INDEPENDENT ORBITER ASSESSMENT ANALYSIS OF THE ATMOSPHERIC REVITALIZATION PRESSURE CONTROL SUBSYSTEM

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1.0 EXECUTIVE SUMMARY

The McDonnell Douglas Astronautics Company (MDAC) was selected in June 1986 to perform an Independent Orbiter Assessment (IOA) of the Failure Mode and Effects Analysis/Critical Items List (FMEA/CIL). Direction was given by the STS Orbiter and GFE Projects Office to perform the hardware analysis using the instructions and ground rules defined in NSTS 22206, Instructions for Preparation of FMEA and CIL, 10 October 1986. The IOA approach features a top-down analysis of the hardware to determine failure modes, criticality, and potential critical items. To preserve independence, this analysis was accomplished without reliance upon the results contained within the NASA FMEA/CIL documentation. This report documents the independent analysis results corresponding to the Orbiter Atmospheric Revitalization and Pressure Control Subsystem (ARPCS).

The ARPCS hardware was categorized into the following subdivisions:

- Atmospheric Make-up and Control
  - Auxiliary Oxygen Assembly
  - Oxygen Assembly
  - Nitrogen Assembly
- Atmospheric Vent and Control
  - Positive Relief Vent Assembly
  - Negative Relief Vent Assembly
  - Cabin Vent Assembly

The IOA analysis process utilized available ARPCS hardware drawings and schematics for defining hardware assemblies, components, and hardware items. Each level of hardware was evaluated and analyzed for possible failure modes and effects. Criticality was assigned based upon the severity of the effect for each failure mode.

Figure 1 presents a summary of the failure criticalities for each of the six major assemblies of the ARPCS. A summary of the number of failure modes, by criticality, is also presented below with Hardware (HW) criticality first and Functional (F) criticality second.
### Summary of IOA Failure Modes By Criticality (HW/F)

<table>
<thead>
<tr>
<th>Criticality:</th>
<th>1/1</th>
<th>2/1R</th>
<th>2/2</th>
<th>3/1R</th>
<th>3/2R</th>
<th>3/3</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>28</td>
<td>59</td>
<td>2</td>
<td>24</td>
<td>32</td>
<td>121</td>
<td>266</td>
</tr>
</tbody>
</table>

For each failure mode identified, the criticality and redundancy screens were examined to identify critical items. A summary of Potential Critical Items (PCIIs) is presented as follows:

### Summary of IOA Potential Critical Items (HW/F)

<table>
<thead>
<tr>
<th>Criticality:</th>
<th>1/1</th>
<th>2/1R</th>
<th>2/2</th>
<th>3/1R</th>
<th>3/2R</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>28</td>
<td>59</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>89</td>
</tr>
</tbody>
</table>
Figure 1 - ARPCS ANALYSIS SUMMARY
2.0 INTRODUCTION

2.1 Purpose

The 51-L Challenger accident prompted the NASA to readdress safety policies, concepts, and rationale being used in the National Space Transportation System (NSTS). The NSTS Office has undertaken the task of reevaluating the FMEA/CIL for the Space Shuttle design. The MDAC is providing an independent assessment of the Orbiter FMEA/CIL for completeness and technical accuracy.

2.2 Scope

The scope of the independent FMEA/CIL assessment activity encompasses those Shuttle Orbiter subsystems and GFE hardware identified in the Space Shuttle Independent FMEA/CIL Assessment Contractor Statement of Work. Each subsystem analysis addresses hardware, functions, internal and external interfaces, and operational requirements for all mission phases.

2.3 Analysis Approach

The independent analysis approach is a top-down analysis utilizing as-built drawings to breakdown the respective subsystem into components and low-level hardware items. Each hardware item is evaluated for failure mode, effects, and criticality. These data are documented in the respective subsystem analysis report, and are used to assess the NASA and Prime Contractor FMEA/CIL reevaluation results. The IOA analysis approach is summarized in the following Steps 1.0 through 3.0. Step 4.0 summarizes the assessment of the NASA and Prime Contractor FMEAs/CILs that will be performed and documented at a later date.

Step 1.0 Subsystem Familiarization
   1.1 Define subsystem functions
   1.2 Define subsystem components
   1.3 Define subsystem specific ground rules and assumptions

Step 2.0 Define subsystem analysis diagram
   2.1 Define subsystem
   2.2 Define major assemblies
   2.3 Develop detailed subsystem representations

Step 3.0 Failure events definition
   3.1 Construct matrix of failure modes
   3.2 Document IOA analysis results
Step 4.0 Compare IOA analysis data to NASA FMEA/CIL
   4.1 Resolve differences
   4.2 Review in-house
   4.3 Document assessment issues
   4.4 Forward findings to Project Manager

2.4 ARPCS Ground Rules and Assumptions

The general ground rules and assumptions used in the IOA are defined in Appendix B.2. The ARPCS specific ground rules and assumptions are presented in Appendix B.3.
3.0 SUBSYSTEM DESCRIPTION

3.1 Design and Function

The ARPCS provides shirt-sleeve environment for the crew by pressurizing the cabin to 14.7 psia with approximately 21% oxygen and 79% nitrogen. Cabin pressure can also be maintained at 8.0 psia for emergency (cabin leak) condition.

For the purpose of this study, the ARPCS was divided into two sections and six assemblies as shown in Figure 2 for which a brief discussion is provided below:

A. Atmospheric Make-up and Control (AMC) - This section uses cryogenic oxygen and gaseous nitrogen for cabin pressure maintenance and crew metabolic requirements. The AMC also provides oxygen or nitrogen for EMU/MMU recharges, water tanks pressurization, payload requirements, and cabin/airlock repressurizations. Figure 3 presents an overview of the AMC and its major hardware components.

This section is further divided into the following three assemblies:

1. Auxiliary Oxygen Assembly - This assembly provides gaseous oxygen (approximately 50 lbm) to the emergency breathing station under emergency conditions and absence of cryogenic oxygen. This assembly consists of one tank, a 300 psi regulator, a motorized valve, and an isolation valve. The assembly interfaces with the oxygen assembly at the crossover manifold and emergency breathing station as shown in Figure 4.

This assembly is only installed on vehicle OV102 as a mission kit, and has not been removed.

2. Oxygen Assembly - The oxygen assembly uses oxygen from the cryogenic oxygen tanks and conditions it for distribution through emergency breathing station, and 14.7 psia cabin regulators. It also provides oxygen for EMU recharges, and spacelab habitable module requirements.

The emergency breathing station regulates and delivers the oxygen to Launch and Entry Helmets (LEHs) during nominal ascent/entry phase, and continuously to LEH-5 during the on-orbit phase. Under cabin leak conditions, this station will also deliver direct (unregulated) cryogenic oxygen to the cabin through direct bleed orifice.

The oxygen is nominally provided to the cabin through either of two redundant loops. Oxygen from the cryogenic tanks is warmed to gaseous state and reduced
to 100 psig before delivery to O2/N2 control panel. The panel delivers 100 psig oxygen to the 14.7 psia cabin regulator, and subsequently into the cabin for pressure maintenance and crew usage. This oxygen interfaces with the 200 psig nitrogen on the panel before entering the cabin regulator.

The oxygen in the cabin is controlled either automatically by one of two controllers, or manually by the crew. In the Auto mode, the controllers sense the partial pressure of oxygen in the cabin. If the PPO2 is below 3.2 +/- 0.2 psia, the controllers will close the O2/N2 control valve allowing 100 psig oxygen to flow to the 14.7 psia cabin regulators. Otherwise, the O2/N2 control valve will be open allowing 200 psig nitrogen to flow to the cabin regulator, thus preventing 100 psig oxygen to flow. In the manual mode, this operation is done by the crew based on continuous monitoring of the cabin total pressure and partial pressure of oxygen.

3. Nitrogen Assembly - The nitrogen assembly stores gaseous nitrogen in four supply tanks, and uses it for cabin pressure maintenance, MMU recharges, payload requirements, and supply/waste water tanks pressurization.

The nitrogen tanks are loaded prelaunch storing approximately 262 lbm of nitrogen. Tanks 1 and 2, and Tanks 3 and 4 are manifolded together and referred to as System 1 and System 2, respectively. System 1 and System 2 are operated interchangeably through two dedicated nitrogen loops with identical sets of hardware. Capability is provided for a cross-tie operation of the loops.

The nitrogen from the supply tanks are regulated to 200+/-15 psig before flowing to the 14.7 psia cabin regulator, payload, and water tanks. Nitrogen requirement for MMU recharges is taken upstream of the 200 psig regulation. The cabin pressure maintenance is provided by the O2/N2 control panel through combined operation of the 14.7 psia cabin regulator and O2/N2 control valve. The 200 psig nitrogen interfaces with 100 psig oxygen downstream of O2/N2 control valve before entering the cabin regulator as discussed in the oxygen assembly section.
B. Atmospheric Vent and Control (AVC) - The AVC provides capability to maintain cabin structural integrity under excessive positive or negative pressure gradients. It will also provide capability for rapid cabin depressurization and prelaunch checkout.

This section is further divided into the following three assemblies as shown by Figure 5:

1. Positive Relief Vent - The positive relief vent is comprised of two separate and redundant loops which provides capability to vent cabin atmosphere under high (16 psia) cabin pressure. Each loop consists of a motorized valve, and a relief valve. The motorized valves are used to isolate the assembly.

2. Negative Relief Vent - The negative relief vent is comprised of dual redundant lines with self-operating relief valves (one per loop). The relief valves will permit atmospheric air into the cabin when outside pressure rises 0.2 psia above cabin pressure.

3. Cabin Vent - The cabin vent is comprised of two identical motor driven valves which provide capability to rapidly vent and check crew cabin pressure during prelaunch operations. The vent valves are denied power after liftoff (circuit breakers are pulled) to prevent inadvertent decompression of the cabin.

3.2 Interfaces and Locations

The ARPCS hardware is primarily divided between the mid-fuselage and crew module. Figures 3, 4, and 5 show an overall representation and location of these equipment.

The ARPCS interfaces were established and studied to assess their performace impact due to failure modes. The subsytem interfaces were:

A. PRSD - The ARPCS receives cryogenic oxygen from The Power Reactant, Supply, and Distribution Subsystem at high pressure (800 to 850 psia) and low temperature (-280 F to -220 F) for general usage.

B. ATCS - The Active Thermal Control Subsystem provides heat for thermal conditioning of the cryogenic oxygen to gaseous oxygen through restrictors.

C. ECLSS - The ARPCS interfaces with the Environmental Control and Life Support Subsystem by providing oxygen/nitrogen for airlock support activities, and supply/waste water tanks pressurization.
D. Payload - Payload interfaces are accomplished through oxygen/nitrogen ports for EMU/MMU recharges and spacetab pressurization.

E. EPS - The Electrical Power Subsystem provides bus power to drive electrical components, switches, display, and instrumentation throughout the ARPCS subsystem.

F. ARS - The gaseous oxygen and nitrogen are provided to the Atmospheric Revitalization Subsystem for circulation throughout the crew cabin.

3.3 Hierarchy

For the purpose and ease of this analysis, the ARPCS was divided into two main sections and six assemblies as shown in Figure 2.
Figure 2 - ARPCS BREAKDOWN
Figure 3 - ATMOSPHERIC MAKE-UP AND CONTROL
Figure 4 - AUXILIARY OXYGEN ASSEMBLY
Figure 5 - ATMOSPHERIC VENT AND CONTROL
4.0 ANALYSIS RESULTS

Detailed analysis results for each of the identified failure modes are presented in Appendix C. Table I presents a summary of the failure criticalities for each of the six major assemblies of the ARPCS.

<table>
<thead>
<tr>
<th>Criticality</th>
<th>1/1</th>
<th>2/1R</th>
<th>2/2</th>
<th>3/1R</th>
<th>3/2R</th>
<th>3/3</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary Oxygen</td>
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<td>5</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Neg. Relief Vent</td>
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<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Cabin vent</td>
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<td>-</td>
<td>-</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>28</td>
<td>59</td>
<td>2</td>
<td>24</td>
<td>32</td>
<td>121</td>
<td>266</td>
</tr>
</tbody>
</table>

Of the 266 failure modes studied, 89 were determined to be Potential Critical Items (PCIs). A summary of PCIs is presented in Table II and Appendix D presents an itemized listing of these PCIs. No PCI was identified due to a failure to pass any of the redundancy screens. Further discussion of these PCIs is provided in the following subsections.

<table>
<thead>
<tr>
<th>Criticality</th>
<th>1/1</th>
<th>2/1R</th>
<th>2/2</th>
<th>3/1R</th>
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<tbody>
<tr>
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<td>15</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Oxygen</td>
<td>6</td>
<td>25</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>31</td>
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<tr>
<td>Nitrogen</td>
<td>7</td>
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<td>2</td>
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<td>-</td>
<td>33</td>
</tr>
<tr>
<td>Pos. Relief Vent</td>
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<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5</td>
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<tr>
<td>Neg. Relief Vent</td>
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<td>4</td>
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<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Cabin vent</td>
<td>-</td>
<td>1</td>
<td>-</td>
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<td>-</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>28</td>
<td>59</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>89</td>
</tr>
</tbody>
</table>

Table III presents a comprehensive listing of the ARPCS hardware items and their associated criticalities. This table may be used for cross referencing to the detailed analysis results in Appendix C.
In addition to these items, the associated signal conditioners and MDMs were analyzed to determine their failure modes and impact on the subsystem. The results of this study were submitted to the Instrumentation Subsystem for an overall failure mode analysis.

4.1 Auxiliary Oxygen Assembly

The PCIs in this assembly are primarily due to failures which resulted in loss of oxygen flow to the crew through LEH panels. These were predicated upon the auxiliary oxygen usage under emergency condition (cabin leak) and absence of cryogenic oxygen supply. These PCIs are of 1/1 category, and account for 54% of 1/1 criticality failure modes in the subsystem.

Typical failure modes resulting in such a criticalities are associated with valves failed closed, external leakage, or tank rupture caused by shock, vibration, or fatigue.

4.2 Oxygen Assembly

The 1/1 and 2/1R PCIs noted for the oxygen assembly were derived based upon associated component failures which resulted in either loss of oxygen to the crew, or creating oxygen rich cabin. The loss of oxygen to the crew was obviously considered to be life threatening, and the oxygen rich cabin created hazardous condition for fire.

4.3 Nitrogen Assembly

The 1/1, 2/1R, and 2/2 PCIs were primarily due to failures which resulted in loss of nitrogen to maintain cabin pressure. Loss of nitrogen in some cases also resulted in compartment overpressurization (due to leak) which was considered potential for structural failure. Furthermore, depletion of consumable nitrogen was considered in these cases to cause loss of pressure maintenance capability to successfully complete a mission. Finally, in one instance (failed closed O2/N2 control valve), the PCIs was due to loss of nitrogen flow control into the cabin resulting in an eventual oxygen rich cabin.

4.4 Positive Relief Valve Assembly

Five 2/1R PCIs were noted in this assembly due to component failures (vent valves failed closed) which resulted in loss of capability to vent cabin atmosphere under severe positive pressure gradient. This was considered to create a potential for structural failure of the cabin. Also, the PCIs include failures (vent valve failed open) which if not corrected will result in cabin decompression, thus a life threatening condition.
4.5 Negative Relief Valve Assembly

Four 2/1R PCIs were derived based upon failure modes (vent valve failed closed) which resulted in loss of capability to safeguard cabin structure from excessive negative pressure gradient. This was considered to be a condition for potential structural failure. Also, failures (vent valve failed open) which result in cabin decompression were considered and included.

