



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

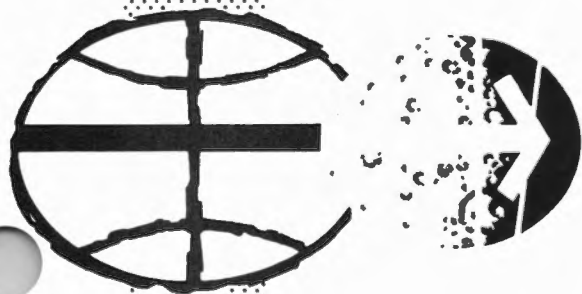
APOLLO 17

ALL LAUNCH DATES

CHANGE A

# CSM MALFUNCTION PROCEDURES

PREPARED BY  
FLIGHT PLANNING BRANCH  
CREW PROCEDURES DIVISION



MANNED SPACECRAFT CENTER  
HOUSTON, TEXAS

NOVEMBER 10, 1972

APOLLO 17

CSM MALFUNCTION PROCEDURES

NOVEMBER 10, 1972

PREPARED BY:

  
JAMES L. BAKER  
BOOK MANAGER

APPROVED BY:

  
T. W. HOLLOWAY  
FLIGHT DATA FILE MANAGER

APPROVED BY:

  
HELMUT A. KUEHNEL, CHIEF  
CREW EQUIPMENT AND DESIGN BRANCH  
FLIGHT CREW INTEGRATION DIVISION

It is requested that any organization having comments, questions, or suggestions concerning this document contact James L. Baker, Flight Planning Branch, CG51, Building 4, room 225, telephone 483-4471.

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CSM MALFUNCTION PROCEDURES

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\*\*9 Sheets

\* Indicates Current Change



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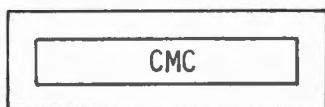
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G&N MALFUNCTION INDEX

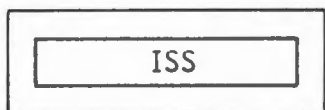
- 1 RCS FAILED ON
- 2 RHC TROUBLESHOOTING ROUTINE
- 2a CMC AUTO TROUBLESHOOTING ROUTINE
- 2b SUSPECTED REDUCED RCS AUTHORITY
- 3 THC TROUBLESHOOTING ROUTINE
- 4 MIN IMP CONT TROUBLESHOOTING ROUTINE

