THE CALS. TWO 111 OCT			
	32-47	FAILURE OF THERMAL CONTROL		MANUALLY CONTROL HEATER STATUS. MAINTAIN AJ-11 BETWEEN -20 DEG F AND 150 DEG F.	DJ-29=1 WHEN HEATER ON. HTR CNTL 117 OCT. HEATER AUTO ON LESS THAN OR EQUAL TO ZERO DEG F. AUTO OFF GREATER THAN OR EQUAL TO 9 DEG F.		
	RULES 32-48 THROUGH 32-50 ARE RESERVED FOR LEAM						
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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

	RULE	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS			
	32-51	TEMP LESS THAN MINUS 10 DEG WITH EXP ON		CMD BACKUP HTR ON.	<u>CUE:</u> AM-5 BASEPLATE TEMP  CMD CA-7			
	32-52	TEMP GREATER THAN 125 DEG F		CMD BACKUP HTR OFF.	<u>CUE:</u> AM-5 BASEPLATE TEMP CMD CA-1			
A A A	32-53	FAILURE OF FIXED ION SOURCE MODE		CMD EMISSION AND HV OFF. CA-4 AND CA-15	AM-11 EMISSION CUR NOT EQUAL TO 230 MA.			
A A A A	32-54	FAILURE OF CYCLIC ION SOURCE MODE		CMD EMISSION AND HV OFF. CA-4 AND CA-15	AM-11 EMISSION CUR NOT EQUAL TO 85 MA.			
A A A	32-55	FAILURE OF FILAMENT		CHO EMISSION AND HV HV OFF. CA-4 AND CA-15	AM-12 OR AM-13 LESS THAN 1.2 AMPS			
A		RULES 32-56 THROUGH 32-60 ARE RESERVED FOR LMS.						
		MISSION	REV	DATE	SECTION	GROUP	PAGE	
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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

	RULE	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
A	32-61	THERMAL CONTROL FAILS (TEMP HIGH)		A. CHECK PRESSURE XDCER OFF.  B. VERIFY SERVOS OFF.  C. VERIFY DECODER OFF	PRESSURE XDCER DISSIPATES 250 WA   <u>CUE:</u> DG-04 MORE THAN 52 DEG F CMD 5A064
A	32-62	MASS CHANGE MOTOR WILL NOT RUN		A. CMD MASS CHANGE SERVO OFF.  B. CMD SLAVE HTR OFF  C. COMMAND MASS SERVO ON.	<u>CUE:</u> MASS CHANGING IS INHIBITED WHEN THE SLAVE HEATER IS ON. TM INDICATED.
A	32-63	BEAM STICKS TOP OR BOTTOM		A. COMMAND SCREW SERVO MOTOR ON, FOLLOWED BY THE VERNIER SLEW COMMAND, WHICH DRIVES THE BEAM AWAY FROM THE STOP.  B. UNCAGE BEAM  C. CAGE THEN UNCAGE BEAM	A. CMD SCREW SERVO ON - LSG MUX CMD 13 VERNIER SLEW UP-21 VERNIER SLEW DOWN-22  B. CMD-10 C. CMD-9 THEN CMD-10  <u>NOTE:</u> SLAVE HTR MUST BE OFF TO UNCAGE.
A	32-64	THERMAL CONTROL FAILS (TEMP LOW)		A. CMD PRESSURE XDCER ON  B. CMD DECODER ON	
A		32-65 THROUGH 32-70 ARE RESERVED FOR LSG.			

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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

SECTION 32-71 THROUGH 32-80		CONTINUED					
RULE	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS			
A A	32-71	TRANSMITTER FAILS TO BEGIN PULSES		SEE RULE 32-31			
	32-72	UNABLE TO COMMAND LSP FORMATTING		A. SEE RULE 32-31 B. CHANGE DDP THEN CMD LSP FMT. C. CMD 007 (LBR). CMD 003 (LSP FMT). CMD 006 (NBR).	MUST BE IN LSP FORMATTING. EXPLOSIVE CHARGE FIRING MODE.		
	32-73	UNABLE TO COMMAND DP FORMATTING FROM LSP FORMATTING.		A. SEE RULE 32-31. B. CHANGE DDP, THEN CMD DP FORMAT. C. COMMAND 122 UPLINK SWITCHOVER. D. SWITCH PCU.			
	32-74	GROUND UNABLE TO COMMAND LSP TO STBY.		A. CMD LSP TO OFF. B. CONTINUE MISSION WITH LSP IN OPERATE MODE.			
	32-75	UNEXPLAINED LOSS OF LOCK ON LSP FMT.		CMD DDP FORMAT CHANGE DP AND RETURN TO LSP FORMAT.	ASSUMES RF CARRIER WITH MODULATION STILL PRESENT		
A	32-77 THROUGH 32-80 ARE RESERVED FOR LSP						
MISSION		REV	DATE	SECTION	GROUP	PAGE	
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## MISSION RULES