4.6 Cabin Vent Assembly

Only one PCI (2/1R) was identified which is due to failure of either vent valve or vent isolation valve in open position. The failure of one of these valves will result in a condition that is one step away from loss of life/vehicle, and a life threatening condition with the failure of the second associated valve.
<table>
<thead>
<tr>
<th>MDAC-ID</th>
<th>CRITICALITY</th>
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<tbody>
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<tr>
<td>* 103</td>
<td>1/1</td>
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<td>* 104</td>
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TABLE III - ARPCS HARDWARE ITEMS, CONTINUED

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**NITROGEN ASSEMBLY**

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**TABLE III - ARPCS HARDWARE ITEMS, CONTINUED**

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* Potential Critical Item
### TABLE III - ARPCS HARDWARE ITEMS, CONTINUED

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**Positive Relief Valve Assembly**

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**Cabin Vent Assembly**

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**Negative Relief Valve Assembly**

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* Potential Critical Item
TABLE III - ARPCS HARDWARE ITEMS, CONCLUDED

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* Potential Critical Item
5.0 REFERENCES


3. RI-MC621-0002, Atmospheric Revitalization and Pressure Control System Procurement Specification, April 27, 1982

4. RI-VS70-960102,-96099,-960103,-960104, Integrated Systems Schematics

5. JSC-12820, STS Operational Flight Rules, Final PCN-3, June 28, 1985


7. NSTS-22206, Instruction for Preparation of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL), October 1986
## APPENDIX A
### ACRONYMS

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SM    -  Systems Management  
SRB   -  Solid Rocket Booster  
SSME  -  Space Shuttle Main Engine  
STS   -  Space Transportation System  
SW    -  Software  
TAL   -  Trans-Atlantic Landing  
TD    -  Touch Down  
WMS   -  Waste Management System
APPENDIX B

DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.1 Definitions
B.2 Project Level Ground Rules and Assumptions
B.3 Subsystem-Specific Ground Rules and Assumptions
APPENDIX B
DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.1 Definitions

Definitions contained in NSTS 22206, Instructions For Preparation of FMEA/CIL, 10 October 1986, were used with the following amplifications and additions.

INTACT ABORT DEFINITIONS:

- RTLS - begins at transition to OPS 6 and ends at transition to OPS 9, post-flight
- TAL - begins at declaration of the abort and ends at transition to OPS 9, post-flight
- AOA - begins at declaration of the abort and ends at transition to OPS 9, post-flight
- ATO - begins at declaration of the abort and ends at transition to OPS 9, post-flight

CREDIBLE (CAUSE) - an event that can be predicted or expected in anticipated operational environmental conditions. Excludes an event where multiple failures must first occur to result in environmental extremes

CONTINGENCY CREW PROCEDURES - procedures that are utilized beyond the standard malfunction procedures, pocket checklists, and cue cards

EARLY MISSION TERMINATION - termination of onorbit phase prior to planned end of mission

EFFECTS/RATIONALE - description of the case which generated the highest criticality

HIGHEST CRITICALITY - the highest functional criticality determined in the phase-by-phase analysis

MAJOR MODE (MM) - major sub-mode of software operational sequence (OPS)

MC - Memory Configuration of Primary Avionics Software System (PASS)

MISSION - assigned performance of a specific Orbiter flight with payload/objective accomplishments including orbit phasing and altitude (excludes secondary payloads such as GAS cans, middeck P/L, etc.)
MULTIPLE ORDER FAILURE - describes the failure due to a single cause or event of all units which perform a necessary (critical) function

OFF-NOMINAL CREW PROCEDURES - procedures that are utilized beyond the standard malfunction procedures, pocket checklists, and cue cards

OPS - software operational sequence

PRIMARY MISSION OBJECTIVES - worst case primary mission objectives are equal to mission objectives

PHASE DEFINITIONS:

PRELAUNCH PHASE - begins at launch count-down Orbiter power-up and ends at moding to OPS Major Mode 102 (liftoff)

LIFTOFF MISSION PHASE - begins at SRB ignition (MM 102) and ends at transition out of OPS 1 (Synonymous with ASCENT)

ONORBIT PHASE - begins at transition to OPS 2 or OPS 8 and ends at transition out of OPS 2 or OPS 8

DEORBIT PHASE - begins at transition to OPS Major Mode 301 and ends at first main landing gear touchdown

LANDING/SAFING PHASE - begins at first main gear touchdown and ends with the completion of post-landing safing operations
APPENDIX B
DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.2 IOA Project Level Ground Rules and Assumptions

The philosophy embodied in NSTS 22206, Instructions for Preparation of FMEA/CIL, 10 October 1986, was employed with the following amplifications and additions.

1. The operational flight software is an accurate implementation of the Flight System Software Requirements (FSSRs).
   RATIONALE: Software verification is out-of-scope of this task.

2. After liftoff, any parameter which is monitored by system management (SM) or which drives any part of the Caution and Warning System (C&W) will support passage of Redundancy Screen B for its corresponding hardware item.
   RATIONALE: Analysis of on-board parameter availability and/or the actual monitoring by the crew is beyond the scope of this task.

3. Any data employed with flight software is assumed to be functional for the specific vehicle and specific mission being flown.
   RATIONALE: Mission data verification is out-of-scope of this task.

4. All hardware (including firmware) is manufactured and assembled to the design specifications/drawings.
   RATIONALE: Acceptance and verification testing is designed to detect and identify problems before the item is approved for use.

5. All Flight Data File crew procedures will be assumed performed as written, and will not include human error in their performance.
   RATIONALE: Failures caused by human operational error are out-of-scope of this task.
6. All hardware analyses will, as a minimum, be performed at the level of analysis existent within NASA/Prime Contractor Orbiter FMEA/CILs, and will be permitted to go to greater hardware detail levels but not lesser.

RATIONALE: Comparison of IOA analysis results with other analyses requires that both analyses be performed to a comparable level of detail.

7. Verification that a telemetry parameter is actually monitored during AOS by ground-based personnel is not required.

RATIONALE: Analysis of mission-dependent telemetry availability and/or the actual monitoring of applicable data by ground-based personnel is beyond the scope of this task.

8. The determination of criticalities per phase is based on the worst case effect of a failure for the phase being analyzed. The failure can occur in the phase being analyzed or in any previous phase, whichever produces the worst case effects for the phase of interest.

RATIONALE: Assigning phase criticalities ensures a thorough and complete analysis.

9. Analysis of wire harnesses, cables, and electrical connectors to determine if FMEAs are warranted will not be performed nor FMEAs assessed.

RATIONALE: Analysis was substantially complete prior to NSTS 22206 ground rule redirection.

10. Analysis of welds or brazed joints that cannot be inspected will not be performed nor FMEAs assessed.

RATIONALE: Analysis was substantially complete prior to NSTS 22206 ground rule redirection.

11. Emergency system or hardware will include burst discs and will exclude the EMU Secondary Oxygen Pack (SOP), pressure relief valves and the landing gear pyrotechnics.

RATIONALE: Clarify definition of emergency systems to ensure consistency throughout IOA project.
Appendix B
Definitions, Ground Rules, and Assumptions

B.3 ARPCS - Specific Ground Rules and Assumptions

The following subsystem ground rules and assumptions were considered in determining component criticalities:

1. The auxiliary oxygen assembly was assigned criticalities based upon its emergency support function not redundant to cryogenics oxygen supply.

   Rationale: The auxiliary oxygen assembly is a mission kit installed on OV102 only. Its usage is under severe cabin leak and loss of cryogenic oxygen.

2. The airlock and wet trash storage vents are considered as part of the Environmental Control and Life Support Subsystem (ECLSS) and therefore not studied in this report.

   Rationale: These subsystem interfaces were discussed and decided by the NASA subsystem manager (Mr. John Whalen) to be part of the ECLSS.

3. A single cabin regulation/distribution loop is considered adequate to maintain nominal pressure throughout the mission.

   Rationale: Flight Data File procedures have been written, and the subsystem designed to operate on one loop with the other loop in standby redundancy.

4. The oxygen and nitrogen contained within cabin volume are adequate without make-up for safe and nominal return.

   Rationale: Under nominal 3.2 psia PPO2 cabin pressure, and return duration (approximately 4 hours from deorbit prep to touchdown), there is adequate oxygen to meet crew metabolic.

5. The PASS/BFS displays are not considered redundant to an on-board meter display when studying the meter failure modes.

   Rationale: The PASS/BFS failure is considered unlikely, and if happened it shall be under multiple failure scenarios.
6. Each LEH panel is considered to be dedicated to a crew person, and as such it is not redundant to the others.

Rationale: A crew person is not denied oxygen in order to meet the demand of others.

7. During a cabin leak condition, no oxygen flow is considered through 8/14.7 psia regulators. Oxygen is provided to the crew and cabin through LEH's and direct bleed orifice respectively.

Rationale: Severe cabin leak and oxygen flow through regulators will deplete cryogenic oxygen rapidly. Oxygen is only needed to keep the crew alive not to maintain cabin pressure.

8. Pressurization of cabin or any compartment with direct and unregulated oxygen is considered a serious fire hazard, thus creating a potential condition for loss of life/vehicle.

Rationale: Oxygen by itself will not cause fire, but the condition created is volatile for fire.

9. Pressurization of cabin or any compartment with direct and unregulated nitrogen is considered a potential for structural failure. Furthermore, in an event when ARPCS will be depleted of consumable nitrogen, a potentially critical condition is created due to loss of capability to maintain cabin/water tanks pressure.

Rationale: The nitrogen tanks are pressurized at approximately 3300 psia, and any enclosed compartment will be excessively pressurized with a direct leakage. The degree of pressurization, location and severity of failure are moot. The author has taken a conservative view on the subject.

10. Cabin pressure will be adequate to maintain water dump and FES (Flash Evaporator System) operations in the event of pressure loss from ARPCS.

Rationale: Under nominal 14.7 psia cabin pressure, the FES and water dump operations will not be affected, but rather minimized. Adequate pressure exists to expel the water.

11. Nitrogen and oxygen flow sensors are considered mission critical instrumentation needed for quick leak detection and prevention.
Rationale: Loss of these instrumentation creates a condition whereby a cabin leak may not be easily and readily detected for successful completion of the mission.

12. Any voluntary cabin vent is accomplished through airlock/vent valves during on-orbit.

Rationale: Due to high cabin vent rate through the cabin vent/isolation valves, this option is not viable.

13. The prelaunch criticality was considered to be of mission impact only when that failure caused loss of life/vehicle or loss of mission any time from liftoff to landing.

Rationale: No launch was considered performed when a failure may result in loss of life/vehicle or mission after liftoff regardless of time to repair.
This section contains the IOA analysis worksheets generated during the analysis of this subsystem. The information on these worksheets is intentionally similar to the NASA FMEAs. Each of these sheets identifies the hardware item being analyzed, and parent assembly, as well as the function. For each failure mode, the possible causes are outlined, and the assessed hardware and functional criticality for each mission phase is listed, as described in the NSTS 22206, Instructions for Preparation of FMEA and CIL, 10 October 1986. Finally, effects are entered at the bottom of each sheet, and the worst case criticality is entered at the top.

LEGEND FOR IOA ANALYSIS WORKSHEETS

Hardware Criticalities:
1 = Loss of life or vehicle
2 = Loss of mission or next failure of any redundant item (like or unlike) could cause loss of life/vehicle
3 = All others

Functional Criticalities:
1R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of life or vehicle.
2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission.

Redundancy Screen A:
1 = Is Checked Out PreFlight
2 = Is Capable of Check Out PreFlight
3 = Not Capable of Check Out PreFlight
NA = Not Applicable

Redundancy Screens B and C:
P = Passed Screen
F = Failed Screen
NA = Not Applicable
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 101

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: PRESSURE SENSOR-V61P2166A(1)
FAILURE MODE: OUT OF TOLERANCE (FULL OUTPUT, ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) ATM MAKE-UP/CONTROL
3) AUXILIARY O2
4)
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: ELECTRICAL FAILURE, VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
INABILITY TO MONITOR AUXILIARY O2 PRESSURE DOWNSTREAM OF THE 300 PSI REGULATOR—NOT SAFETY OR MISSION CRITICAL. V64JP0202A, EVLSS O2 SUPPLY PRESSURE SENSOR MAY BE USED TO READ THE LINE PRESSURE.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 102

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: TEMPERATURE SENSOR- V61T2216A(1)
FAILURE MODE: OUT OF TOLERANCE (FULL OUTPUT, ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 (SUPPLY TANK)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: ME449-0010

CAUSES: ELECTRICAL FAILURE, VIBRATION, SHOCK

EFFECTS/RATIONALE:
INABILITY TO MONITOR AUX. O2 TANK TEMPERATURE- NOT MISSION OR SAFETY CRITICAL. NO OTHER TEMPERATURE SENSOR EXISTS TO READ THE LINE TEMPERATURE.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 103

ITEM: AUX. 02 SUPPLY TANK (1)
FAILURE MODE: RUPTURE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. 02 ASSY (SUPPLY TANK)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC282-0082-0050

CAUSES: OVER PRESSURIZATION, TEMPERATURE, FATIGUE

EFFECTS/RATIONALE:
TANK RUPTURE AFTER L/O AND PRIOR TO LANDING IS EXPECTED TO SEVERELY IMPACT STRUCTURAL INTEGRITY OF THE VEHICLE. AUXILIARY OXYGEN IS NOT AVAILABLE WHEN NEEDED, POTENTIAL LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86  C-4
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 104

ITEM: AUX. 02 SUPPLY TANK (1)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. 02 ASSY (SUPPLY TANK)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC282-0082-0050

CAUSES: OVER PRESSURIZATION, TEMPERATURE, FATIGUE

EFFECTS/RATIONALE:
SLOW LEAK WILL RESULT IN OVERPRESSURIZATION AND FIRE HAZARD LEADING TO CATASTROPHIC FAILURE. ALSO, LOSS OF OXYGEN WHEN NEEDED. NOTE: LARGE LEAK WOULD HAVE SAME EFFECT AS A RUPTURED TANK.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 105

ITEM: PRESSURE SENSOR-V61P2161A (1)
FAILRE MODE: OUT OF TOLERANCE (FULL OUTPUT, ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: ELECTRICAL FAILURE, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:
INABILITY TO DETECT PRESSURE OF AUX. O2 TANK—NOT MISSION OR SAFETY CRITICAL. TWO OTHER PRESSURE SENSORS EXIST DOWNSTREAM TO SENSE THE LINE PRESSURE.

REFERENCES:

REPORT DATE 12/02/86 C-6
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 106  ABORT: 3/3

ITEM: SUPPLY VALVE-LV5(1)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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Redundancy Screens: A [ ]  B [ ]  C [ ]

Location: Mid-Fuselage
Part Number: MC250-0002

Causes: Vibration, Mechanical Shock, Electrical Loss, Corrosion, Binding/Jamming

Effects/Rationale:
Loss of prelaunch servicing of the tank (quick disconnect is not self-sealing. Thus cap cannot be installed). Otherwise, the valve is nominally open—not a safety item. Regulators plus the downstream isolation valve will provide flow on demand.

References:

Report Date 12/02/86  C-7
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  
SUBSYSTEM: ARPCS  
MDAC ID: 107  

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1  
ABORT: 1/1  

ITEM: SUPPLY VALVE-LVS(1)  
FAILURE MODE: FAILED CLOSED, CLOGGED FILTERS  

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  
SUBSYS LEAD: M. SAIIDI  

BREAKDOWN HIERARCHY:
1) ARPCS  
2) AMC  
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)  
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]  

LOCATION: MID-FUSELAGE  
PART NUMBER: MC250-0002  

CAUSES: VIBRATION, MECHANICAL SHOCK, ELECTRICAL LOSS, CORROSION, BINDING/JAMMING  

EFFECTS/RATIONALE:  
LOSS OF AUXILIARY OXYGEN TO THE CREW WHEN NEEDED ASSUMING NO CRYOGENIC OXYGEN AND EMERGENCY CONDITION EXISTS. 

REFERENCES:  

REPORT DATE 12/02/86  
C-8
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 108

ITEM: SUPPLY VALVE-LV5(1) FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. 02 ASSY. (02 SUPPLY PANEL)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, MECHANICAL SHOCK, CORROSION, FATIGUE

EFFECTS/RATIONALE:
SAME AS AUX. 02 TANK EXTERNAL LEAKAGE, MDAC ID 104.