5



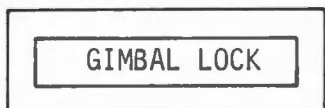
RED

6



RED

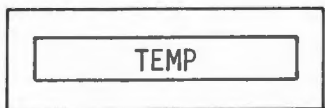
7



YELLOW

- 7a NO ATT LIGHT
- 7b ISS TURN ON
- 7c IMU CAGE
- 7d IMU COARSE ALIGN

8



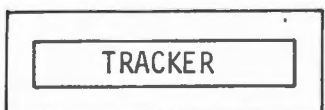
YELLOW

9



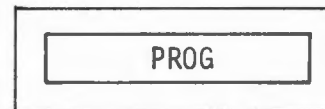
YELLOW

10



YELLOW

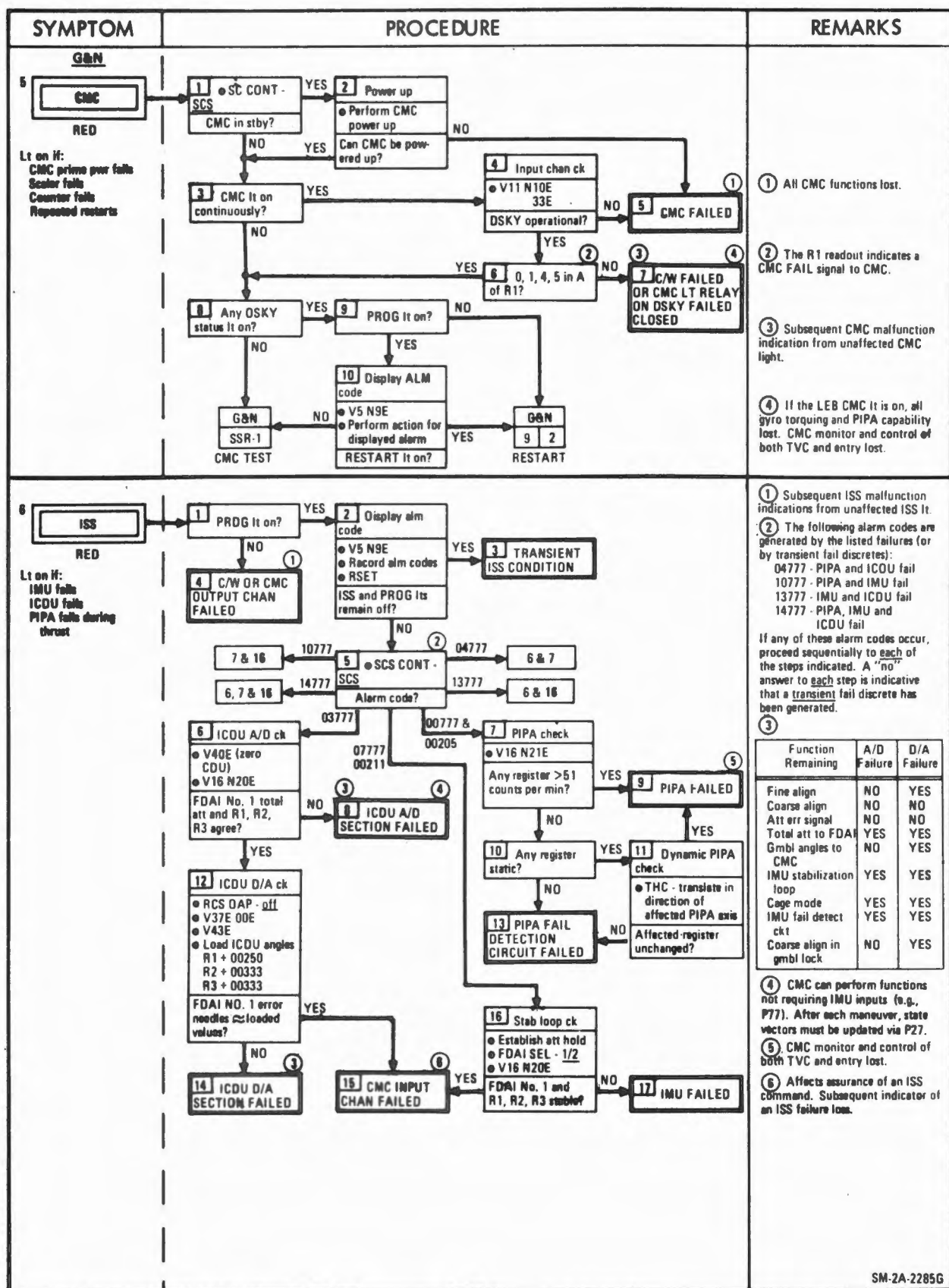
11

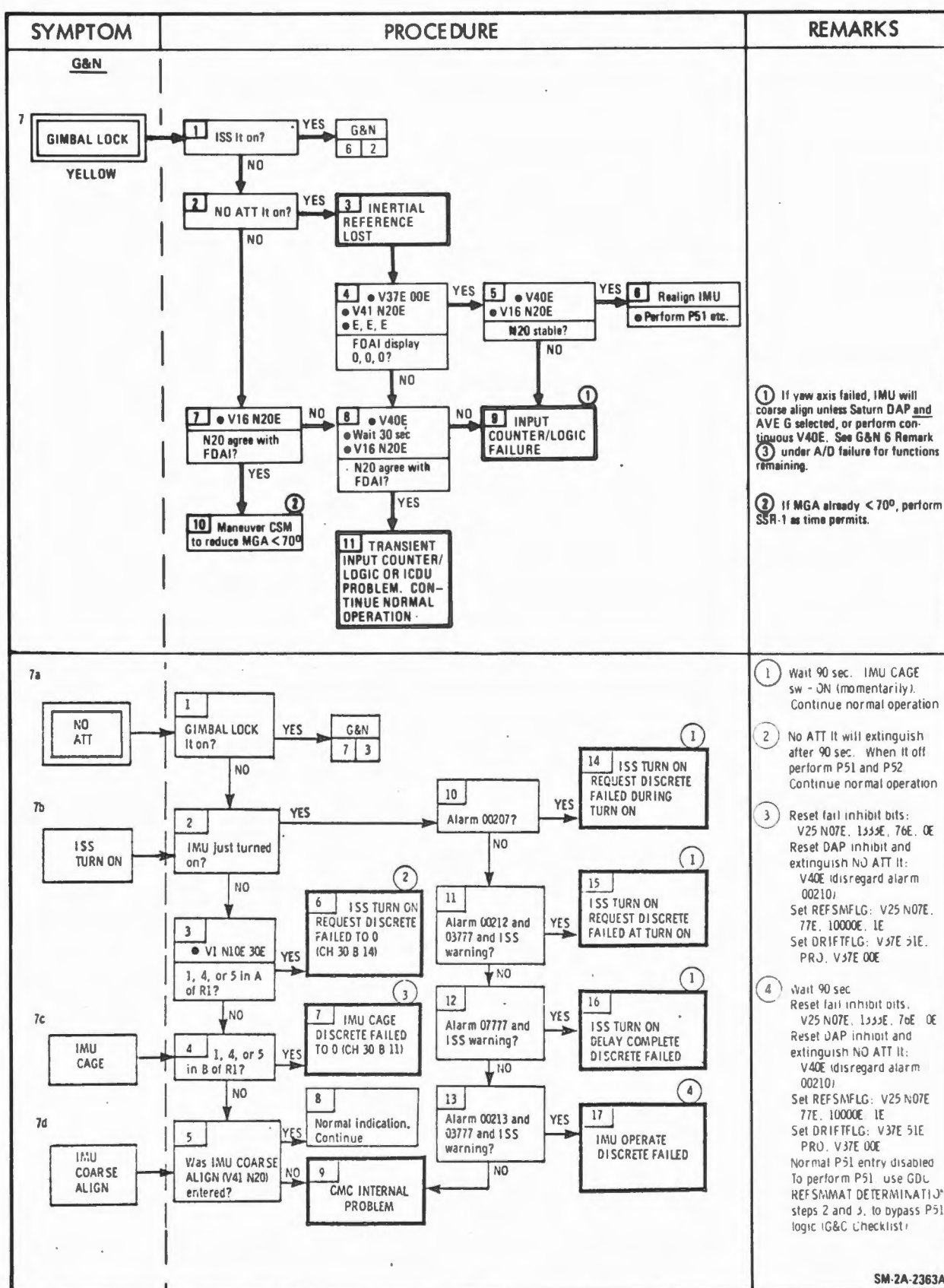


YELLOW

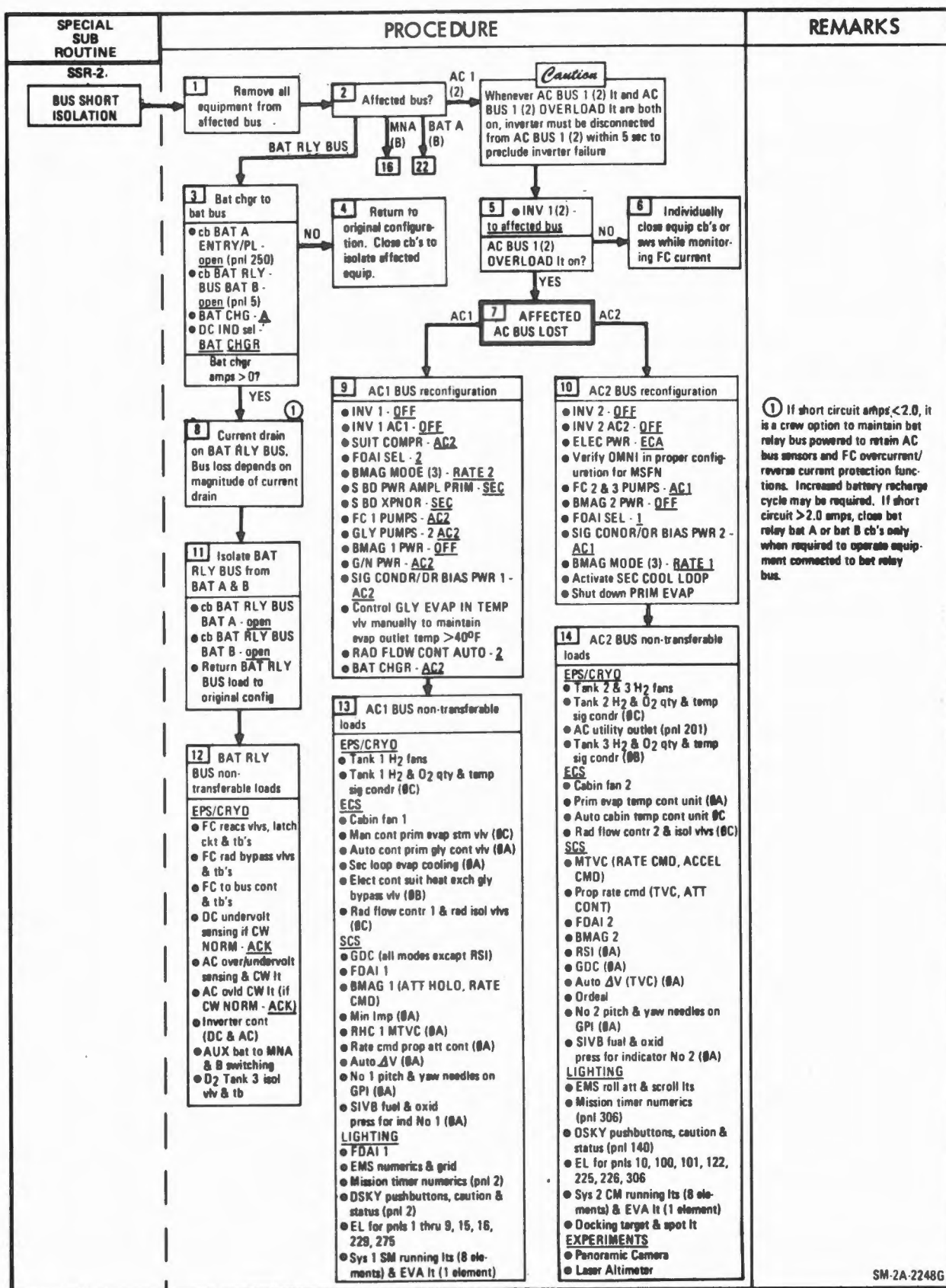
- 12 ALARM CODES
- 13 OSCILLATING OR DIVERGING MOTION
- SSR-1 CMC TEST
- SSR-2 CMC JET RE-CONFIG
- SSR-3 FRESH START