R	RULE	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS		
32-81	UNABLE TO DRILL NORMAL HFE EMPLACEMENT HOLES.						
A	A.	IF EITHER HOLE IS LESS THAN 40 INCHES DEEP AND DRILL IS INOPERABLE.		A.1. HAND-AUGER AND HAMMER BORE STEMS INTO SUBSURFACE AT LEAST 40 INCHES.			
A				2. IF UNSUCCESSFUL INSERT PROBE INTO HOLE MADE BY A DOUBLE CORE TUBE. FILL HOLE AROUND PROBE.			
A				3. IF LESS THAN 40 INCHES, LAY PROBE ON SURFACE AND ORIENT BLACK TAPE ON CABLE NORTH/SOUTH.			
A	B.	IF EITHER HOLE IS LESS THAN 40 INCHES AND DRILL IS STILL OPERABLE		B. DRILL DEEP CORE AT SHALLOW BORE LOCATION AND INSERT PROBE IN HOLE THROUGH TREADLE, AND CAVE SOIL IN AROUND PROBE.	B. USE TREADLE AND EXTRACTOR TO HOLD SOIL IN PLACE. MOVE TREADLE AT LEAST 10 FEET DOWN THE CABLE TOWARD THE ELECTRONICS.		
A	C.	IF HOLE IS NOT NOMINAL DEPTH		C. PLACE PROBE IN HOLE AS FAR AS IT WILL GO. EMPLACE LOWER RADIATION SHIELD ON THE TOP OF THE PROBE, EMPLACE MIDDLE RADIATION SHIELD BELOW LUNAR SURFACE OR ON TOP OF PROBE.			
32-82	HAVE CHOICE OF DRILLING SECOND HFE HOLE OR CORE SAMPLE HOLE.			DRILL SECOND HFE PROBE EMPLACEMENT HOLE	HFE HAS PRIORITY OVER CORE SAMPLES		
32-83	DRILL RATE REDUCED TO LESS THAN 5 IN./MIN.			A. IF LESS THAN TWO STEM SECTIONS ARE ATTACHED TO THE POWER HEAD, WITHDRAW AND START AT NEW LOCATION FOR MAXIMUM OF THREE LOCATIONS FOR EACH BORE.			
				B. IF TWO OR MORE STEM SECTIONS ARE ATTACHED TO THE POWER HEAD, CONTINUE UNTIL 10 MIN OF POWER ON TIME FOR THE DRILL STRING HAS ELAPSED.			
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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED							
RULE	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS			
32-84	HFE INTERRUPTED DURING CONDUCTIVITY MEASUREMENT (HEATER ON)  A. DURING MODE II:  1. HEATER GOES OFF.  2. HEATER GOES TO MODE III		A.1. GO TO NEXT CONDUCTIVITY MEASUREMENT.  2. TURN HEATER OFF AND RETURN TO MODE II AND GO TO NEXT HFE CONDUCTIVITY MEASUREMENT.  B. IF ON TIME IS MORE THAN 6 HR, GO TO DECAY MODE. IF ON TIME IS LESS THAN 6 HR, GO TO NEXT CONDUCTIVITY MEASUREMENT.	A.2. HFE HTR-CMD 152			
32-85	HFE DOWNLINK DATA LOSES SYNC		A. CONDUCTIVITY MEASUREMENT IS IN PROGRESS SWITCH DATA PROCESSOR. 1. DATA PROC X SEL (CMD 034) 2. DATA PROC Y SEL (CMD 035)  B. IF CONDUCTIVITY MEASUREMENT IS NOT IN PROGRESS, SEND MODE I CMD IF MODE I STATUS IS DOUBTFUL.	B. MODE I CMD 135			
32-86	HFE ELECTRONICS REFERENCE TEMPERATURE IS INCREASING TO GREATER THAN 333 DEG K.		SELECT LOWER POWER MODE OR TURN OFF FOR APPROPRIATE AMOUNT OF TIME	CUE: DH-13 T1 REF, CH-15 T2 REF MODE I CMD 135			
32-87	HFE OFF AT LUNAR NIGHT LONGER THAN 6 HRS.		GO TO STBY UNTIL LUNAR SUNRISE	HFE STBY - 046			
MISSION		REV	DATE	SECTION	GROUP	PAGE	
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## MISSION RULES

### SECTION 4 - ALSEP SPECIFIC RULES - CONTINUED

R	RULE	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS			
A A	32-88	HFE ELECTRONICS REFERENCE TEMP FAILS TO LESS THAN 273 DEG K.		SELECT IN SEQUENCE HFE STBY - 046 HFE OFF - 050 HFE ON - 045 GO TO SOP 6-13				
		RULE NUMBERS 32-89 THROUGH 32-93 ARE RESERVED.						
		MISSION	REV	DATE	SECTION	GROUP	PAGE	
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