REFERENCES:

REPORT DATE 12/02/86 C-9
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 109

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: POSITION INDICATION, DS8 (1)
FAILURE MODE: FAILS TO CONDUCT AT ANY CONTACT POSITION, FAILS TO SWITCH

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0222-0029

CAUSES: VIBRATION, SHOCK, MECHANICAL FAILURE, CORROSION, CONTAMINATION, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION NOT MISSION/SAFETY CRITICAL

REFERENCES:

REPORT DATE 12/02/86 C-10
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 110

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE, DS8 (2)
FAILURE MODE: OPEN, SHORTS, OUT OF TOLERANCE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION. NO EFFECT AND NON-ESSENTIAL ITEM.

REFERENCES:

REPORT DATE 12/02/86 C-11
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 111

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: SINGLE PHASE MOTOR/SHUTOFF VALVE (1)
FAILURE MODE: LOSS OF OUTPUT (VALVE IN OPEN POSITION)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: NONE

CAUSES: ELECTRICAL, VIBRATION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF PRELAUNCH SERVICING OF THE TANK, OTHERWISE NO EFFECT. SEE ALSO MDAC ID 106.

REFERENCES:

REPORT DATE 12/02/86 C-12
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 112

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: SINGLE PHASE MOTOR/SHUTOFF VALVE (1)
FAILURE MODE: LOSS OF OUTPUT (VALVE IN CLOSED POSITION)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: NONE

CAUSES: ELECTRICAL, VIBRATION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF AUXILIARY OXYGEN TO THE CREW WHEN NEEDED.

REFERENCES:

REPORT DATE 12/02/86 C-13
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 113

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: SWITCH-S12
FAILURE MODE: SWITCH FAILED OPEN OR PARTIALLY OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7205

CAUSES: MECHANICAL OR ELECTRICAL FAILURE, CORROSION, CONTAMINATION, SHOCK, VIBRATION

EFFECTS/RATIONALE:
LOSS OF SWITCHING ACTION, BUT SINCE THE VALVE IS CONFIGURED OPEN, IT WILL REMAIN IN THE OPEN POSITION—NO SIGNIFICANT EFFECT.

REFERENCES:

REPORT DATE 12/02/86 C-14
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS
FLIGHT: 1/1
MDAC ID: 114
ABORT: 1/1

ITEM: SWITCH-S12
FAILURE MODE: SWITCH FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7205

CAUSES: MECHANICAL OR ELECTRICAL FAILURE, CORROSION, CONTAMINATION, SHOCK, VIBRATION

EFFECTS/RATIONALE:
DRIVES THE VALVE TO CLOSED POSITION, THUS LOSS OF OXYGEN TO CREW WHEN NEEDED. IN ABORT SITUATIONS, THE CREW CAN RETURN ON CABIN VOLUME EXCEPT FOR ATO.

REFERENCES:

REPORT DATE 12/02/86 C-15
**INDEPENDENT ORBITER ASSESSMENT**  
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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**ITEM:** RESISTOR, A9R2, 5.1K (1)  
**FAILURE MODE:** FAILED OPEN

**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN  
**SUBSYS LEAD:** M. SAPIID

**BREAKDOWN HIERARCHY:**
1) ARPCS  
2) AMC  
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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**REDUNDANCY SCREENS:** A [ ]  B [ ]  C [ ]

**LOCATION:** CREW MODULE  
**PART NUMBER:** RLR05C512GR

**CAUSES:** SHOCK, VIBRATION, THERMAL STRESS

**EFFECTS/RATIONALE:**  
LOSS OF VALVE POSITION INDICATION.

**REFERENCES:**

REPORT DATE 12/02/86  C-16
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 116  ABORT: 3/3

ITEM: RESISTOR, A9R2, 5.1K (1)
FAILURE MODE: SHORTED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: RLR05C512GR

CAUSES: CONTAMINATION, CORROSION ANY CONTACT

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 117

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CIRCUIT BREAKER-CB16
FAILURE MODE: FAILED OPEN, PREMATURELY OPENS

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-00026-2030

CAUSES: PIECE FAILURE, SHOCK, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:
FAILURE TO OPERATE MOTOR, SWITCH, AND POSITION INDICATION. HOWEVER, VALVE NOMINALLY OPEN. O2 REMAINS AVAILABLE ON DEMAND.

REFERENCES:

REPORT DATE 12/02/86 C-18
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 118

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CIRCUIT BREAKER-CB16
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-00026-2030

CAUSES: PIECE FAILURE, SHOCK, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:
NOMINALLY CLOSED. NEED TO OPEN IS DUE TO DOWNSTREAM ELECTRICAL COMPONENT FAILURES ACCOUNTED FOR ELSEWHERE, LOSS OF POSSIBLE CIRCUIT OVERLOAD PROTECTION.

REFERENCES:

REPORT DATE 12/02/86 C-19
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 119

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: QUICK DISCONNECT/GSE (1)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. 02 ASSY. (02 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC276-0010-0310

CAUSES: VIBRATION, SHOCK, FATIGUE

EFFECTS/RATIONALE:
LOSS OF AUX. O2 INTO PAYLOAD BAY AND VENTED OUT (NO FIRE HAZARD PERHAPS), BUT DEPLETES OXYGEN FROM CREW USEAGE FOR WHEN NEEDED.

REFERENCES:

REPORT DATE 12/02/86 C-20
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 120

HIGHEST CRITICITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: QUICK DISCONNECT/GSE (1)
FAILURE MODE: INABILITY TO MATE/DEMATE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
4)
5)
6)
7)
8)
9)

CRITICALITIES

<table>
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<tr>
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC276-0010-0310

CAUSES: CORROSION, BINDING, JAMMING

EFFECTS/RATIONALE:
INABILITY TO SERVICE THE AUX. O2 TANK DURING PRELAUNCH AND LANDING SAFING.

REFERENCES:

REPORT DATE 12/02/86 C-21
**INDEPENDENT ORBITER ASSESSMENT**

**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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<tr>
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<td>FAILURE MODE:</td>
<td>INTERNAL LEAKAGE</td>
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**LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN**

**SUBSYS LEAD: M. SAIIDI**

**BREAKDOWN HIERARCHY:**
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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**CRITICALITIES**

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**REDUNDANCY SCREENS:**
A [ ]
B [ ]
C [ ]

**LOCATION:** MID-FUSELAGE

**PART NUMBER:** MC276-0010-0310

**CAUSES:** CORROSION, BINDING, JAMMING

**EFFECTS/RATIONALE:**
NO EFFECT, SINCE THE GSE CAP WILL BLOCK ANY FLOW.

**REFERENCES:**

**REPORT DATE 12/02/86**

C-22
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
HIGHEST CRITICALITY: HDW/FUNC
SUBSYSTEM: ARPCS
MDAC ID: 122
FLIGHT: 3/3
ABORT: /NA

ITEM: FILTER, 10 MICRONS (1)
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
INCREASES TIME REQUIRED TO FILL AUX. O2 TANK, OR CHANGE FILTER.

REFERENCES:

REPORT DATE 12/02/86 C-23
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 123

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: FILTER, 10 MICRONS (1)
FAILURE MODE: RESTRICTED FLOW, CLOGGED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO FILL THE TANK. IT WOULD REQUIRE REPAIR, THUS IMPACTING THE MISSION.

REFERENCES:

REPORT DATE 12/02/86 C-24
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 124

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: CAP/GSE DISCONNECT
FAILURE MODE: INABILITY TO MATE, OR DEMATE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC276-0010-0360

CAUSES: VIBRATION SHOCK, CORROSION, BINDING/JAMMING

EFFECTS/RATIONALE:
DIFFICULTY SERVICING THE TANK, BUT THE PROBLEM CAN BE REPAIRED WITHOUT ANY IMPACT ON THE MISSION.

REFERENCES:

REPORT DATE 12/02/86 C-25
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS FLIGHT: 1/1
MDAC ID: 125 ABORT: 1/1

ITEM: CAP/GSE DISCONNECT
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC276-0010-0360

CAUSES: VIBRATION, SHOCK, FATIGUE

EFFECTS/RATIONALE:
LOSS OF GASEOUS OXYGEN DEPLETES SUPPLY FOR CREW USE WHEN IT IS NEEDED—POTENTIAL LOSS OF LIFE/VEHICLE EXISTS.

REFERENCES:

REPORT DATE 12/02/86 C-26
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 126

HIGHEST CRITICALITY

FAILURES

ARPCS FLIGHT:
ABORT:

3/3
3/3

ITEM:
PRESSURE REGULATOR/300 PSIG (1)

FAILURE MODE:
FAIL OPEN 1ST OR 2ND STAGE, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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CRITICALITIES

FLIGHT PHASE         HDW/FUNC         ABORT         HDW/FUNC
Prelaunch:            3/3             RTLS:          3/3
Liftoff:              3/3             Tal:           3/3
Onorbit:              3/3             AOA:           3/3
Deorbit:              3/3             ATO:           3/3
Landing/Safing:       3/3

REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, PIECE PART FAILURE

EFFECTS/RATIONALE:
NO EFFECT, THE FAILURE OF ONE STAGE WILL NOT INHIBIT THE PROPER OPERATION OF THE OTHER STAGE REGULATOR. THE EFFECT OF THE TANK HIGH PRESSURE ON THE SECOND STAGE WITH THE FIRST STAGE FAILURE WAS CONSIDERED MINIMAL. THE TWO STAGE REGULATORS WERE TREATED AS TWO SEPARATE REGULATORS WITH A SINGLE FUNCTIONAL PATH.

REFERENCES:

REPORT DATE 12/02/86  C-27
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 127
HIGHEST CRITICALITY FLIGHT: 1/1
ABORT: 1/1

ITEM: PRESSURE REGULATOR/300 PSIG (1)
FAILURE MODE: FAILED CLOSED, 1ST OR SECOND STAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, PIECE PART FAILURE

EFFECTS/RATIONALE:
COMPLETE LOSS OF O2 WHEN NEEDED UNDER EMERGENCY CONDITION AND LOSS OF CRYO-O2.

REFERENCES:

REPORT DATE 12/02/86 C-28
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 128

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: PRESSURE REGULATOR/300 PSIG (1)
FAILURE MODE: EXTERNAL LEAKAGE, 1ST OR 2ND STAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. 02 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF AUX. O2 WHEN NEEDED. POTENTIAL LOSS OF LIFE/VEHICLE DUE TO FIRE HAZARD FROM OXYGEN RICH CABIN.

REFERENCES:

REPORT DATE 12/02/86 C-29
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS             FLIGHT: 1/1
MDAC ID: 129                ABORT: 1/1

ITEM: RELIEF VALVE, 1250 PSIG.
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF AUX. O2 DURING USE, OR FOR WHEN IT IS NEEDED.

REFERENCES:

REPORT DATE 12/02/86  C-30
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS

MDAC ID: 130

ITEM: RELIEF VALVE, 1250 PSIG.

FAILURF MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCCLAUGHLIN

SAIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE

PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
VALVE NORMALLY CLOSED, NO OTHER FAILURES ASSUMED.

REFERENCES:

REPORT DATE 12/02/86 C-31
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 131

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<th>SUBSYS LEAD</th>
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<td>RELIEF VALVE, 1250 PSIG.</td>
<td>EXTERNAL LEAKAGE</td>
<td>R. DUFFY / T. MCLAUGHLIN</td>
<td>M. SAIDI</td>
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BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY. (O2 SUPPLY PANEL)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF AUX. O2 DURING USE. POTENTIAL LOSS OF LIFE/VEHICLE DUE TO FIRE HAZARD FROM OXYGEN RICH CABIN.

REFERENCES:

REPORT DATE 12/02/86  C-32
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 132

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: ISOLATION VALVE (1)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY.
4)
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
NO EFFECT WHEN CRYO O2 IS IN USE, THE PRESSURE IS ASSUMED LOW
ENOUGH NOT TO CRACK THE RELIEF VALVE (1250 PSIG) OPEN.

REFERENCES:

REPORT DATE 12/02/86 C-33
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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| ITEM:         | ISOLATION VALVE (1) |
| FAILURE MODE: | FAILED CLOSED       |
| LEAD ANALYST: | R. DUFFY / T. MCLAUGHLIN |
| SUBSYS LEAD:  | M. SAIIDI          |

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY.
4) 5) 6) 7) 8) 9)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF AUX. O2 WHEN NEEDED, POTENTIAL LOSS OF LIFE/VEHICLE.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 134

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: ISOLATION VALVE (1)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY.
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF AUX. O2 WHEN NEEDED. IN ADDITION, LOSS OF REGULAR OXYGEN, UNLESS THE CROSSOVER VALVES ARE CLOSED. FIRE HAZARD.

REFERENCES:

REPORT DATE 12/02/86 C-35
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 135

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: LINES AND FITTINGS
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDDII

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) AUX. O2 ASSY.

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: CORROSION, VIBRATION, FATIGUE, SHOCK

EFFECTS/RATIONALE:
LOSS OF AUXILIARY OXYGEN AND SUBSEQUENT FIRE HAZARD CONDITION.
OXYGEN NOT AVAILABLE WHEN NEEDED—LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86 C-36
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 136

ITEM: PRESSURE SENSOR-V64P0202A(1)
FAILURE MODE: OUT OF TOLERANCE (FULL OUTPUT, ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME449-0177-9505

CAUSES: ELECTRICAL FAILURE, VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
INABILITY TO KNOW PRESSURE OF O2 ENTERING EMU SUPPLY VALVES, LEH SUPPLY, OR DIRECT O2 VALVE. NOT MISSION OR SAFETY CRITICAL.

REFERENCES:

REPORT DATE 12/02/86  C-37
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 137

HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CROSSOVER VALVE-LV3 AND LV4 (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
NO EFFECT, THE VALVE IS NOMINALLY OPEN THROUGHOUT THE MISSION.

REFERENCES:

REPORT DATE 12/02/86 C-38
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 138
ITEM: CROSSOVER VALVE-LV3 AND LV4 (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
ONE O2 SUPPLY SYSTEM WILL BE ADEQUATE TO PROVIDE FOR NOMINAL MISSION O2 REQUIREMENT. HOWEVER, FOR AN EMERGENCY SITUATION AND LOSS OF ALL REDUNDANCY, NO O2 WILL BE AVAILABLE TO THE CREW THROUGH LEH AND DIRECT O2 ORIFICE - POSSIBLE LOSS OF LIFE.

REFERENCES:

REPORT DATE 12/02/86 C-39
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 139

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: CROSSOVER VALVE-LV3 AND LV4 (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.

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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
AFFECTED O2 SUPPLY SYSTEM WILL HAVE TO BE ISOLATED. SEE NOTE FOR FAILED CLOSED SCENARIO (MDAC ID 138).

REFERENCES:

REPORT DATE 12/02/86 C-40
INDEPENDENT ORRBTER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 
SUBSYSTEM: ARPCS
MDAC ID: 140

ITEM: SWITCH-S15 AND S18 (2)
FAILURE MODE: SWITCH FAILED OPEN, OR PARTIALLY OPEN (VALVE IS OPEN)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7101

CAUSES: MECHANICAL OR ELECTRICAL FAILURE, CORROSION, CONTAMINATION, SHOCK

EFFECTS/RATIONALE:
NO EFFECT, THE VALVE IS NOMINALLY OPEN THROUGHOUT THE MISSION. 
(SEE MDAC ID 137 FOR VALVE.)

REFERENCES:

REPORT DATE 12/02/86         C-41
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 141

HIGHEST CRITICALITY

HDW/FUNC

FLIGHT: 2/1R
ABORT: 2/1R

ITEM: SWITCH-S15 AND S18 (2)
FAILURE MODE: SWITCH FAILED CLOSED (VALVE IS CLOSED).