G&N

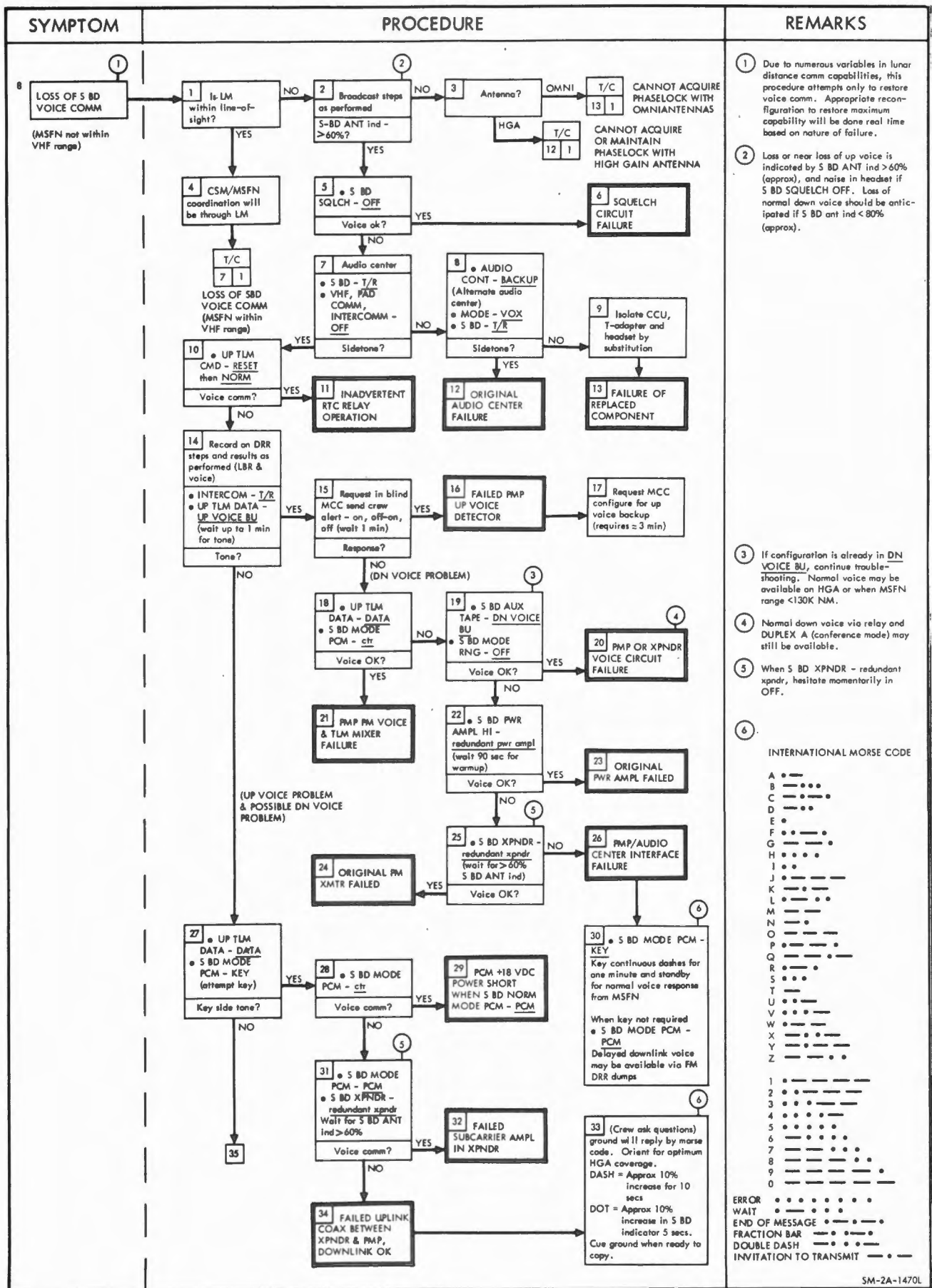
5  
THR  
6



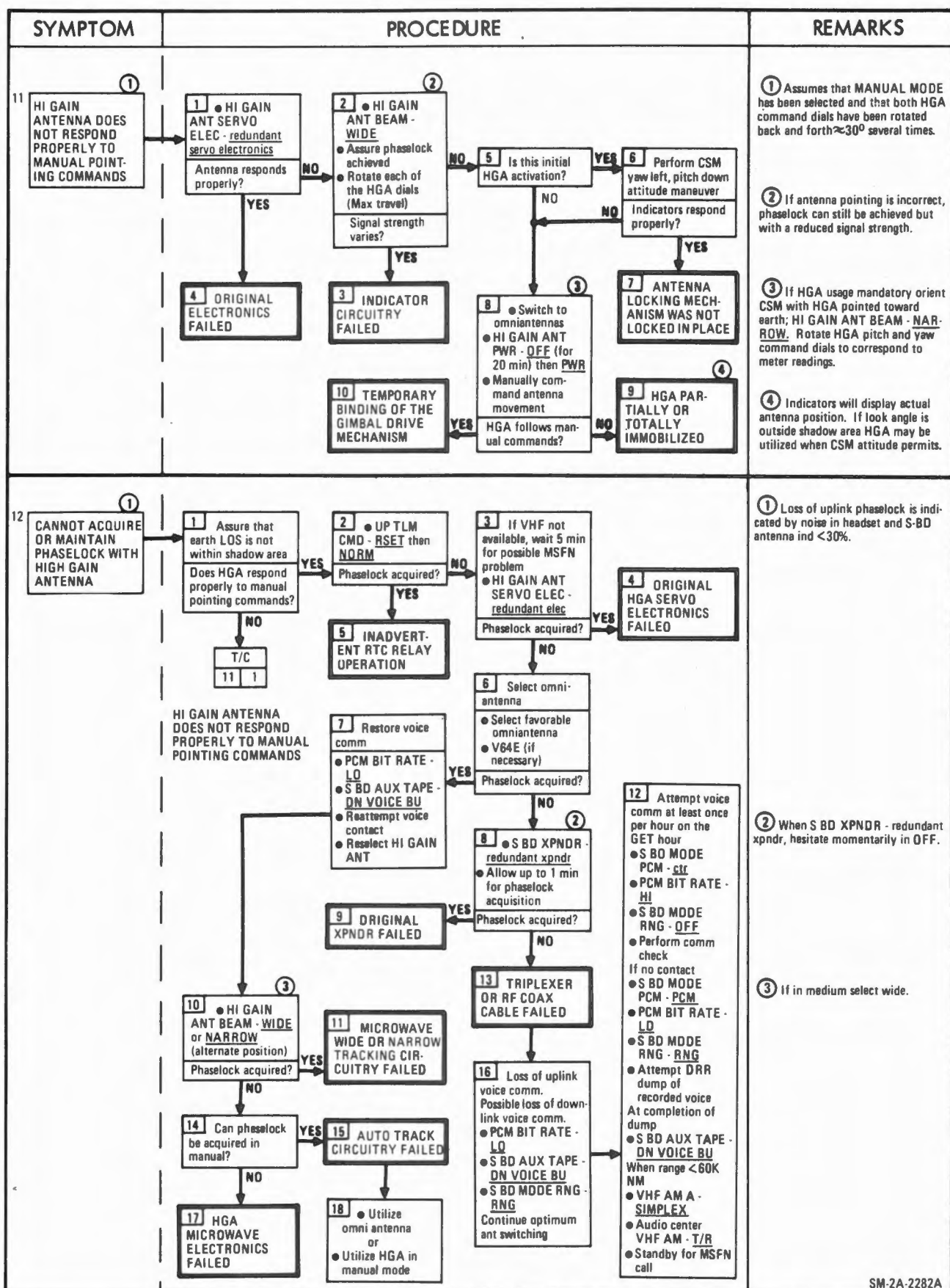




| SYMPTOM      | PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | REMARKS                                                                                                                                                             |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------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| SSR-2 (Cont) | <p>15 Individually close equip cb's or sws while monitoring FC current</p> <p>16 DC IND sel - FC 1(3)<br/>FC 1(3) MN BUS A (B) - on (momentarily)<br/>DC amps &gt; 25?</p> <p>17 AFFECTED MAIN DC BUS LOST</p> <p>18 MN BUS A reconfiguration</p> <ul style="list-style-type: none"> <li>FC 2, 3 - MNB only</li> <li>FC 1 MNB - on (up) (if reqd)</li> <li>FC 1 MNA - OFF</li> <li>INV 1 AC1 - OFF</li> <li>INV 1 - OFF</li> <li>INV 3 - MNB</li> <li>INV 3 AC1 - on (up)</li> <li>cb MNA BAT BUS A - open</li> <li>cb MNB BAT C - close</li> <li>SUIT H2O ACCUM AUTO - 2</li> <li>BMAG MDOE (3) - RATE 2</li> <li>FDAL SEL - 2</li> <li>NON ESS BUS - MNB</li> <li>URINE DUMP - HTR B</li> <li>WASTE H2O DUMP - HTR B</li> <li>RHC PWR DIR 2 - MNB</li> <li>AUTO RCS SEL (16) - MNB (as reqd)</li> <li>RAD PRIM HTR - 1</li> <li>RAD FLOW CONT AUTO - 2</li> <li>SPS LINE HTRS - A/B (as reqd)</li> <li>SCS TVC (2) - RATE CMD</li> <li>Use RHC's for RCS dump, not CM PRPLNT DUMP sw</li> </ul> <p>19 MN BUS B reconfiguration</p> <ul style="list-style-type: none"> <li>FC 1, 2 - MNA only</li> <li>FC 3 MNA - on (up) (if reqd)</li> <li>FC 3 MNB - OFF</li> <li>INV 2 AC2 - OFF</li> <li>INV 2 - OFF</li> <li>INV 3 - MNA</li> <li>INV 3 AC2 - on (up)</li> <li>cb MNB BAT BUS B - open</li> <li>cb MNA BAT C - close</li> <li>BMAG MODE (3) - RATE 1</li> <li>RHC PWR DIR 1 - MNA</li> <li>AUTO RCS SEL (16) - MNA (as reqd)</li> <li>ELEC PWR - ECA</li> <li>RAD PRIM HTR - 2</li> <li>RAD FLOW CONT AUTO - 1</li> <li>Use RHC's for RCS dump, not CM PRPLNT DUMP sw</li> </ul> <p>20 MN BUS A non-transferable loads</p> <p>EPS/CRYO</p> <ul style="list-style-type: none"> <li>Tank 1 H2 htr</li> <li>Tank 1 O2 100W htr</li> <li>Tank 2 &amp; 3 O2 50W htrs</li> <li>Inverter 1 pwr</li> <li>Utility outlets (pnl 15 &amp; 16)</li> <li>Tank 1 O2 vac-ion pump</li> </ul> <p>ECS</p> <ul style="list-style-type: none"> <li>CO2 PP ind, CW It &amp; PCM</li> <li>Prim 2 rad htr cont</li> <li>Rad flow contr 1 &amp; auto select</li> <li>Rad isol vlv man sel</li> <li>H2O accum 1 auto &amp; man cont</li> <li>Urine &amp; waste H2O dump htr A</li> <li>Steam duct htr A</li> <li>Sec rad htr cont</li> <li>Sec rad in &amp; out temp ind &amp; PCM</li> </ul> <p>RCS</p> <ul style="list-style-type: none"> <li>CM sys 1 htrs</li> <li>CM sys 1 fuel &amp; oxid purge</li> <li>CM oxid interconnect</li> <li>CM fuel/He interconnect</li> <li>CM sys 1 prplnt dump (61 sec TD)</li> <li>CM sys 1 prplnt isol vlv &amp; tb</li> <li>SM B &amp; O He 1 &amp; 2 isol vlv &amp; tb</li> <li>SM B &amp; D prim/sec prplnt isol vlv &amp; tb</li> <li>SM B &amp; D sec fuel press isol vlv</li> <li>SM B &amp; D htrs</li> <li>Transfer mot sw 1</li> </ul> <p>SPS</p> <ul style="list-style-type: none"> <li>Pitch &amp; yaw (prim) gmbt mots</li> <li>Enable pwr sol driver 1</li> <li>He vlv 1 &amp; tb</li> <li>Pilot vlv 1 &amp; 2</li> <li>Prim pilot pre-avl</li> <li>Line htrs A</li> <li>PUGS test</li> </ul> <p>SCS</p> <ul style="list-style-type: none"> <li>FDAL 1 total attitude</li> <li>GDC (except RSI)</li> <li>BMAG 1 htr &amp; CW temp It (eventually lose BMAG 1 as temp decreases)</li> <li>Auto coils CM RCS 1 (if prior to CM/SM sep)</li> <li>Direct ullage yaw D3 &amp; B4</li> <li>Auto ΔV</li> <li>Auto attitude hold</li> <li>Rate 1 MTVC</li> <li>RHC pwr dir 1</li> <li>a. MNA/MNB to half of jets</li> <li>b. MNA to all jets</li> <li>RHC pwr dir 2, MNA/MNB to half of