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7101

CAUSES: MECHANICAL OR ELECTRICAL FAILURE, CORROSION, CONTAMINATION, SHOCK

EFFECTS/RATIONALE:
LOSS OF CRYOGENIC OXYGEN TO CREW (THROUGH LEH'S) DURING ASCENT/ENTRY AND EMERGENCY CONDITIONS. ON-ORBIT, THE CABIN REGULATORS WILL PROVIDE OXYGEN TO THE CABIN, BUT LOSS OF RECHARGE CAPABILITY TO EMU'S.

REFERENCES:

REPORT DATE 12/02/86  C-42
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 142

ITEM: RESISTOR-A12R1 & R2/5.1K (2)
FAILURE MODE: FAILED OPEN, SHORT

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: RLR05C512GR

CAUSES: SHOCK, VIBRATION, THERMAL STRESS

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION. VALVE POSITION CAN BE CHECKED BY SETTING UP THE O2 SYSTEM TO FLOW OXYGEN THROUGH THE CROSSOVER, OR SENSING FLOW THROUGH THE DIRECT OXYGEN BLEED TO THE CABIN.

REFERENCES:

REPORT DATE 12/02/86 C-43
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 2/1R
MDAC ID: 143  ABORT: 2/1R

ITEM: CIRCUIT BREAKER-CB19 & CB20 (2)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: PIECE FAILURE, SHOCK, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:
LOSS OF ONE LEG OF REDUNDANCY (VALVE FAILS IN CLOSED POSITION). OXYGEN DOES NOT FLOW TO LEH'S, EMU'S, AND DIRECT BLEED ORIFICE WHEN NEEDED.

REFERENCES:

REPORT DATE 12/02/86  C-44
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 144

HIGHEST CRITICALITY
ARPCS FLIGHT: 3/3
ABORT: 3/3

ITEM: CIRCUIT BREAKER-CB19 & CB20 (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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5)
6)
7)
8)
9)

CRITICALITIES

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RTLS: 3/3
TAL: 3/3
AOA: 3/3
ATO: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: PIECE FAILURE, SHOCK, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:
LOSS OF OVER-LOAD CIRCUIT PROTECTION. CB NOMINALLY CLOSED.

REFERENCES:

REPORT DATE 12/02/86 C-45
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 145

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ITEM: FILTER-10 MICRONS (2)
FAILURE MODE: RESTRICTED FLOW, CLOGGED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) 02 ASSY.
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LOCATION: MID-FUSELAGE
PART NUMBER: ME286-0061-0001

CAUSES: CONTAMINATION, CORROSION, DAMAGED ELEMENT

EFFECTS/RATIONALE:
LOSS OF ONE FILTER COULD RESULT IN ABORT DECISION WITH ONE O2 SYSTEM AVAILABLE. CLOGGING BOTH FILTERS WOULD CAUSE LOSS OF O2 TO CREW WITH POTENTIAL LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86  C-46
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 146

HIGHEST CRITICALITY

FLIGHT: 3/3
ABORT: 3/3

ITEM: FILTER-10 MICRONS (2)
FAILURE MODE: DAMAGED ELEMENT

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: ME286-0061-0001

CAUSES: VIBRATION, SHOCK

EFFECTS/RATIONALE:
OPEN FILTER HAS NO EFFECT ON THE SUBSYSTEM. HOWEVER, THE CONTAMINANTS MAY POSE HAZARDS TO COMPONENTS DOWNSTREAM, BUT THESE ARE COVERED SEPARATELY.

REFERENCES:

REPORT DATE 12/02/86  C-47
INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  
SUBSYSTEM: ARPCS  
MDAC ID: 147

HIGHEST CRITICALITY   HDW/FUNC
FLIGHT: 2/1R  
ABORT: 2/1R

ITEM: ORIFICE-(ONE 20 LBM/HR IN LOOP1, TWO 10 LBM/HR IN LOOP 2)  
FAILURE MODE: RESTRICTED FLOW (CLOGGED) (LOOP 1)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS  
2) AMC  
3) O2 ASSY.
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LOCATION: MID-FUSELAGE  
PART NUMBER: V070-614100

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:  
LOSS OF LOOP 1 O2, LEAVES ONLY LOOP 2 LEADING TO ABORT DECISION.

REFERENCES:

REPORT DATE 12/02/86  C-48
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 148

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: ORIFICE—(ONE 20 LBM/HR IN LOOP1, TWO 10 LBM/HR IN LOOP2)
FAILURE MODE: RESTRICTED FLOW (CLOGGED) (LOOP 2)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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LOCATION: MID-FUSELAGE
PART NUMBER: V070-614100

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
SINGLE ORIFICE FAILURE WILL HAVE NO EFFECT ON LOOP 2 SINCE 10 LBM/HR CAN FLOW FROM THE OTHER ORIFICE. REDUCED TOTAL FLOW FROM LOOP 1 AND 2.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 2/1R
MDAC ID: 149  ABORT: 2/1R

ITEM: ORIFICE-(ONE 20 LBM/HR IN LOOP1, TWO 10 LBM/HR IN LOOP2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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LOCATION: MID-FUSELAGE
PART NUMBER: V070-614100

CAUSES: CORROSION, SHOCK, VIBRATION

EFFECTS/RATIONALE:
LOSS OF ONE OXYGEN SYSTEM, NEXT FAILURE IS POTENTIALLY LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86    C-50
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 2/1R
MDAC ID: 150  ABORT: 2/1R

ITEM: LINES AND FITTINGS
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
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LOCATION: MID-FUSELAGE, CREW MODULE
PART NUMBER: V070-613130

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF 1 O2 ASSEMBLY (LOSS OF REDUNDANCY) WILL LEAD TO SHORTER MISSION. LOSS OF REDUNDANCY MEANS LOSS OF O2 FOR CREW USEAGE AND CABIN PRESSURIZATION. ALSO POSES FIRE HAZARD. *FAILURE IS DETECTABLE BY CABIN PP02 SENSOR AND CRYO O2 RATE OF FLOW INDICATION. HOWEVER EXACT LOCATION OF THE LEAK MAY NOT BE OBVIOUS.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 151

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: LEH O2 SUPPLY VALVE (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
VALVES ARE NOMINALLY OPEN DURING ASCENT AND ENTRY. THE LEH'S COULD BE ISOLATED DURING ONORBIT BY RESPECTIVE LEH PANEL SHUTOFF VALVES (PNL C6). IN ADDITION, THE QUICK DISCONNECTS ARE SELF SEALING.

REFERENCES:

REPORT DATE 12/02/86  C-52
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 2/1R
MDAC ID: 152  ABORT: 2/1R

ITEM: LEH O2 SUPPLY VALVE (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M.
SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF 1 VALVE CAN BE TOLERATED BY PROVIDING O2 TO THE CREW
THROUGH OTHER SUPPLY VALVE OR DIRECT O2 OR CABIN REGULATOR.
HOWEVER, UNDER AN EMERGENCY SITUATION, CREW MAY BE O2 STARVED IF
HIGH DP/DT DROP OCCURS.
* OXYGEN FLOW THROUGH THE LEH IS DIRECTLY DETECTABLE BY CREW.

REFERENCES:

REPORT DATE 12/02/86  C-53
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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ITEM: LEH O2 SUPPLY VALVE (2)

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SAME AS VALVE FAILED CLOSED. (MDAC ID 152.)
* OXYGEN FLOW (OR LACK OF) THROUGH THE LEH IS DIRECTLY DETECTABLE BY CREW.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 154

ITEM: LEH O2 REGULATOR (2)
FAILURE MODE: FAILED OPEN, LOSS OF REGULATION

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, PIECE PART FAILURE, BINDING, JAMMING

EFFECTS/RATIONALE:
FAILURE WILL CAUSE RELIEF VALVE (245 PSIG) TO CRACK OPEN RAISING PPO2 LEVEL IN CABIN AND DENYING LEH FLOW FROM THE AFFECTED LOOP. POSSIBLE FIRE HAZARD.
* OXYGEN FLOW THROUGH THE LEH IS DETECTABLE BY CREW. IN ADDITION, THE RELIEF VALVE WILL OPEN, AND PPO2 WILL GO HIGH TRIGGERING THE KLAXON.

REFERENCES:

REPORT DATE 12/02/86 C-55
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 155

ITEM: LEH O2 REGULATOR (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING

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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, PIECE PART FAILURE, BINDING, JAMMING

EFFECTS/RATIONALE:
LOSS OF AFFECTED VALVE ISOLATES OXYGEN FLOW FROM THE CREW, LEADING TO ABORT DECISION.
* OXYGEN FLOW (OR LACK OF) THROUGH THE LEH IS DIRECTLY DETECTABLE BY CREW.

REFERENCES:

REPORT DATE 12/02/86 C-56
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 156
ITEM: LEG O2 REGULATOR (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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CRITICALITIES

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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, PIECE PART FAILURE, BINDING, JAMMING

EFFECTS/RATIONALE:
LEAKAGE WILL BE ISOLATED BY SHUTTING OFF THE LEH O2 SUPPLY VALVE, THUS LOSS OF REDUNDANCY LEADING TO ABORT DECISION.
* OXYGEN FLOW (OR LACK OF) THROUGH THE LEH IS DIRECTLY DETECTABLE BY CREW. PPO2 WILL GO HIGH TRIGGERING THE KLAXON.

REFERENCES:

REPORT DATE 12/02/86 C-57
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 157

ITEM: RELIEF VALVE-245 PSIG (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE, EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
FAILURE CAUSES INCREASED CABIN PPO2 LEVEL REQUIRING DEACTIVATION OF THE AFFECTED LEG; THUS AN ABORT DECISION. LEH FLOW MAY NOT BE MAINTAINED UNDER SEVER DEPRESSURIZATION.
* READILY DETECTABLE BY THE CREW.

REFERENCES:

REPORT DATE 12/02/86 C-58
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 158  ABORT: 3/3

ITEM: RELIEF VALVE-245 PSIG (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT, HOWEVER UNABLE TO DEPRESSURIZE THE LINES DOWNSTREAM OF THE REGULATOR WHEN REGULATOR FAILS OPEN (COVERED BY MDAC ID 154).

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS FLIGHT: 2/1R
MDAC ID: 159 ABORT: 2/1R

ITEM: FILTER-10 MICRONS (2)
FAILURE MODE: RESTRICTED FLOW (CLOGGED)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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CRITICALITIES

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| HDW/FUNC ABORT | RTL: 2/1R | TAL: 2/1R | AOA: 2/1R | ATO: 2/1R |


LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
TOTALLY CLOGGED FILTER WILL FORCE THE REGULATOR TO SHUT-OFF THE
FLOW THUS LOSS OF REDUNDANT LEG-ABORT DECISION.
* SEE MDAC ID 155.

REFERENCES:

REPORT DATE 12/02/86 C-60
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS FLIGHT: 3/3
MDAC ID: 160 ABORT: 3/3

ITEM: FILTER-10 MICRONS (2)
FAILURE MODE: DAMAGED FILTER (FULL OPEN)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
NO EFFECT, POSSIBLE CONTAMINATION IN THE LEH'S.

REFERENCES:

REPORT DATE 12/02/86 C-61
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CHECK VALVE
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
NO EFFECT, HOWEVER FAILURE OF THIS VALVE COMBINED WITH AN EXTERNAL LEAKAGE UPSTREAM OR FAILED OPEN RELIEF VALVE WILL FORCE DEACTIVATION OF LEH THUS CRITICALITY 2/1R.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 162

HIGHEST CRITICALITY
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: CHECK VALVE
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING

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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, SHOCK, CORROSION, BINDING, JAMMING

EFFECTS/RATIONALE:
PREVENTS FLOW OF OXYGEN TO THE CREW THROUGH LEH'S WHEN NEEDED.

REFERENCES:

REPORT DATE 12/02/86 C-63
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 163

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: LEH O2 SHUTOFF VALVE/Crew + Passenger (8)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0004-0006

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT WHEN IN USE DURING ASCENT, ENTRY OR EMERGENCY.
OTHERWISE, LEH SYSTEM MAY BE DEACTIVATED BY LEH SUPPLY VALVES-PCS WILL PROVIDE ADEQUATE OXYGEN. NOT HAVING LEH #'S MAY TRIGGER C&W. CREW DISCOMFORT. REDUNDANCY NOT ASSUMED.

REFERENCES:

REPORT DATE 12/02/86 C-64
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT:  1/1
MDAC ID: 164  ABORT:  1/1

ITEM: LEH O2 SHUTOFF VALVE/CREW + PASSENGER (8)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0004-0006

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
FAILURE OF ANY LEH VALVE WILL DENY O2 TO THAT CREW MEMBER, POTENTIAL LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86  C-65
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 165

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: LEH 02 SHUTOFF VALVE/CREW + PASSENGER (8)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) 02 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0004-0006

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
THIS FAILURE MAY DENY DIRECT O2 TO THE LEH IN THE EVENT OF SEVERE CABIN LEAK.

REFERENCES:

REPORT DATE 12/02/86 C-66
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 166

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: QUICK DISCONNECTS (8)
FAILURE MODE: INABILITY TO MATE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: F361-2660-3

CAUSES: BINDING, JAMMING, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
THIS FAILURE MAY DENY DIRECT O2 TO THE LEH IN THE EVENT OF SEVERE CABIN LEAK.

REFERENCES:

REPORT DATE 12/02/86  C-67
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 167

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: QUICK DISCONNECTS (8)
FAILURE MODE: INABILITY TO DEMATE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
5)
6)
7)
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: F361-2660-3

CAUSES: BINDING, JAMMING, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT, CREW INCONVENIENCE.

REFERENCES:

REPORT DATE 12/02/86 C-68
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 168

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: QUICK DISCONNECTS (8)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: F361-2660-3

CAUSES: BINDING, JAMMING, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
THIS FAILURE MAY DENY DIRECT O2 TO THE LEH IN THE EVENT OF SEVERE CABIN LEAK. THE LEAK CAN BE ISOLATED BY CLOSING THE SHUTOFF VALVE.

REFERENCES:

REPORT DATE 12/02/86 C-69
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 169

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: 3/3

ITEM: QUICK DISCONNECTS (8)
FAILURE MODE: INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: F361-2660-3

CAUSES: BINDING, JAMMING, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT WHEN LEH IS IN NORMAL USE. OTHERWISE, IT CAN BE ISOLATED BY CLOSING THE SHUTOFF VALVE.

REFERENCES:

REPORT DATE 12/02/86  C-70
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 170  ABORT: /NA

ITEM: LEH #5, BLEED ORIFICE
FAILURE MODE: INABILITY TO MATE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: BINDING, JAMMING, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT. THERE ARE 8 HOOK UP POINTS.

REFERENCES:

REPORT DATE 12/02/86 C-71
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 1/1
MDAC ID: 171  ABORT: /NA

ITEM: LEH #5, BLEED ORIFICE
FAILURE MODE: INABILITY TO DEMATE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: BINDING, JAMMING, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO REDUNDANCY ASSUMED. THIS FAILURE MAY DENY O2 TO A CREWMEMBER IN THE EVENT OF SEVERE CABIN LEAK. WHEN 8 CREWMEMBERS ARE PRESENT.

REFERENCES:

REPORT DATE 12/02/86  C-72
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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**ITEM:** LEH #5, BLEED ORIFICE
**FAILURE MODE:** RESTRICTED FLOW

**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN
**SUBSYS LEAD:** M. SAIDI

**BREAKDOWN HIERARCHY:**
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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**REduNDANCY SCREENS:** A [ ] B [ ] C [ ]

**LOCATION:** CREW MODULE
**PART NUMBER:**

**CAUSES:** BINDING, JAMMING, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**
NO EFFECT. CREW INCONVENIENCE, POSSIBLE C&W.

**REFERENCES:**

**REPORT DATE** 12/02/86 C-73
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 173

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CAP/LEH Q.DSCNT (8)
FAILURE MODE: BREAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: VIBRATION, SHOCK, MISHANDLING

EFFECTS/RATIONALE:
NO EFFECT, THE SELF-SEALED DISCONNECT WILL HOLD PRESSURE. ALSO, WHEN LEH IS NOT IN USE, THE SOV IS CLOSED.