jets</li> </ul> <p>LIGHTING</p> <ul style="list-style-type: none"> <li>RH girth shelf flood (fixed mode)</li> <li>RH couch flood (fixed mode)</li> <li>LH girth shelf flood (variable mode)</li> <li>LH couch flood (variable mode)</li> <li>LH &amp; RH strut flood (variable mode)</li> <li>LH optical align sight</li> </ul> <p>Rendezvous It</p> <ul style="list-style-type: none"> <li>Sys A tunnel Its (6 elements)</li> </ul> <p>DISPLAYS &amp; CONTROLS</p> <ul style="list-style-type: none"> <li>Mission elapsed timer (pnl 2)</li> </ul> <p>DOCKING</p> <ul style="list-style-type: none"> <li>Sys A probe connector (however A &amp; B connectors may be switched)</li> </ul> <p>EXPERIMENTS</p> <ul style="list-style-type: none"> <li>Panoramic camera</li> <li>Mapping camera/laser altimeter cover operation &amp; tb</li> <li>Mapping camera extend &amp; retract function &amp; tb</li> <li>Lunar sounder radar</li> <li>UV cover operation &amp; tb</li> <li>IR cover operation &amp; tb</li> <li>Lunar sounder HF-1 antenna operation &amp; tb</li> </ul> <p>21 MN BUS B non-transferable loads</p> <p>EPS/CRYO</p> <ul style="list-style-type: none"> <li>Tank 2 H2 htr</li> <li>Tank 2 &amp; 3 O2 100W htrs</li> <li>Tank 1 O2 50W htr</li> <li>Tank 3 H2 fans</li> <li>Inverter 2 pwr</li> <li>Utility outlet (pnl 100)</li> <li>LM power</li> <li>Tank 2 &amp; 3 O2 vac-ion pumps</li> </ul> <p>ECS</p> <ul style="list-style-type: none"> <li>O2 high flow CW It</li> <li>Prim 1 rad htr cont</li> <li>Rad flow contr 2</li> <li>Prim rad in temp ind &amp; PCM</li> <li>H2O accum 2 auto &amp; man cont</li> <li>Urine &amp; waste dump htr B</li> <li>Steam duct htr B</li> </ul> <p>RCS</p> <ul style="list-style-type: none"> <li>CM sys 2 htrs</li> <li>CM sys 2 fuel &amp; oxid purge</li> <li>CM fuel interconnect</li> <li>CM oxid/He interconnect</li> <li>CM sys 2 prplnt dump (61 sec TD)</li> <li>CM sys 2 prplnt isol vlv &amp; tb</li> <li>SM A &amp; C He 1 &amp; 2 isol vlv &amp; tb</li> <li>SM A &amp; C prim/sec prplnt isol vlv &amp; tb</li> <li>SM A &amp; C sec fuel press isol vlv</li> <li>SM A &amp; C htrs</li> <li>Transfer mot sw 2</li> </ul> <p>SPS</p> <ul style="list-style-type: none"> <li>Pitch &amp; yaw (sec) gmbt mots</li> <li>Enable pwr sol driver 2</li> <li>He vlv 2 &amp; tb</li> <li>Pilot vlv (3 &amp; 4)</li> <li>Line htrs B</li> <li>Sec pilot pre-avl</li> </ul> <p>SCS</p> <ul style="list-style-type: none"> <li>FDAL 2 total attitude</li> <li>GDC</li> <li>BMAG 2 htr &amp; CW temp It (eventually lose BMAG 2 as temp decreases)</li> <li>Auto coils CM RCS 2 (if prior to CM/SM sep)</li> <li>Direct ullage pitch C3 &amp; A4</li> <li>Auto ΔV (maybe degraded)</li> <li>Min imp increased to ≈ 42 MS</li> <li>RSI</li> <li>Ordeal</li> <li>RHC pwr dir 1, MNA/MNB to half of jets</li> <li>RHC pwr dir 2</li> <li>a. MNA/MNB to half of jets</li> <li>b. MNB to all jets</li> </ul> <p>LIGHTING</p> <ul style="list-style-type: none"> <li>LH girth shelf flood (fixed mode)</li> <li>LH couch flood (fixed mode)</li> <li>LH &amp; RH strut flood (fixed mode)</li> <li>RH couch flood (variable mode)</li> <li>RH girth shelf flood (variable mode)</li> <li>RH optical align sight</li> <li>Sys B tunnel Its (6 elements)</li> <li>Spotlight door initiator</li> </ul> <p>DISPLAYS &amp; CONTROLS</p> <ul style="list-style-type: none"> <li>Mission elapsed timer (pnl 306)</li> </ul> <p>DOCKING</p> <ul style="list-style-type: none"> <li>Sys B probe connector (however A &amp; B connectors may be switched)</li> </ul> <p>EXPERIMENTS</p> <ul style="list-style-type: none"> <li>Mapping camera</li> <li>Laser altimeter</li> <li>Lunar sounder optical recorder</li> <li>Lunar sounder HF-2 antenna operation &amp; tb</li> </ul> | <p>② MASTER ALARM and FC BUS DISC Its will come on when reconnecting open-circuited FC to bus.</p> <p>③ Place two batteries on remaining bus for SPS maneuvers.</p> |