REFERENCES:

REPORT DATE 12/02/86  C-74
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 174

HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: SHUTOFF VALVE/DIRECT OXYGEN (1)
FAILURE MODE: FAILED OPEN, OR EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE

PART NUMBER:

CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE, CORROSION

EFFECTS/RATIONALE:
NOMINALLY THE VALVE IS CLOSED. THE FAILURE CREATES A FIRE HAZARD WITH AN OXYGEN-RICH CABIN. IT IS PARTICULARLY LIFE THREATENING DURING ASCENT AND ENTRY WHEN THE CREW IS ON LEH AND THE LEAK CANNOT BE ISOLATED.

REFERENCES:

REPORT DATE 12/02/86 C-75
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY   HDW/FUNC
SUBSYSTEM: ARPCS           FLIGHT: 2/1R
MDAC ID: 175             ABORT: 2/1R

ITEM: SHUTOFF VALVE/DIRECT OXYGEN (1)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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LOCATION: CREW MODULE
PART NUMBER:

CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE, CORROSION

EFFECTS/RATIONALE:
NOMINALLY NO EFFECT, HOWEVER, WITH CABIN LEAK CONDITION, O2 FLOW MAY BE PROVIDED BY CONFIGURING ONE OF THE O2/N2 CONTROL VALVES TO FLOW ONLY OXYGEN WHILE THE OTHER WILL FLOW ONLY NITROGEN. LEH-O2 FLOW WILL BE MAINTAINED.

REFERENCES:

REPORT DATE 12/02/86  C-76
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 176

HIGHEST CRITICALITY

FLIGHT: 2/1R
ABORT: 2/1R

ITEM: ORIFICE-DIRECT BLEED (1)
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) EMERGENCY BREATHING
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LOCATION: CREW MODULE
PART NUMBER:

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
THE WORST CASE HAS THE SAME EFFECT AS MDAC ID 175.

REFERENCES:

REPORT DATE 12/02/86 C-77
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY

HDW/FUNC

FLIGHT: 2/1R

ABORT: 2/1R

SUBSYSTEM: ARPCS

MDAC ID: 177

ITEM: FILTER/CHECK VALVE (2)

FAILURE MODE: FAILED CLOSED, RESTRICTED FLOW

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SAIDDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE

PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION, PIECE PART FAILURE, VIBRATION, SHOCK

EFFECTS/RATIONALE:
LOSS OF REDUNDANT O2 LEG-ABORT DECISION. NOMINAL CABIN + CREW USEAGE CAN BE MAINTAINED BY THE UNAFFECTED LEG.

REFERENCES:

REPORT DATE 12/02/86 C-78
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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ITEM: FILTER/CHECK VALVE (2)
FAILURE MODE: FAILED OPEN (C.V)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION, PIECE PART FAILURE, VIBRATION, SHOCK

EFFECTS/RATIONALE:
NO EFFECT WHEN O2 IS FLOWING. POSSIBLE BACK FLOW OF CONTAMINANTS ON NON-FLOW O2 LEG.

REFERENCES:

REPORT DATE 12/02/86 C-79
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 179

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: FILTER/CHECK VALVE (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION, PIECE PART FAILURE, VIBRATION, SHOCK

EFFECTS/RATIONALE:
LOSS OF REDUNDANCY LEG BY ISOLATING THE O2 SYSTEM. SAME AS VALVE FAILED CLOSED. (MDAC ID 177.)

REFERENCES:

REPORT DATE 12/02/86  C-80
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/2R
MDAC ID: 180  ABORT: 3/2R

ITEM: FLOW SENSOR MT11&MT12 (2)
FAILURE MODE: OUT OF TOLERANCE (FULL FLOW, ZERO FLOW)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCKS, THERMAL STRESS, ELECTRICAL, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF O2 FLOW MEASUREMENT FOR DETECTING CABIN LEAK QUICKLY. LOSS OF C&W RED LIGHT IN THIS CASE. HIGH FLOW OF O2/N2 DUE TO LEAK MAY MAINTAIN NOMINAL CABIN PRESSURE (NO CHANGE IN DP/DT) WITHOUT BEING READILY NOTICED–THE IMPACT OF THIS FAILURE ON DEORBIT/ABORT ARE DEBATABLE.

REFERENCES:

REPORT DATE 12/02/86  C-81
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 181

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: 3/3

ITEM: SWITCH-02 FLOW,S5 (1)
FAILURE MODE: INABILITY TO SWITCH

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0093-5025

CAUSES: MECHANICAL OR ELECTRICAL FAILURE, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF FLOW READING ON THE METER. PASS/BFS DISPLAYS MAY BE USED TO MONITOR THE FLOW. THE FAILURE OF ON-BOARD FLOW RATE WILL HAVE THE SAME EFFECT.

REFERENCES:

REPORT DATE 12/02/86 C-82
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 182

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: C&W-O2/N2 FLOW (1)
FAILURE MODE: INABILITY TO LIGHT

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE

PART NUMBER:

CAUSES: SHORT, ELECTRICAL

EFFECTS/RATIONALE:
NO EFFECT, HIGH FLOW RATES ARE MONITORED BY O2/N2 METER OR ON-BOARD DISPLAYS.

REFERENCES:

REPORT DATE 12/02/86 C-83
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 183
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: PRESSURE SENSOR, REGULATOR INLET - MT3 & MT4
FAILURE MODE: OUT OF TOLERANCE (FULL/ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL (OXYGEN REGULATOR)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: ELECTRICAL, CONTAMINATION, CORROSION, PIECE PART FAILURE

EFFECTS/RATIONALE:
NO EFFECT; PRESSURE CAN BE VERIFIED DOWNSTREAM OF THE REGULATOR

REFERENCES:

REPORT DATE 12/02/86  C-84
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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ITEM: REGULATOR INLET SOV (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL (OXYGEN REGULATOR)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION, PIECE PART FAILURE, VIBRATION, SHOCK

EFFECTS/RATIONALE:
INABILITY TO ISOLATE THE AFFECTED REGULATOR LEG. THE PCS MAY BE OPERATED AUTO ON AFFECTED LEG OR MANUALLY WITHOUT ANY PROBLEM - CREW INCONVENIENCE.

REFERENCES:

REPORT DATE 12/02/86 C-85
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 185

ITEM: REGULATOR INLET SOV (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL (OXYGEN REGULATOR)
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION, PIECE PART FAILURE, VIBRATION, SHOCK

EFFECTS/RATIONALE:
LOSS OF ONE O2/N2 CONTROLLER LEG BY THE INABILITY TO FLOW OXYGEN WHEN NEEDED. PRESSURE CAN BE MANAGED, AND O2 FLOW MAINTAINED TO THE CREW THRU EITHER LEH OR DIRECT BLEED ORIFICE - ABORT DECISION. THE FAILURE IS NOT CRITICAL DURING ASCENT OR ENTRY SINCE CREW IS ON THE LEH SYSTEM AND THE SOV IS NOMINALLY CLOSED.

REFERENCES:

REPORT DATE 12/02/86 C-86
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 186

ITEM: REGULATOR INLET SOV (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAWIDDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL (OXYGEN REGULATOR)
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION, PIECE PART FAILURE, VIBRATION, SHOCK

EFFECTS/RATIONALE:
LEAKS MOST LIKELY INTO THE CABIN, RESULTING IN HIGH PPO2 (FIRE HAZARD) FORCING CREW TO ISOLATE AFFECTED O2 SUPPLY LINE AND CLOSING THE X-OVER VALVE. LOSS OF REDUNDANCY WILL DENY CREW LEH O2 FLOW.

REFERENCES:

REPORT DATE 12/02/86 C-87
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 187

ITEM: REGULATOR - 100 PSIG (2)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, CORROSION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
POSSIBLE DAMAGE TO 8/14.7 PSI REGULATORS, AND/OR CRACKING 245 PSIG OPEN TO CABIN RESULTING IN OXYGEN-RICH CABIN (FIRE HAZARD).
NO EFFECT ON ASCENT/ENTRY SINCE THE INLET SOV IS NOMINALLY CLOSED.

REFERENCES:

REPORT DATE 12/02/86 C-88
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 188
HIGHEST CRITICALITY: 10/29/86 HIGHEST CRITICALITY
HDW/FUNC: 3/2R
FLIGHT: 3/2R
ABORT: 3/3
ITEM: REGULATOR - 100 PSIG (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, CORROSION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF ONE O2/N2 CONTROLLER LEG BY THE INABILITY TO FLOW OXYGEN WHEN NEEDED. PRESSURE CAN BE MANAGED, AND O2 FLOW MAINTAINED TO THE CREW THRU EITHER LEH OR DIRECT BLEED ORIFICE - ABORT DECISION. SEE ALSO MDAC ID 185 - REGULATOR INLET SOV.

REFERENCES:

REPORT DATE 12/02/86  C-89
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 189

ITEM: REGULATOR - 100 PSIG (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:

1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, CORROSION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
SAME AS MDAC ID 186 - EXTERNAL LEAKAGE.

REFERENCES:

REPORT DATE 12/02/86 C-90
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/1R
MDAC ID: 190  ABORT: 3/3

ITEM: RELIEF VALVE, 245 PSIG (2)
FAILURE MODE: FAILED OPEN, EXTERNAL LEAKAGE AND INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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CRITICALITIES

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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, CORROSION, PIECE PART FAILURE, SHOCK

EFFECTS/RATIONALE:
LOSS OF AUTO MODE OF O2/N2 CONTROLLERS, THE HARDWARE CRITICALITY ACCOUNTS FOR THE FACT THAT THERE IS A REDUNDANT LEG OF THE SYSTEM AND THAT THE FAILED LEG CAN BE OPERATED MANUALLY BY OPENING AND CLOSING THE SHUTOFF VALVE. ALSO LOSS OF FLOW TO S/L MODULES. CABIN PRESSURE AND CREW USAGE MAY BE MANAGED MANUALLY, HOWEVER, POTENTIAL EXISTS FOR CABIN OXYGEN-RICH ENVIRONMENT LEADING TO FIRE HAZARD WITH POTENTIAL LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86  C-91
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/2R
MDAC ID: 191  ABORT: 3/3

ITEM: RELIEF VALVE, 245 PSIG (2)  HIGHEST CRITICALITY:
FAILURE MODE: FAILED CLOSED  FLIGHT:
ABORT: 3/3

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
  1) ARPCS
  2) AMC
  3) O2 ASSY.
  4) O2/N2 CONTROL PANEL

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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, CORROSION, PIECE PART FAILURE, SHOCK

EFFECTS/RATIONALE:
NO EFFECT UNDER NOMINAL CONDITION OF ASCENT OR ENTRY. HOWEVER, WILL RESULT IN LOSS OF FUNCTION TO VENT THE LINE IF NEEDED, POSSIBLY DAMAGING 8/14.7 PSI A REGULATION. THIS IS LOSS OF REDUNDANCY AND MISSION ABORT DECISION.

REFERENCES:

REPORT DATE 12/02/86 C-92
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

**DATE:** 10/29/86

**HIGHEST CRITICALITY**

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**SUBSYSTEM:** ARPCS

**MDAC ID:** 192

**ITEM:** PRESSURE SENSOR (2)

**FAILURE MODE:** OUT OF TOLERANCE (FULL OUTPUT, ZERO OUTPUT)

**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN

**SUBSYS LEAD:** M. SAIIDI

**BREAKDOWN HIERARCHY:**

1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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**CRITICALITIES**

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**REDUNDANCY SCREENS:**

A [ ]

B [ ]

C [ ]

**LOCATION:** CREW MODULE

**PART NUMBER:** MF449-0177-6103

**CAUSES:** CORROSION, ELECTRICAL, PIECE PART FAILURE

**EFFECTS/RATIONALE:**

NO EFFECT, PRESSURE CAN BE CHECKED BY THE PRESSURE-SENSOR DOWNSTREAM OF O2/N2 CONTROL VALVE

**REFERENCES:**

REPORT DATE 12/02/86 C-93
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 193

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CHECK VALVE (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE (WITHOUT S/L)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
   2) AMC
   3) O2 ASSY.
   4) O2/N2 CONTROL PANEL
   5) 
   6) 
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
POSSIBILITY OF 200 PSI N2 BACK-FLOW WILL FORCE O2 REGULATOR TO CLOSE AND SPACELAB O2 SUPPLY MUST BE SHUTOFF. OTHERWISE, PCS MAY OPERATE IN AUTO OR MANUAL MODE WITH NO EFFECT. ALSO SEE MDAC ID 366 FOR FAILURE WITH S/L.

REFERENCES:

REPORT DATE 12/02/86  C-94
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 194

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: CHECK VALVE (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF ONE REDUNDANT LEG-ABORT DECISION. HOWEVER, OXYGEN NECESSARY FOR CREW USAGE CAN BE MAINTAINED UNDER NOMINAL OR CABIN LEAK CONDITIONS THROUGH LEH OR DIRECT BLEED ORIFICE. CABIN PRESSURE CAN BE MAINTAINED BY THE NITROGEN SYSTEM.

REFERENCES:

REPORT DATE 12/02/86 C-95
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 195

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CHECK VALVE (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
THIS FAILURE RESULTS IN FLOWING UNREGULATED O2 AND N2 TO THE CABIN FORCING THE AFFECTED O2/N2 CONTROL VALVE TO BE SHUT CLOSED AS WELL AS THE O2 REGULATOR INLET SHUTOFF VALVE. UNREGULATED OXYGEN LEAK POSES FIRE HAZARD. LOSS OF ONE N2 AND O2 REDUNDANT LEG.

REFERENCES:

REPORT DATE 12/02/86 C-96
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 196

HIGHEST CRITICALITY
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: LINES & FITTINGS
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: V070-614112

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF O2 REDUNDANT LEG, ABORT DECISION. OTHERWISE UNREGULATED O2 INTO THE CABIN WILL RAISE PPO2 (FIRE HAZARD), SUBSEQUENTLY FORCING ISOLATION OF THE LINE.

REFERENCES:

REPORT DATE 12/02/86 C-97
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 197

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: 3/3

ITEM: SHUTOFF VALVE (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE (WITHOUT SPACELAB)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAITIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, P/L INTERFACE
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
NO EFFECT, SINCE THE LINE IS CAPPED TIGHT AT THE END TO HOLD FLOW.

REFERENCES:

REPORT DATE 12/02/86 C-98
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/1R
MDAC ID: 198  ABORT: 3/1R

ITEM: SHUTOFF VALVE (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE (WITH S/L)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, P/L INTERFACE
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO ISOLATE S/L, RESULTING IN
UNREGULATED/CONTINUOUS FLOW OF OXYGEN INTO THE S/L MODULE, OXYGEN
RICH MODULE POSES FIRE HAZARD. OTHER REDUNDANT LEG OR DIRECT
BLEED ORIFICE AVAILABLE TO PROVIDE OXYGEN FLOW.

REFERENCES:

REPORT DATE 12/02/86   C-99
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86    HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS    FLIGHT: 3/3
MDAC ID: 199    ABORT: 3/3

ITEM: SHUTOFF VALVE (2)
FAILURE MODE: FAILED CLOSED (WITHOUT S/L)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN    SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, P/L INTERFACE
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
NO EFFECT

REFERENCES:

REPORT DATE 12/02/86 C-100
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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<td>3) O2 ASSY.</td>
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
POSSIBLE OXYGEN DEFICIENCY IN THE MODULE, LIFE SCIENCE CREW WORK IMPACT, ABORT DECISION.

REFERENCES:

REPORT DATE 12/02/86 C-101
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 201

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: SHUTOFF VALVE (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, P/L INTERFACE
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8)
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
FLOW OF UNREGULATED O2 INTO THE CABIN WILL RAISE THE PPO2 LEVEL AND FORCE CREW TO ISOLATE THAT LEG. IN THIS CASE THE O2 WILL BE ALSO DENIED TO THE PAYLOAD (IF FLOWN). CABIN-RICH OXYGEN WILL POSE FIRE HAZARD.