| SYMPTOM                                      | PROCEDURE | REMARKS                                                                                                                                                                                                                                            |
|----------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>8 (Cont)</p>                              |           | <p>7 CMP PTT switch will be inoperative. S BD reception will be via intercom bus.</p> <p>8 Time required to establish Stanford/ Goldstone interface may be as much as two hours</p>                                                                |
| <p>9 MSFN REPORTS LOSS OF RANGING</p>        |           | <p>1 Coordinate with MSFN</p> <p>2 When SBD XPNDR-redundant xpndr, hesitate momentarily in OFF.</p> <p>3 Skin tracking performed by ground radar; no crew action required.</p> <p>4 Original XPNDR is usable for all functions except ranging.</p> |
| <p>10 MSFN REPORTS LOSS OF REAL TIME PCM</p> |           | <p>1 The capability is lost to transmit recorded PCM simultaneously with real time PCM.</p>                                                                                                                                                        |

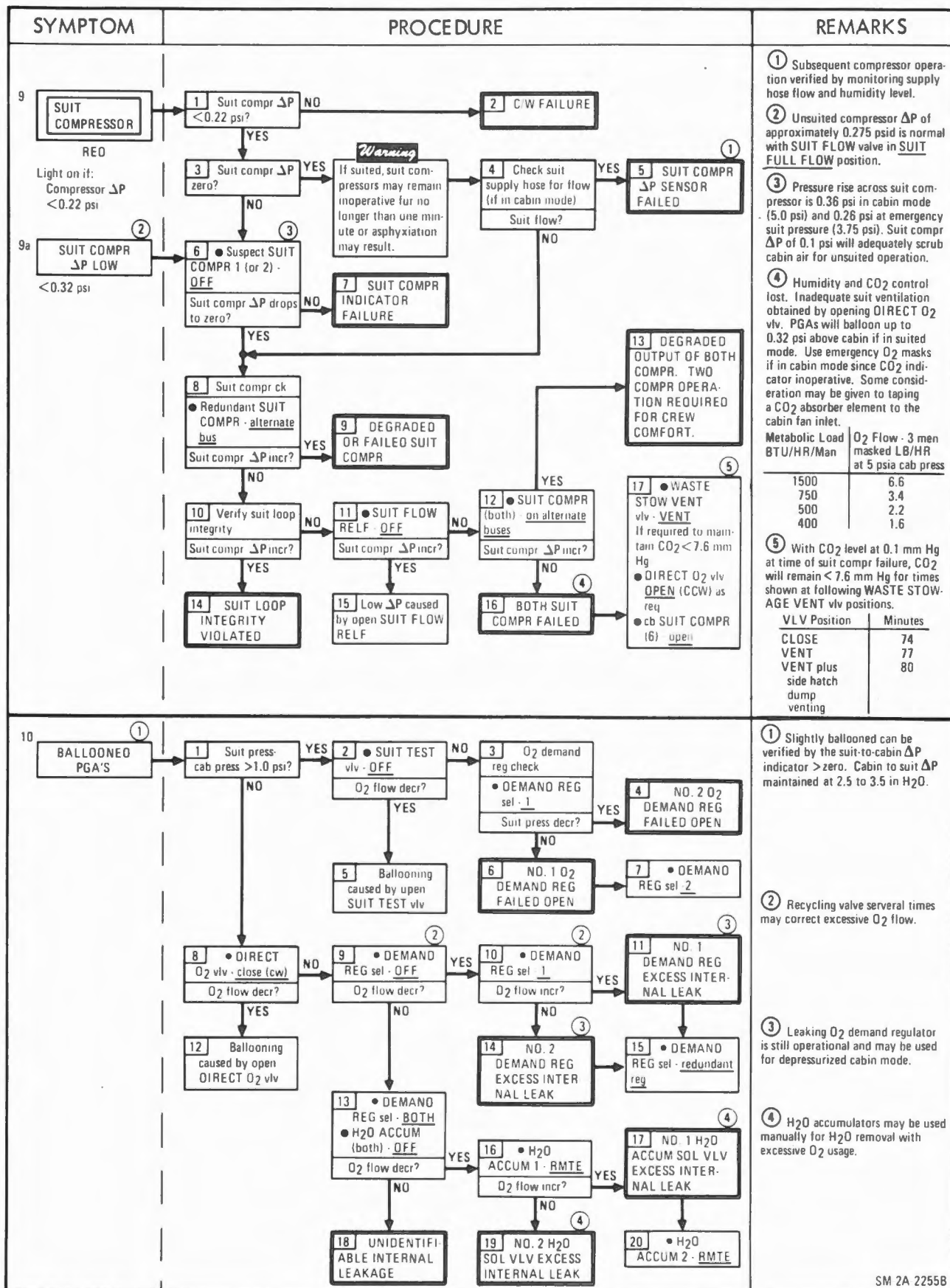
11  
THRU  
12

| SYMPTOM                                              | PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | REMARKS                                                                                                                                                                                                                                         |
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| <p>13 CANNOT ACQUIRE PHASELOCK WITH OMNIANTENNAS</p> | <pre> graph TD     13[13 CANNOT ACQUIRE PHASELOCK WITH OMNIANTENNAS] --&gt; 1[1 • Select V64E (check ant selected)<br/>Ant OK?]     1 -- NO --&gt; 2[2 • Select proper antenna (wait 1 min for phaselock)<br/>Phaselock acquired?]     1 -- YES --&gt; 4[4 • SBD XPNDR redundant XPNDR<br/>• Allow up to 30 sec for phaselock acquisition<br/>Phaselock acquired?]     2 -- YES --&gt; 3[3 ORIGINAL ANT LOOK ANGLE BAD]     2 -- NO --&gt; 6[6 • UP TLM CMD - RESET then NORM<br/>Phaselock acquired?]     4 -- YES --&gt; 8[8 ORIGINAL XPNDR FAILED]     4 -- NO --&gt; 9[9 Do attitude and propellant constraints allow roll maneuver?]     5[5 If VHF not available, wait 5 min for possible MSFN problem] --&gt; 6     6 -- YES --&gt; 7[7 INADVERTENT RTC RELAY OPERATION]     6 -- NO --&gt; 5     9 -- YES --&gt; 13_2[13 • Roll CSM not less than 45°<br/>• Allow up to 30 sec for phaselock acquisition<br/>• Attempt phaselock acquisition with all omni antennas<br/>Phaselock acquired?]     9 -- NO --&gt; 10[10 • SBD ANT OMNI - HI GAIN<br/>• Attempt phaselock acquisition utilizing HGA<br/>Phaselock acquired?]     10 -- YES --&gt; 11[11 FAILURE OF RF SWITCH TO HI GAIN POSITION OR OMNI-ANTENNA FAILED]     10 -- NO --&gt; 14[14 TRIPLEXER OR RF COAX CABLE FAILED]     11 --&gt; 12[12 SBD COMM limited to HGA or remaining omnis]     13_2 -- YES --&gt; 16[16 OMNI-ANTENNA FAILED]     13_2 -- NO --&gt; 14     14 --&gt; 15[15 Loss of uplink voice comm. Possible loss of downlink voice comm.<br/>• PCM BIT RATE - LO<br/>• SBD AUX TAPE - DN VOICE BU<br/>• SBD MODE RNG - RNG<br/>Continue optimum ant switching. Attempt voice comm at least once per hour on the GET hour as follows:<br/>• SBD MODE PCM - ctr<br/>• PCM BIT RATE - HI<br/>• SBD MODE RNG - OFF<br/>• Perform comm check<br/>If no contact -<br/>• SBD MODE PCM - PCM<br/>• PCM BIT RATE - LO<br/>• SBD MODE RNG - RNG<br/>• Attempt DRR dump of recorded voice<br/>At completion of dump -<br/>• SBD AUX TAPE - DN VOICE BU<br/>When range &lt; 60K NM<br/>• VHF AM A - SIMPLEX<br/>• Audio Center VHF AM - T/R<br/>• Standby for MSFN call]                     </pre> | <p>① Loss of uplink phaselock is indicated by noise in headset and S BD antenna ind &lt; 30%.</p> <p>② When SBD XPNDR - redundant xpndr, hesitate momentarily in OFF.</p> <p>③ Performing roll maneuver eliminates omni antenna as failure.</p> |



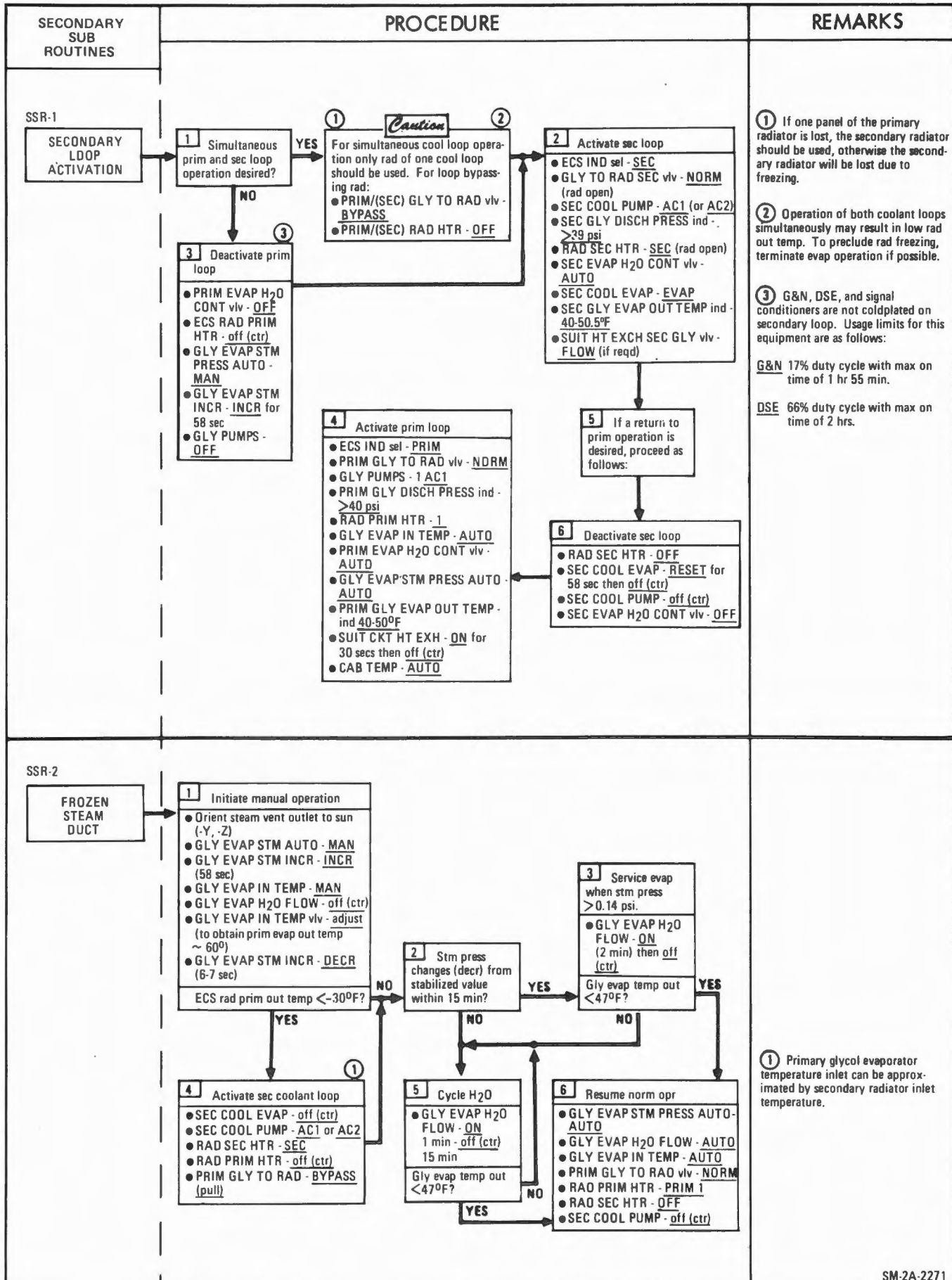
| SYMPTOM                                                                                     | PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | REMARKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| <p>8a</p> <p>①</p> <p><b>NO O<sub>2</sub> FLOW THRU PGA</b></p> <p>CABIN IS PRESSURIZED</p> | <p><b>Warning</b></p> <p>O<sub>2</sub> flow to fully suited crewmen must be established within one minute or asphyxiation may result</p> <p>1</p> <ul style="list-style-type: none"> <li>• Verify PGA/Umbilical QD's</li> <li>• Cycle SUIT FLOW vlv then - <b>SUIT FULL FLOW</b></li> </ul> <p>PGA flow?</p> <p>YES → 2</p> <p>NO → 3</p> <p>2</p> <p><b>QD's IMPROPERLY CONNECTED OR CHECK VLV (FLAPPER) IN SUIT FLOW VLV WAS FAILED CLOSE</b></p> <p>3</p> <p><b>Pressurize Suit Loop</b></p> <ul style="list-style-type: none"> <li>• SUIT TEST vlv - <b>PRESS</b></li> <li>• <b>DIRECT O<sub>2</sub> vlv - OPEN</b> until suit press ≈ 2.0 psig then - close</li> <li>• O<sub>2</sub> DEM REG - <b>OFF</b>, O<sub>2</sub> flow It - out</li> <li>• No flow crewmen disconnect inlet O<sub>2</sub> umbilical from PGA. Suit loop press will drop to cabin press</li> <li>• SUIT TEST vlv - <b>OFF</b></li> </ul> <p>PGA press drop to cabin press when hose disconnected?</p> <p>YES → 4</p> <p>NO → 5</p> <p>4</p> <p><b>CHECK VLV (FLAPPER) IN SUIT FLOW VLV WAS STUCK CLOSED</b></p> <p>5</p> <p><b>Reconfigure</b></p> <ul style="list-style-type: none"> <li>• O<sub>2</sub> DEM REG - <b>BOTH</b></li> <li>• Connect inlet O<sub>2</sub> umbilical to PGA</li> </ul> <p>6</p> <p><b>UNIDENTIFIED BLOCKAGE OF O<sub>2</sub> FLOW FROM PGA</b></p> <p>7</p> <p><b>Reconfigure</b></p> <ul style="list-style-type: none"> <li>• O<sub>2</sub> DEM REG - <b>BOTH</b></li> <li>• Pop one glove to relieve PGA press</li> <li>• Doff helmets and gloves</li> </ul> | <p><b>ASSUMPTIONS</b></p> <ul style="list-style-type: none"> <li>• For single crewman operation, select and alternate crew station.</li> <li>• Other two crewmen were getting O<sub>2</sub> flow to PGA's.</li> </ul> <p>① Detected when helmet and gloves donned and SUIT FLOW vlv was positioned to - Suit <b>FULL FLOW</b></p> <p>② This action will increase <math>\Delta P</math> across suit flow vlv check vlv. O<sub>2</sub> DEM REG must be positioned to <b>OFF</b> to prevent seal scarring when suit test vlv is turned off.</p> <p>③ Three man closed suit loop operation capability is lost.</p> |