REFERENCES:

REPORT DATE 12/02/86 C-102
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 202

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/2R

ITEM: ORIFICE (2)
FAILURE MODE: RESTRICTED FLOW, CLOGGED ORIFICE (WITH S/L)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, P/L INTERFACE
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LACK OF O2 TO MEET P/L REQUIREMENTS AND LOSS OF ONE REDUNDANT LEG, O2 CAN BE PROVIDED THRU THE OTHER LEG.

REFERENCES:

REPORT DATE 12/02/86 C-103
**INDEPENDENT ORBITER ASSESSMENT**
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN  
**SAIIDI**

**SUBSYS LEAD:** M.

**BREAKDOWN HIERARCHY:**
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, P/L INTERFACE
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6)  
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**LOCATION:** CREW MODULE
**PART NUMBER:** MC250-0002

**CAUSES:** VIBRATION, SHOCK, MISHANDLING, FATIGUE, POROSITY

**EFFECTS/RATIONALE:**
FLOW OF UNREGULATED O2 INTO THE CREW CABIN RESULTING IN OXYGEN RICH CABIN, FIRE HAZARD. OTHERWISE LINE MUST BE ISOLATED (LOSS OF REDUNDANT LEG) AND OPERATE THE P/L FROM REDUNDANT LEG, AND OR CREW CABIN AIR TRANSFER THROUGH TUNNEL.

**REFERENCES:**

**REPORT DATE 12/02/86 C-104**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS

MDAC ID: 204

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/3
ABORT: 3/3

ITEM: PRESSURE SENSOR, MT7 & MT8 (2)

FAILURE MODE: OUT OF TOLERANCE (FULL/ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, CABIN REGULATION
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE

PART NUMBER: ME449-0177-6103

CAUSES: ELECTRICAL, PIECE PART FAILURE, SHOCK, CORROSION, CONTAMINATIN

EFFECTS/RATIONALE:
LOSS OF PRESSURE MEASUREMENT DOWNSTREAM OF THE O2/N2 CONTROL VALVE. HOWEVER, THE O2 AND N2 PRESSURES CAN BE ALSO READ FROM ADDITIONAL SENSORS DOWNSTREAM OF 100/200 PSIA REGULATION.

REFERENCES:

REPORT DATE 12/02/86 C-105
**INDEPENDENT ORBITER ASSESSMENT**
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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<td>FAILURE MODE:</td>
<td>FAILED OPEN, INTERNAL LEAKAGE</td>
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<td>LEAD ANALYST:</td>
<td>R. DUFFY / T. MCLAUGHLIN</td>
<td>SUBSYS LEAD: M. SAIIDI</td>
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**BREAKDOWN HIERARCHY:**
1) ARPCS
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3) O2 ASSY.
4) O2/N2 CONTROL PANEL, CABIN REGULATION
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**REDUNDANCY SCREENS:**

**LOCATION:** CREW MODULE

**PART NUMBER:** MC250-0002

**CAUSES:** VIBRATION, CORROSION, PIECE PART FAILURE, SHOCK, BINDING/JAMMING

**EFFECTS/RATIONALE:**
WILL RESULT IN LOSS OF 8 PSI REGULATOR OPERATION DURING CABIN LEAK/EMERGENCY CONDITIONS. THIS WILL DEPLETE CONSUMABLES EARLIER THAN 8.0 PSIA CABIN REGULATION, THUS SHORTENING THE TIME THAT CABIN COULD BE MAINTAINED PRESSURIZED. POTENTIAL LOSS OF LIFE/VEHICLE.

**REFERENCES:**

REPORT DATE 12/02/86  C-106
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 206

HIGHEST CRITICALITY
FLIGHT: 3/2R
ABORT: 3/3

ITEM: 14.7 PSI REG INLET SOV (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, CABIN REGULATION
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, CORROSION, PIECE PART FAILURE, SHOCK, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF ONE LEG OF 14.7 CABIN REGULATION DURING ON-ORBIT-DOCKING ASCENT/ENTRY, ARPCS IS CONFIGURED FOR 8.0 PIA REGULATION. CABIN CAN BE MAINTAINED AT 14.7 OR 8.0 PSIA FROM THE REDUNDANT LEG, OR 8.0 PSIA AT AFFECTED LEG.

REFERENCES:

REPORT DATE 12/02/86 C-107
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 207

HIGHEST CRITICALITY: HDW/FUNC

FLIGHT: 2/1R
ABORT: 3/2R

ITEM: 14.7 PSI REG INLET SOV (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, CABIN REGULATION
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, CORROSION, PIECE PART FAILURE, SHOCK, BINDING/JAMMING

EFFECTS/RATIONALE:
FLOW OF CONTINUOUS/UNREGULATED NITROGEN INTO THE CABIN ACTIVATES THE POSITIVE RELIEF VALVE, AND SUBSEQUENTLY DEPLETES NITROGEN SUPPLY FROM THE AFFECTED SYSTEM (TWO TANKS). OXYGEN WILL BE DEPLETED IN THE SAME WAY.

REFERENCES:

REPORT DATE 12/02/86 C-108
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 208

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 3/3

ITEM: 14.7 PSI REGULATOR
FAILURE MODE: FAILED OPEN, EXTERNAL LEAKAGE, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF UNREGULATED N2/O2 INTO THE CABIN CREATING SAME EFFECT AS MDAC ID 207 - EXTERNAL LEAKAGE FAILURE MODE. EXCEPT FOR ASCENT/ENTRY THE REGULATOR INLET SOV IS CLOSED TO CONFIGURE TO 8.0 PSIA REGULATION.

REFERENCES:

REPORT DATE 12/02/86 C-109
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 209

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: 14.7 PSI REGULATOR (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAlIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF 14.7 PSI REGULATION, CREW CAN RETURN ON CABIN VOLUME OR 8.0 PSIA REGULATION.

REFERENCES:

REPORT DATE 12/02/86 C-110
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS

MDAC ID: 210

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 2/1R

ABORT: 2/1R

ITEM: 8 PSI REGULATOR (2)

FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, 8 PSI REGULATION
5)
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CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: 3/2R RTLS: 2/1R
LIFTOFF: 2/1R TAL: 2/1R
ONORBIT: 2/1R AOA: 2/1R
DEORBIT: 2/1R ATO: 2/1R
LANDING/SAFING: 3/3


LOCATION: CREW MODULE

PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
ALTERNATE FLOW OF UNREGULATED N2 AND O2 INTO THE CABIN WITH INTERMITTANT VENTING UNTIL CONSUMABLES ARE DEPLETED.

REFERENCES:

REPORT DATE 12/02/86 C-111
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 211

ITEM: 8 PSI REGULATOR (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY.
4) O2/N2 CONTROL PANEL, 8 PSI REGULATION
5)
6)
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CRITICALITIES

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LOCATION: CREW MODULE
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WHEN ARPCS CONFIGURED TO 8.0 PSIA REGULATION, THIS FAILURE WILL
NOT ALLOW O2/N2 FLOW INTO THE CABIN TO MAINTAIN CABIN PRESSURE.
THUS DECOMPRESSION OF THE CABIN WILL OCCUR.

REFERENCES:

REPORT DATE 12/02/86 C-112
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS   FLIGHT: 2/1R
MDAC ID: 212     ABORT: 2/1R

ITEM: N2 TANKS (4)
FAILURE MODE: RUPTURE, EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY TANKS
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LOCATION: MID-FUSELAGE
PART NUMBER: MC282-0082-0040

CAUSES: FATIGUE, OVERPRESSURIZATION, TEMPERATURE

EFFECTS/RATIONALE:
LOSS OF NITROGEN FOR CABIN PRESSURE MAINTENANCE, AND
OVERPRESSURIZATION OF THE COMPARTMENT AREA WITH POSSIBLE
STRUCTURAL FAILURE.

REFERENCES:

REPORT DATE 12/02/86  C-113
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 213  ABORT: 3/3

ITEM: TEMPERATURE SENSOR (4)
FAILURE MODE: OUT OF TOLERANCE (FULL OUTPUT, ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY TANKS
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: ME449-0010-0007

CAUSES: CORROSION, ELECTRICAL, SHOCK, VIBRATION

EFFECTS/RATIONALE:
NO EFFECT; TELEMETRY DATA ONLY.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 214

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: LINES & FITTINGS - TP27 & TP28
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY TANKS
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE AND CREW MODULE

PART NUMBER:

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF THE NITROGEN SYSTEM AND THE ABILITY TO MAINTAIN CABIN PRESSURE. OVERPRESSURIZATION OF THE COMPARTMENT WITH POSSIBLE STRUCTURAL FAILURE. BOTH COULD LEAD TO LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86   C-115
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 215

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: GSE QUICK DISCONNECT (1)
FAILURE MODE: FAILED TO MATE/DEMATE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY TANKS
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CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: 3/3 RTLS: /NA
LIFTOFF: /NA TAL: /NA
ONORB: /NA AOA: /NA
DEORBIT: /NA ATO: /NA
LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC276-0010-0380

CAUSES: VIBRATION, SHOCK, CORROSION, BINDING/JAMMING

EFFECTS/RATIONALE:
UNABLE TO SERVICE THE TANKS PRELAUNCH, RESULTING IN MISSION DELAY.

REFERENCES:

REPORT DATE 12/02/86  C-116
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 216

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: GSE QUICK DISCONNECT (1)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LED: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC276-0010-0380

CAUSES: VIBRATION, SHOCK, MISHANDLING

EFFECTS/RATIONALE:
LOSS OF N2 FROM THE FOUR SUPPLY TANKS RESULTING IN LOSS OF CABIN PRESSURE MAINTENANCE. ALSO OVERPRESSURIZATION OF THE COMPARTMENT AREA.

REFERENCES:

REPORT DATE 12/02/86 C-117
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 217

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: GSE CAP (1)
FAILURE MODE: INABILITY TO MATE, DEMATE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY TANKS
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RENDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC276-0010-0361

CAUSES: VIBRATION, SHOCK CORROSION, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF TANK SERVICING DURING PRELAUNCH, CAUSING DELAY DUE TO REPAIR/REPLACEMENT OF THE PIECE AND RESERVICING THE TANKS.

REFERENCES:

REPORT DATE 12/02/86 C-118
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY

HDW/FUNC

FLIGHT: 1/1

ABORT: 1/1

ITEM: GSE CAP (1)

FAILURE MODE: EXTERNAL LEAK, INTERNAL LEAK

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

HIGHEST CRITICALITY

FLIGHT PHASE

HDW/FUNC

ABORT

HDW/FUNC

PRELAUNCH: 2/2

RTLS: 1/1

LIFTOFF: 1/1

TAL: 1/1

ONORBIT: 1/1

AOA: 1/1

DEORBIT: 1/1

ATO: 1/1

LANDING/SAFING: 3/3

CRITICALITIES

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE

PART NUMBER: MC276-0010-0361

CAUSES: VIBRATION, SHOCK, CORROSION, FATIGUE

EFFECTS/RATIONALE:

LOSS OF N2 FROM FOUR SUPPLY TANKS. DEPLETION OF N2 FOR PRESSURE MAINTENANCE.

REFERENCES:

REPORT DATE 12/02/86 C-119
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 219

HIGHEST CRITICALITY
ORBIT FLIGHT: 3/3
ABORT: /NA

ITEM: GSE FILTER (1)-10 MICRONS
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY TANKS
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF TANKS SERVICING PROCEDURE DURING PRELAUNCH AND POSTLANDING. THE PIECE MUST BE REPLACED AND TANKS RESERVICED—MISSION DELAY.

REFERENCES:

REPORT DATE 12/02/86 C-120
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS FLIGHT: 3/3
MDAC ID: 220 ABORT: /NA

ITEM: GSE FILTER (1)-10 MICRONS HIGHEST CRITICALITY FLIGHT: 3/3
FAILURE MODE: OPEN ABORT: /NA

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY TANKS
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: MISHANDLING, SHOCK

EFFECTS/RATIONALE:
NO SIGNIFICANT IMPACT.

REFERENCES:

REPORT DATE 12/02/86 C-121
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 221

ITEM: PRESSURE SENSOR (2)
FAILURE MODE: OUT OF TOLERANCE (FULL OUTPUT, ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY PANEL/40V61A16
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REDUNDANCY SCREENS: A [  ] B [  ] C [  ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: ELECTRICAL, VIBRATION, SHOCK

EFFECTS/RATIONALE:
LOSS OF TANKS PRESSURE INDICATION-TANK PRESSURE CAN BE CHECKED DOWNSTREAM.

REFERENCES:

REPORT DATE 12/02/86 C-122
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 222

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: ISOLATION VALVE (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY PANEL/40V61A16
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LOCATION: MID-FUSELAGE
PART NUMBER: ME284-0556-0001

CAUSES: ELECTRICAL, VIBRATION, SHOCK, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF NITROGEN TO P/L (MMU) RESULTING ON MISSION LOSS. VALVE IS NOMINALLY CLOSED UNTIL NEEDED.

REFERENCES:

REPORT DATE 12/02/86 C-123
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 223

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: ISOLATION VALVE (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY PANEL/40V61A16
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LOCATION: MID-FUSELAGE
PART NUMBER: ME284-0556-0001

CAUSES: ELECTRICAL, VIBRATION SHOCK, BINDING/JAM

EFFECTS/RATIONALE:
MMU FLOWN-NOT ABLE TO USE MMU, REMOVAL OF MMU WILL DEplete N2-
SYSTEM, MISSION IMPACT. MMU NOT FLOWN-LINES CAPPED OFF TO HOLD
PRESSURE-NO LEAK.

REFERENCES:

REPORT DATE 12/02/86 C-124
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 224

ITEM: ISOLATION VALVE (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2 SUPPLY PANEL/40V61A16
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CRITICALITIES

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LOCATION: MID-FUSELAGE
PART NUMBER: ME284-0556-0001

CAUSES: VIBRATION, SHOCK, FATIGUE

EFFECTS/RATIONALE:
LOSS OF GASEOUS NITROGEN AND PRESSURE MAINTENANCE CAPABILITY.
ALSO, LOSS OF PRESSURE HEAD NEEDED TO OPERATE WATER TANKS FOR
DUMP AND FES COOLING-FES COOLING DURING ASCENT/ENTRY IS CRITICAL.

REFERENCES:

REPORT DATE 12/02/86 C-125
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 225

ITEM: POSITION INDICATION, DS8&DS9 (2)
FAILURE MODE: INABILITY TO LATCH PROPERLY

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL/PAYLOAD INTERFACE
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0222-0029

CAUSES: ELECTRICAL, BINDING/JAMMING, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF ACCURATE VALVE POSITION INDICATION. FLOW WILL INDICATE VALVE OPEN/CLOSE POSITION.

REFERENCES:

REPORT DATE 12/02/86 C-126
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 226

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE, DS8&DS9 (4)
FAILURE MODE: OPEN, SHORTS, OUT OF TOLERANCE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL/PAYLOAD INTERFACE
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION. NO EFFECT, NON-ESSENTIAL ITEM.

REFERENCES:

REPORT DATE 12/02/86 C-127
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 227

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, DS8&9, 5.1K (4)
FAILURE MODE: ANY CREDIBLE FAILURE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL/PAYLOAD INTERFACE

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REDUNDANCY SCREENS:  A [ ]   B [ ]   C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION. NO EFFECT, NOT MISSION ESSENTIAL.

REFERENCES:

REPORT DATE 12/02/86 C-128
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 228

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: SWITCH-S10&S11, MMU ISOL VLV (2)
FAILURE MODE: OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M.
SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL/PAYLOAD INTERFACE
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LOCATION: CREW MODULE
PART NUMBER:

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:
WILL DRIVE THE ISOLATION VALVE OPEN—SEE MDAC ID 223 FAILED OPEN.

REFERENCES:

REPORT DATE 12/02/86 C-129
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 229

HIGHEST CRITICALITY
FLIGHT: 3/2R
ABORT: 3/3

ITEM: SWITCH-S10&S11, MMU ISOL VLV (2)
FAILURE MODE: CLOSE, OR MIDDLE POSITION—UNABLE TO SWITCH

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/02 SUPPLY PANEL/PAYLOAD INTERFACE

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LOCATION: CREW MODULE
PART NUMBER:

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:
WILL DRIVE THE VALVE CLOSE—SEE MDAC ID 222. IF NOT ABLE TO SWITCH, THE VALVE REMAINS IN THE CLOSED POSITION.

REFERENCES:

REPORT DATE 12/02/86 C-130
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 230

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/2R
ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB69&CB74-MMU ISOL VLV (2)
FAILURE MODE: OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: CREW MODULE
PART NUMBER:

CAUSES: PIECE PART FAILURE, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:
LOSS OF POWER TO OPERATE ASSOCIATED SW, VALVE, AND VALVE POSITION INDICATION, VALVE WILL REMAIN IN CLOSED POSITION, NOT SUPPLYING N2 TO MMU IF NEEDED.

REFERENCES:

REPORT DATE 12/02/86 C-131
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 231  ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB69&CB74-MMU ISOL VLV (2)
FAILURE MODE: CLOSE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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CRITICALITIES
FLIGHT PHASE  HDW/FUNC  ABORT  HDW/FUNC
PRELAUNCH: 3/3  RTLS: 3/3
LIFTOFF: 3/3  TAL: 3/3
ONORBIT: 3/3  AOA: 3/3
DEORBIT: 3/3  ATO: 3/3
LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: PIECE PART FAILURE, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:
NO EFFECT, LOSS OF CIRCUIT OVERLOAD PROTECTION.

REFERENCES:

REPORT DATE 12/02/86  C-132
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 232
STATUS: HIGHEST CRITICALITY
FLIGHT: 2/1R
ABORT: 3/3

ITEM: LINES & FITTINGS
FAILURE MODE: EXTERNAL LEAKAGE (DOWNSTREAM OF MMU ISOL.VLV)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: MID-FUSELAGE AND CREW MODULE

PART NUMBER:

CAUSES: VIBRATION, SHOCK, FATIGUE

EFFECTS/RATIONALE:
LOSS OF THE NITROGEN REQUIRED FOR PRESSURE MAINTENANCE.
ASCENT/ENTRY NOT AFFECTED SINCE THE SOV IS CLOSED. WITHOUT THE
MMU 3/3 CAN BE ASSIGNED SINCE THE ISOLATION VALVE IS NOMINALLY
CLOSED.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 233

ITEM: N2 SYSTEM SUPPLY ISOL. VLV-LV3&LV4 (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SAIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: ELECTRICAL, VIBRATION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
VALVE IS NOMINALLY LEFT OPEN—NO EFFECT WHEN PCS IS OPERATING ON THE FAILED VALVE/N2 TANKS, CONTINUE UNTIL TANKS ARE EMPTIED THEN SWITCHOVER TO THE OTHER SYSTEM. NITROGEN CAN BE SHARED AND PROVIDED TO MMU FROM EITHER N2 SYSTEM.

REFERENCES:

REPORT DATE 12/02/86 C-134
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 2/1R

ABORT: 2/1R

SUBSYSTEM: ARPCS

MDAC ID: 234

ITEM: N2 SYSTEM SUPPLY ISOL. VLV-LV3&LV4 (2)

FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: MID-FUSELAGE

PART NUMBER: MC250-0002

CAUSES: ELECTRICAL, VIBRATION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
WITH LOSS OF ONE VALVE, ONLY HALF OF THE N2 SYSTEM IS AVAILABLE FOR THE MISSION. POTENTIAL LOSS OF LIFE/VEHICLE DUE TO INABILITY TO MAINTAIN CABIN PRESSURE WITH LOSS OF FUNCTION. MISSION ABORT, RETURN ON CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86 C-135
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 235

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: N2 SYSTEM SUPPLY ISOL. VLV-LV3&LV4 (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, FATIGUE

EFFECTS/RATIONALE:
EVENTUAL LOSS OF THE NITROGEN SYSTEM. POTENTIAL LOSS OF LIFE/VEHICLE DUE TO INABILITY TO MAINTAIN CABIN PRESSURE. MISSION ABORT, RETURN ON CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86 C-136
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 236

ITEM: SINGLE PHASE MOTOR/N2-SYSTEM ISOL. VLV (2)
FAILURE MODE: INABILITY TO OPERATE-VALVE IS OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
5) 
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7) 
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CRITICALITIES

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REMETANCE SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER:

CAUSES: ELECTRICAL/SHORT, MECHANICAL JAM/BREAK

EFFECTS/RATIONALE:
FAILURE OF THE MOTOR WILL CAUSE THE VALVE TO REMAIN IN THE OPEN POSITION. IT IS LIKE MDAC ID 233 (FAILED OPEN). AFFECTED VALVE CANNOT BE OPERATED MANUALLY.

REFERENCES:

REPORT DATE 12/02/86 C-137
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS FLIGHT: 2/1R
MDAC ID: 237 ABORT: 2/1R

ITEM: SINGLE PHASE MOTOR/N2-SYSTEM ISOL. VLV (2)
FAILURE MODE: INABILITY TO OPERATE - VALVE IS CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: MID-FUSELAGE
PART NUMBER:

CAUSES: ELECTRICAL/SHORT, MECHANICAL JAM/BREAK

EFFECTS/RATIONALE:
VALVE IS NOMINALLY OPEN. FAILED CLOSE WOULD PRECLUDE THE SYSTEMS OF N2. SEE NOTES IN MDAC ID 234 (FAILED CLOSED).

REFERENCES:

REPORT DATE 12/02/86 C-138
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 238

HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: POSITION INDICATION, DS6&DS10 (2)
FAILURE MODE: IMPROPER CONTACT, NO CONTACT

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0222-0029

CAUSES: CORROSION, CONTAMINATION BINDING/JAMMING, ELECTRICAL
EFFECTS/RATIONALE:
LOSS OF BARBER POLE INDICATION. TELEMETRY DATA IS AVAILABLE.

REFERENCES:

REPORT DATE 12/02/86 C-139
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 239

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE, DS6&DS10 (4)
FAILURE MODE: FAILED OPEN, SHORTS, OUT OF TOLERANCE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION. NO EFFECT, NON-ESSENTIAL ITEM.

REFERENCES:

REPORT DATE 12/02/86 C-140
### Independent Orbiter Assessment

**Orbiter Subsystem Analysis Worksheet**

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**Item:** Switch, S13&S21/N2-System Isol VLV (2)

**Failure Mode:** Failed Open, Intermediate Position

**Lead Analyst:** R. Duffy / T. McLaughlin

**Subsys Lead:** M. SAIIDI

**Breakdown Hierarchy:**
1. ARPCS
2. AMC
3. N2 Assembly
4. N2/O2 Supply Panel

**Criticalities**

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**Location:** Crew Module

**Part Number:** ME452-0102-7205

**Causes:** Corrosion, Binding/Jamming, Piece Part Failure

**Effects/Rationale:**

Valve is nominally open. This failure would prevent isolating N2 systems from each other.

**References:**

**Report Date:** 12/02/86 C-141
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 241

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/1R
ABORT: 3/3

ITEM: SWITCH, S13&S21/N2-SYSTEM ISOL VLV (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7205

CAUSES: CORROSION, BINDING/JAMMING, PIECE PART FAILURE

EFFECTS/RATIONALE:
DRIVES THE VALVE TO CLOSED POSITION AND WILL REMAIN CLOSED. SAME EFFECTS AS MDAC ID 234.

REFERENCES:

REPORT DATE 12/02/86 C-142
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS

MDAC ID: 242

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CIRCUIT BREAKER CB17 & CB18/N2 SUPPLY ISOL. VLV.

(2)

FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE

PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, PARTS FAILURE, CORROSION

EFFECTS/RATIONALE:
NO EFFECT, EXCEPT FOR LOSS OF OVERLOAD CIRCUIT PROTECTION.

REFERENCES:

REPORT DATE 12/02/86  C-143
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 243
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CIRCUIT BREAKER CB17& CB18/N2 SUPPLY ISOL. VLV.
(2)
FAILURE MODE: FAILED OPEN, FAILS TO CONDUCT

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, PARTS FAILURE, CORROSION

EFFECTS/RATIONALE:
LOSS OF VALVE/SWITCH OPERATION, AND POSITION INDICATION. VALVE WILL REMAIN IN ITS SET POSITION OPEN. INABILITY TO ISOLATE THE NITROGEN TANK SYSTEMS FROM EACH OTHER.

REFERENCES:

REPORT DATE 12/02/86 C-144
**INDEPENDENT ORBITER ASSESSMENT**

**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

**DATE:** 10/29/86  
**SUBSYSTEM:** ARPCS  
**MDAC ID:** 244  

**ITEM:** RESISTOR A10R1&A17R1(5.1K)/N2-SUPPLY ISOL. VLV (2)  
**FAILURE MODE:** FAILED OPEN, SHORT, GROUND  

**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN  
**SBAID:**  

**BREAKDOWN HIERARCHY:**
1) ARPCS  
2) AMC  
3) N2 ASSEMBLY  
4) N2/O2 SUPPLY PANEL  

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**REDUNDANCY SCREENS:** A [ ]  B [ ]  C [ ]  

**LOCATION:** CREW MODULE  
**PART NUMBER:** RLR05C512GR  

**CAUSES:** VIBRATION, SHOCK, THERMAL STRESS  

**EFFECTS/RATIONALE:**
LOSS OF THE VALVE POSITION INDICATION, VALVE POSITION MAY BE VERIFIED BY N2 FLOW/PRESSURE INDICATION IN THE LINE DOWNSTREAM.  

**REFERENCES:**

**REPORT DATE 12/02/86  C-145**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 245

ITEM: REGULATOR INLET VALVE LV1 & LV2/N2 SYSTEM (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAK

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: ELECTRICAL, VIBRATION, SHOCK, PIECE PART FAILURE, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
VALVES ARE NOMINALLY OPEN. LOSS OF CAPABILITY TO ISOLATE ONE N2 LEG.

REFERENCES:

REPORT DATE 12/02/86 C-146
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 246

HIGHEST CRITICALITY
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: REGULATOR INLET VALVE LV1 & LV2/ N2 SYSTEM (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCCLAUGHLIN
SUBSYS LEAD: M. SAIDID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: ELECTRICAL, VIBRATION, SHOCK, PIECE PART FAILURE, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
POTENTIAL LOSS OF LIFE/VEHICLE DUE TO INABILITY OF ARPCS TO MAINTAIN CABIN PRESSURE, WATER TANKS PRESSURE, AND P/L REQUIREMENT. MISSION ABORT, RETURN ON CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86 C-147
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 247

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: REGULATOR INLET VALVE LV1 & LV2/ N2 SYSTEM (2)
FAILURE MODE: EXTERNAL LEAK

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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CRITICALITIES

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LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: ELECTRICAL, VIBRATION, SHOCK, PIECE PART FAILURE, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NITROGEN SYSTEM WILL BE DEPLETED AFFECTING OTHER OPERATIONS IF NO ACTION IS TAKEN. THE NITROGEN SUPPLY VALVES MUST BE CLOSED TO ISOLATE THE LEAK AND PREVENT POSSIBLE OVER PRESSURE IN VALVE COMPARTMENT.

REFERENCES:

REPORT DATE 12/02/86 C-148
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 248

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: SINGLE PHASE MOTOR/N2 REGULATOR INLET VALVE (2)
FAILURE MODE: INABILITY TO OPERATE, VALVE LEFT CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE
PART NUMBER:

CAUSES: ELECTRICAL, SHORT, MECHANICAL, JAM/BREAK

EFFECTS/RATIONALE:
THE VALVE CAN ONLY FAIL CLOSE DURING PRELAUNCH SYSTEM CHECKOUT. FOR OTHER PHASES OF THE MISSION THE VALVE IS NOMINALLY IN THE OPEN POSITION AND THE FAILURE MODE IS NOT APPLICABLE.

REFERENCES:

REPORT DATE 12/02/86 C-149
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 249

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: SINGLE PHASE MOTOR/N2 REGULATOR INLET VALVE (2)
FAILURE MODE: INABILITY TO OPERATE, VALVE LEFT OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MID-FUSELAGE

PART NUMBER:

CAUSES: ELECTRICAL, SHORT, MECHANICAL, JAM/BREAK

EFFECTS/RATIONALE:
LOSS OF MOTOR ACTION WILL KEEP THE VALVE IN ITS ORIGINAL POSITION, OPEN IN THIS CASE. NO EFFECT, EXCEPT FOR INABILITY TO ISOLATE THE LINE.

REFERENCES:

REPORT DATE 12/02/86 C-150
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 250

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: 3/3

ITEM: POSITION INDICATION, DS7 & DS11 (2)
FAILURE MODE: NO CONTACT (CLOSE OR OPEN)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL, N2 SUPPLY REG.
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0222-0029

CAUSES: CORROSION, CONTAMINATION, BINDING, JAMMING, ELECTRICAL

EFFECTS/RATIONALE:
VALVE POSITION INDICATOR DOES NOT OPERATE. SYSTEM FUNCTION IS NOT AFFECTED.

REFERENCES:

REPORT DATE 12/02/86 C-151
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 251

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE, DS7 & DS11 (4)
FAILURE MODE: OPEN, SHORTS, OUT OF TOLERANCE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 SUPPLY PANEL, N2 SUPPLY REG.
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: JANTXVIN 4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION NO EFFECT, NON-ESSENTIAL ITEM.

REFERENCES:

REPORT DATE 12/02/86 C-152
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY
HDW/FUNC

SUBSYSTEM: ARPCS

MDAC ID: 252

FLIGHT: 3/3
ABORT: 3/3

ITEM: SWITCH, S14 & S22/REG. INLET VALVE (2)

FAILURE MODE: NO CONTACT, VALVE OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE

PART NUMBER: ME452-0102-7205

CAUSES: CORROSION, BINDING, JAMMING, PIECE PART FAILURE

EFFECTS/RATIONALE:
SAME AS VALVE FAILED OPEN, MDAC ID 245.

REFERENCES:

REPORT DATE 12/02/86 C-153
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 253

HIGHEST CRITICALITY
HDW/FUNC FLIGHT: 2/1R
ABORT: 2/1R

ITEM: SWITCH, S14 & S22/REG. INLET VALVE (2)
FAILURE MODE: NO CONTACT, VALVE CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7205

CAUSES: CORROSION, BINDING, JAMMING, PIECE PART FAILURE

EFFECTS/RATIONALE:
SAME AS VALVE FAILED CLOSED, MDAC ID 246.

REFERENCES:

REPORT DATE 12/02/86  C-154
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 254

HIGHEST CRITICALITY
HDW/FUNC FLIGHT: 3/3
ABORT: 3/3

ITEM: CIRCUIT BREAKER CB20 & CB21/REG. INLET VALVE (2)
FAILURE MODE: CLOSE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CORROSION, PART FAILURE

EFFECTS/RATIONALE:
SYSTEM IS OPERATIONAL BUT WITHOUT CIRCUIT OVERLOAD PROTECTION.

REFERENCES:

REPORT DATE 12/02/86 C-155
## Independent Orbiter Assessment
### Orbiter Subsystem Analysis Worksheet

**Date:** 10/29/86  
**Highest Criticality HDW/Func:**  
**Subsystem:** ARPCS  
**MDAC ID:** 255  
**Flight:** 3/3  
**Abort:** 3/3

**Item:** Circuit Breaker CB20 & CB21/Reg. Inlet Valve (2)  
**Failure Mode:** Failed Open, Fails to Conduct

**Lead Analyst:** R. Duffy / T. McLaughlin  
**Subsys Lead:** M. Saitdi

### Breakdown Hierarchy:
1) ARPCS  
2) AMC  
3) N2 Assembly  
4) N2/O2 Supply Panel  
5)  
6)  
7)  
8)  
9)  

### Criticalities

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**Redundancy Screens:** A [ ]  
**Location:** Crew Module  
**Part Number:** MC454-0026-2030

**Causes:** Vibration, Shock, Corrosion, Part Failure

**Effects/Rationale:** Valve will not operate. However, valve will be left in its nominally open position. Loss of capability to isolate the line.