8a





| SYMPTOM                                                   | PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | REMARKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30<br>ENTRAPPED GAS IN POTABLE H <sub>2</sub> O           | <p>1 Pot qty full? YES → 2 Isolate pot tk<br/>         • POT TK IN vlv - CLOSE<br/>         • H<sub>2</sub>O QTY IND sw - POT<br/>         • Draw off 1 qt H<sub>2</sub>O (water gun)<br/>         Pot qty decr 5%? NO → 4 GAS IS OXYGEN FROM PRESS SYSTEM</p> <p>NO → 3 GAS IS HYDROGEN YES → 5 Install gas water separator to water gun or food probe</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>① System is usable. Quantity gaging capability is compromised.</p> <p>② If suited, purge suit periodically.</p> <p>③ Unit stowed in A1.</p>                                                                                                                                                                                                                                                                                                                                                                         |
| 31<br>URINE OVERBOARD DUMP NOT DRAINING                   | <p>1 • Replace urine filter<br/>         Urine backs up? YES → 2 • Use other collection device<br/>         Urine backs up? YES → 3 • Orient CSM to heat ovbd dump nozzle<br/>         • URINE DUMP - redundant htr<br/>         Urine ovbd drain flow resumes? YES → 4 URINE HEATER FAILURE</p> <p>NO → 5 PLUGGED URINE FILTER</p> <p>NO → 6 URA OR UTS DEVICE BLOCKED</p> <p>NO → 7 BLOCKED URINE OVBD DRAIN → 8 Use waste H<sub>2</sub>O vent line<br/>         • Remove waste H<sub>2</sub>O ovbd dump line Q-D cap and stow.<br/>         • Remove flex hose from Q-D<br/>         • Connect flex hose to waste H<sub>2</sub>O vent line</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>① Allow 2 hrs for heater operation. Orient CSM for maximum external heat on dump nozzle (-Y -Z) in attempt to clear probable ice block.</p> <p>② If UTS was being used replace UTS receiver assembly. Spare UTS receiver assembly stowed in R-11. Replacement of UTS receiver assembly may make UTS serviceable.</p> <p>③ Water tanks H<sub>2</sub> and O<sub>2</sub> bleed capability lost unless waste H<sub>2</sub>O dump line interconnected.</p> <p>④ Auxiliary dump through side hatch is also available.</p> |
| 31a<br>WASTE H <sub>2</sub> O OVERBOARD DUMP NOT DRAINING | <p>9 • Orient CSM to heat ovbd dump nozzle<br/>         • WASTE H<sub>2</sub>O DUMP - redundant htr<br/>         Water drains? YES → 12 WASTE H<sub>2</sub>O DUMP HTR FAILED</p> <p>NO → 10 Use urine dump line<br/>         • Remove waste H<sub>2</sub>O ovbd dump line cap and stow<br/>         • Remove flex hose from Q-D (yellow)<br/>         • Connect flex hose to waste H<sub>2</sub>O dump line<br/>         Water drains? YES → 14 BLOCKED WASTE H<sub>2</sub>O DUMP NOZZLE</p> <p>NO → 11 BLOCKED WASTE H<sub>2</sub>O LINE → 13 Dump waste H<sub>2</sub>O with urine hose<br/>         • Install female Q-D on waste tank service port<br/>         • Connect urine dump hose/filter to urine faces Q-D<br/>         • Connect other end of UT hose to female Q-D on waste tank service port<br/>         • Ovbd drain valve - open<br/>         • Waste tank serv valve - open until waste H<sub>2</sub>O qty ind 15% then close<br/>         • Disconnect UT hose from water panel<br/>         • Disconnect T-adapter from UT hose and purge for 2-5 min<br/>         • Ovbd drain valve - close</p> | <p>⑤ Battery and H<sub>2</sub> separator vent capabilities lost unless urine dump line interconnected.</p> <p>⑥ Battery vent valve should not be open if overboard drain or waste storage vent valve is open and the urine dump line is interconnected to the waste water dump line.</p>                                                                                                                                                                                                                               |
| 32<br>INADEQUATE VENTILATION AFTER LANDING                | <p>1 Cycle PL vent sw<br/>         Ventilation incr? YES → 4 Resets attitude sensor relay to resume PLV operation</p> <p>NO → 2 Actuate PLVC<br/>         • PLVC sw - OPEN<br/>         Ventilation incr? YES → 3 ATTITUDE SENSING SW FAILED</p> <p>NO → 5 PLV FAN FAILURE</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>① Postlanding vent switch must be cycled to OFF and back to HIGH (LOW) anytime CM attitude exceeds 60° to reset attitude control relay.</p> <p>② Ventilation available only by opening either hatch.</p>                                                                                                                                                                                                                                                                                                            |
| 33<br>WATER INFLOW AFTER LANDING                          | <p>1 • PLVC sw - NORM<br/>         Water inflow stops? YES → 4 Inflow caused by open PLV vlv</p> <p>NO → 2 • PL VENT - OFF<br/>         • CAB PRESS RELF vlv (2) - CLOSE<br/>         Water inflow stops? YES → 5 ATTITUDE SENSING SWITCH FAILED OPEN</p> <p>NO → 3 UNCONTROLLABLE WATER INFLOW INTO CM</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

SR-1  
HRU  
SR-2

| SYMPTOM                                                     | PROCEDURE | REMARKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>5 V-AXIS ONLY OR MULTIPLE DISPLAYS ABNORMAL (TEST 4)</p> |           | <p>① EMS FUNC - TEST 4 capability lost. EMS operational but accelerometer accuracy can be verified only by performing a <math>\Delta V</math> TEST.</p> <p>② TEST 4 and <math>\Delta V</math> TEST only lost.</p> <p>③ V-axis and range display lost.</p> <p>④ This failure will invalidate the <math>\Delta V</math> TEST and TEST 4, except the G-axis display. EMS should be operational but corridor verification erroneous during entry.</p> <p>⑤ V AXIS and RNG information erroneous only.</p> <p>⑥ EMS FUNC - TEST 4 lost but EMS operation during entry should be normal.</p> <p>⑦ V AXIS, <math>\Delta V</math> and RNG information erroneous. Other EMS information unaffected. MSFN may be able to supply a correction factor for this error.</p> <p>⑧ There is no method of distinguishing between these two failures. Scroll velocity information will be erroneous. Range readout of uncertain validity.</p> |
| <p>6 RNG IND ONLY ABNORMAL (TEST 4)</p>                     |           | <p>① This check constrained by test pattern availability.</p> <p>② EMS ENTRY and <math>\Delta V</math> functions unaffected.</p> <p>③ RNG and <math>\Delta V</math> displays lost.</p> <p>④ RNG display lost.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>7 G-AXIS ONLY ABNORMAL (TEST 4)</p>                      |           | <p>① Scroll G display erroneous.</p> <p>② Scroll G display lost. Backup G information from CMC or G meter.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

5  
THRU  
7

| SYMPTOM                                                                                     | PROCEDURE | REMARKS                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>8<br/>LIFT VECTOR UP LT NOT ON (TEST 5)</p> <p>8a<br/>G-AXIS DOES NOT DRIVE (TEST 5)</p> |           | <p>① Lift vector up Lt lost in TEST 5 and ENTRY. Backup entry angle information from CMC or MSFN. No Lt 10 sec after .05 G could be used to indicate lift vector up.</p> <p>② Corridor verification lost during TEST 5 and ENTRY. Backup entry angle information from MSFN or CMC.</p> <p>③ EMS FUNC - TEST 5 lost only.</p> <p>④ Scroll G display inoperative.</p> |
| <p>9<br/>RNG IND DOES NOT SLEW IN RNG SET</p> <p>9a<br/>G-AXIS DOES NOT ZERO IN RNG SET</p> |           | <p>① EMS operation unaffected. Use alternate RNG SET method.</p> <p>② ENTRY operation unaffected.</p> <p>③ This failure produces an error only in the initial phase of the G trace.</p>                                                                                                                                                                             |
| <p>10<br/>V-AXIS DOES NOT SLEW IN Vo SET</p>                                                |           | <p>① Range display erroneous during ENTRY. Other ENTRY functions unaffected after Vo slewed by alternate methods.</p>                                                                                                                                                                                                                                               |