**References:**

---

Report Date 12/02/86  
C-156  
C-3
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 256

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, A18R1 & A11R1 (5.1K)/REG. INLET VALVE LATCH (2)
FAILURE MODE: FAILED OPEN, SHORT, GROUND

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: RLRO5C512GR

CAUSES: VIBRATION, SHOCK, THERMAL STRESS

EFFECTS/RATIONALE:
VALVE POSITION INDICATOR DOES NOT OPERATE. SYSTEM FUNCTION IS NOT AFFECTED.

REFERENCES:

REPORT DATE 12/02/86 C-157
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 257

ITEM: NITROGEN REGULATOR VALVE (200 PSIG)
FAILURE MODE: FAILED OPEN, 2ND STAGE REGULATOR, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL - REGULATOR ASSY
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LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CONTAMINATION, CORROSION, PART FAILURE

EFFECTS/RATIONALE:
Prelaunch mission will be delayed with loss of regulation control. Through the other phases of the mission (except L&S), the nitrogen system will be depleted through the pressure relief valve and vent system.

REFERENCES:

REPORT DATE 12/02/86  C-158
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY

SUBSYSTEM: ARPCS
MDAC ID: 258

HDW/FUNC

FLIGHT: 2/1R
ABORT: 2/1R

ITEM: NITROGEN REGULATOR VALVE (200 PSIG)

FAILURE MODE: FAILED CLOSED, FIRST OR SECOND STAGE REG.

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL - REGULATOR ASSY

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LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CONTAMINATION, CORROSION, PART FAILURE

EFFECTS/RATIONALE:
PRELAUNCH MISSION WILL BE DELAYED WITH LOSS OF REGULATION CONTROL. FOR OTHER PHASES OF THE MISSION (EXCEPT L&S) THE NITROGEN SYSTEM IS INOPERABLE THUS PREVENTING CABIN PRESSURE, WATER AND FES SYSTEM OPERATION.

REFERENCES:

REPORT DATE 12/02/86  C-159
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 259

HIGHEST CRITICALITY
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: NITROGEN REGULATOR VALVE (200 PSIG)
FAILURE MODE: EXTERNAL LEAK

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL - REGULATOR ASSY
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LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CONTAMINATION, CORROSION, PART FAILURE

EFFECTS/RATIONALE:
PRELAUNCH MISSION WILL BE DELAYED WITH LOSS OF REGULATION
CONTROL. FOR OTHER PHASES OF THE MISSION (EXCEPT L&S) THE
NITROGEN SYSTEM WILL BE DEPLETED. THUS IMPAIRING AND EVENTUALLY
PREVENTING CABIN PRESSURE, FES, AND WATER SYSTEMS OPERATION.

REFERENCES:

REPORT DATE 12/02/86  C-160
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

**DATE:** 10/29/86  
**HIGHEST CRITICALITY**  
**HDW/FUNC**  
**SUBSYSTEM:** ARPCS  
**FLIGHT:** 3/3  
**ABORT:** 3/3

**ITEM:** NITROGEN REGULATOR VALVE (200 PSIG)  
**FAILURE MODE:** FAILED OPEN, 1ST STAGE REGULATOR

**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN  
**SUBSYS LEAD:** M. SAIIDI

**BREAKDOWN HIERARCHY:**
1) ARPCS  
2) AMC  
3) N2 ASSEMBLY  
4) N2/O2 SUPPLY PANEL - REGULATOR ASSY

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**REDUNDANCY SCREENS:** A [ ]  B [ ]  C [ ]

**LOCATION:** MID-FUSELAGE  
**PART NUMBER:** MC250-0002

**CAUSES:** SHOCK, VIBRATION, CONTAMINATION, CORROSION, PART FAILURE

**EFFECTS/RATIONALE:**
RESPONSE AND CONTROL WILL NOT BE ACCURATE BUT SECOND STAGE WILL PERFORM REGULATOR CONTROL. ASSUMES 2ND STAGE HOLDS 3000 PSIG PRESSURE.

**REFERENCES:**

---

REPORT DATE 12/02/86          C-161
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 261

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: NITROGEN RELIEF VALVE (275 PSIG) (2)
FAILURE MODE: FAILED OPEN, INTERNAL OR EXTERNAL LEAK

LEAD ANALYST: R. DUFFY / T. MC LAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL - REGULATOR ASSY
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LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, PART FAILURE

EFFECTS/RATIONALE:
SAME EFFECTS AS MDAC ID 257 (FAILED OPEN). IN ADDITION, THIS FAILURE IS HARDER TO DETECT SINCE REGULATOR VALVE IS CONTROLLING THE SYSTEM TO 200 PSIG AND THERE ARE NO OTHER INDICATORS.

REFERENCES:

REPORT DATE 12/02/86 C-162
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 262

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: NITROGEN RELIEF VALVE (275 PSIG) (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL - REGULATOR ASSY
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LOCATION: MID-FUSELAGE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, PART FAILURE, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO VENT HIGH PRESSURE NITROGEN LINE WHEN NEEDED. POSSIBLE DAMAGE TO COMPONENTS DOWNSTREAM. LOSS OF ONE REDUNDANT LEG.

REFERENCES:

REPORT DATE 12/02/86 C-163
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 263

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

ITEM: LINES & FITTINGS
FAILURE MODE: EXTERNAL LEAK

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL - REGULATOR ASSY.
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE AND MID-FUSELAGE
PART NUMBER: V070-634465

CAUSES: SHOCK, VIBRATION, CORROSION, PART FAILURE

EFFECTS/RATIONALE:

REFERENCES:

REPORT DATE 12/02/86  C-164
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 264  ABORT: 3/3

ITEM: FILTER/CHECK VALVE, AFTER N2 REGULATOR VALVE (2)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, PIECE FAILURE, CONTAMINATION

EFFECTS/RATIONALE:
NO MAJOR EFFECT, POSSIBLE CONTAMINATION OF ITEMS DOWNSTREAM.

REFERENCES:

REPORT DATE 12/02/86  C-165
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 265

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: FILTER/CHECK VALVE AFTER N2 REGULATOR VALVE (2)
FAILURE MODE: RESTRICTED FLOW, CLOGGED, CHECK VALVE FAILS CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, PIECE FAILURE, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
POTENTIAL LOSS OF LIFE/VEHICLE DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE. MISSION ABORT, RETURN ON CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86 C-166
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 266

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: FILTER/CHECK VALVE AFTER N2 REGULATOR VALVE (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
UNCONTROLLED N2 INTO A CABIN FLOOR COMPARTMENT CAUSING OVER
PRESSURIZATION OF THE COMPARTMENT, POTENTIAL RUPTURE AND LOSS OF
VEHICLE. ALSO DEPLETION OF N2 NEEDED FOR PRESSURE MAINTENANCE.

REFERENCES:

REPORT DATE 12/02/86 C-167
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY: ARPCS
MDAC ID: 267  HDW/FUNC: 3/2R

FLIGHT: 3/2R  ABORT: 3/2R

ITEM: FLOW SENSOR (2)
FAILURE MODE: OUT OF TOLERANCE (INCLUDING FULL/ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) N2/O2 SUPPLY PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK, PIECE PART FAILURE, ELECTRICAL

EFFECTS/RATIONALE:
INABILITY TO READILY DETECT FLOW. LOSS OF FUNCTION PRECLUDES DETERMINATION OF NITROGEN USE STATUS, THUS RISKING OVERCONSUMPTION. THE IMPACT OF THIS FAILURE DURING AN ABORT IS MOOT. LOSS OF ALL REDUNDANT INSTRUMENTATION WILL RESULT IN A GREATER DEGREE OF UNCERTAINTY TO CONTINUE THE MISSION, ABORT DECISION.

REFERENCES:

REPORT DATE 12/02/86  C-168
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 268

HIGHEST CRITICALITY
HDW/FUNC: FLIGHT: 3/3, ABORT: 3/3

ITEM: PRESSURE SENSOR (2)
FAILURE MODE: OUT OF TOLERANCE (FULL/ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME449-0177-6103

CAUSES: SHOCK, VIBRATION, PIECE PART FAILURE, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO DETECT N2 PRESSURE AFTER N2 REGULATOR. NOT MISSION OR SAFETY CRITICAL.

REFERENCES:

REPORT DATE 12/02/86 C-169
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 269

ITEM: SHUTOFF VALVE (2) (PNL M010W)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, PAYLOAD INTERFACE
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LOCATION: CREW MODULE

PART NUMBER:

CAUSES: SHOCK, CORROSION, VIBRATION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
THIS FAILURE RESULTS IN LOSS OF ABILITY TO ISOLATE PAYLOAD FROM N2 SYSTEM OVERPRESSURIZATION. PAYLOAD DEFINES THE USAGE/REQUIREMENTS.

REFERENCES:

REPORT DATE 12/02/86  C-170
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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<th>HIGHEST CRITICALITY</th>
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| ITEM:     | SHUTOFF VALVE (2) |
| FAILURE MODE: | FAILED CLOSE |

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, PAYLOAD INTERFACE
5) 
6) 
7) 
8) 
9) 

CRITICALITIES

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LOCATION: CREW MODULE

PART NUMBER:

CAUSES: SHOCK, CORROSION, VIBRATION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
INABILITY TO DELIVER N2 TO PAYLOAD. MISSION IMPACT IF PAYLOAD REQUIRES N2.

REFERENCES:

REPORT DATE 12/02/86  C-171
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 271

ITEM: SHUTOFF VALVE (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, PAYLOAD INTERFACE
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LOCATION: CREW MODULE

PART NUMBER:

CAUSES: SHOCK, CORROSION, VIBRATION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF N2, UNREGULATED FLOW OF N2 INTO CABIN. THE AFFECTED LEG MUST BE ISOLATED. EVENTUAL DEPLETION OF NITROGEN. POTENTIAL LOSS OF LIFE/VEHICLE DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE. MISSION ABORT, RETURN ON CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86 C-172
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 272

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: ORIFICE 10 LBM/HR (2)
FAILURE MODE: RESTRICTED FLOW (CLOGGED)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, PAYLOAD INTERFACE
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LOCATION: CREW MODULE
PART NUMBER:

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF N2 FLOW TO P/L WHEN REQUIRED, SEE ALSO MDAC ID 270.

REFERENCES:

REPORT DATE 12/02/86 C-173
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 273

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: ORIFICE 10 LBM/HR (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, PAYLOAD INTERFACE
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LOCATION: CREW MODULE

PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
WHEN IN USE (P/L REQUIREMENT), WILL RESULT IN LOSS OF P/L AND OVERPRESSURIZATION OF THE COMPARTMENT, LEADING TO LOSS OF N2 CONSUMABLE, LOSS OF CAPABILTY TO MAINTAIN PRESSURE.

REFERENCES:

REPORT DATE 12/02/86 C-174
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 274

HIGHEST CRITICALITY

FLIGHT: 3/3
ABORT: 3/3

ITEM: CROSSOVER VALVE (1)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
NO EFFECT, NOT MISSION SAFETY CRITICAL. SYSTEM CAN BE CONTROLLED THROUGH OTHER VALVES. REDUCES OPERATIONAL FLEXIBILITY.

REFERENCES:

REPORT DATE 12/02/86 C-175
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 275

ITEM: Crossover Valve (1)
FAILURE MODE: Failed Closed

LEAD ANALYST: R. Duffy / T. Mclaughlin
SAIDI
SUBSYS LEAD: M. Saidi

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 Assembly
4) O2/N2 Control Panel
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: Vibration, Shock, Corrosion, Contamination, Piece Part Failure

EFFECTS/RATIONALE:
Valve nominally closed. Reduces operational flexibility.

REFERENCES:

REPORT DATE 12/02/86 C-176
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 276

ITEM: CROSSOVER VALVE (1)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
FLOW OF UNREGULATED N2 INTO THE CABIN. DEPLETION OF N2. POTENTIAL LOSS OF LIFE/VEHICLE DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE. MISSION ABORT, RETURN ON CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86 C-177
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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ITEM: SHUTOFF VALVE, H2O TANK REGULATOR INLET VALVE (2)
FAILURE MODE: FAILED OPEN (INTERNAL LEAKAGE)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SASI DI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT, VALVE NOMINALLY OPEN. REDUCES OPERATIONAL FLEXIBILITY TO ISOLATE N2 LINE.

REFERENCES:

REPORT DATE 12/02/86  C-178
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/2R

SUBSYSTEM: ARPCS
MDAC ID: 278

ITEM: SHUTOFF VALVE, H20 TANK REGULATOR INLET VALVE (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF SUPPLY AND WASTE WATER TANK PRESSURE. DIFFICULT TO OPERATE FES AND WATER DUMP ON-ORBIT. ON RETURN, USE CABIN VOLUME FOR FES OPERATION.

REFERENCES:

REPORT DATE 12/02/86 C-179
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 279

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: SHUTOFF VALVE, H2O TANK REGULATOR INLET VALVE (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT

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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
FLOW OF UNREGULATED N2 INTO THE CABIN. POTENTIAL LOSS OF LIFE/VEHICLE AFTER N2 IS DEPLETED DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE. RETURN ON REDUNDANT LEG OR CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86 C-180
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 280

HIGHEST CRITICALITY: FLIGHT: 3/1R
HIGHEST CRITICALITY: ABORT: 3/1R

ITEM: REGULATOR, 15.5-17 PSIG (2)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
HIGH PRESSURE N2 WILL CAUSE RELIEF VALVE TO VENT N2 INTO THE CABIN CONTINUOUSLY. IN TURN, THE CABIN WILL VENT EXCESS PRESSURE. POTENTIAL LOSS OF LIFE/VEHICLE AFTER N2 IS DEPLETED DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE. REGULATOR AND RELIEF VALVES CAN BE ISOLATED WITH INLET SOV AND SYSTEM CAN OPERATE ON REDUNDANT LEG OR MANUALLY.

REFERENCES:

REPORT DATE 12/02/86 C-181
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 281

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/2R

ITEM: REGULATOR, 15.5-17 PSIG (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
5) ...
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF SUPPLY AND WASTE WATER TANK PRESSURE. DIFFICULT TO OPERATE FES AND WATER DUMP ON-ORBIT. ON RETURN, USE CABIN VOLUME FOR FES OPERATION.

REFERENCES:

REPORT DATE 12/02/86 C-182
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/1R
MDAC ID: 282  ABORT: 3/1R

ITEM: REGULATOR, 15.5-17 PSIG (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MC LAUGHLIN
SABS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
5) 
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
FLOW OF UNREGULATED N2 INTO THE CABIN. POTENTIAL LOSS OF LIFE/VEHICLE AFTER N2 IS DEPLETED DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE. RETURN ON REDUNDANT LEG OR CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86  C-183
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 283

ITEM: RELIEF VALVE
FAILURE MODE: FAILED OPEN (EXTERNAL LEAKAGE)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF H2O TANK PRESSURIZATION. CABIN WILL VENT EXCESS PRESSURE, POTENTIAL LOSS OF LIFE/VEHICLE AFTER N2 IS DEPLETED DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE. RELIEF VALVE CAN BE ISOLATED WITH INLET SOV AND SYSTEM CAN BE OPERATED ON REDUNDANT LEG OR MANUALLY.

REFERENCES:

REPORT DATE 12/02/86 C-184
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/1R
MDAC ID: 284  ABORT: 3/1R

ITEM: RELIEF VALVE
FAILURE MODE: FAILED CLOSE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
VALVE IS NOMINALLY CLOSED, NO EFFECT. LOSS OF ABILITY TO RELIEVE HIGH PRESSURE IN THE LINE WILL RESULT IN POSSIBLE WATER BLADDER RUPTURE AND BACK FLOW INTO FUEL CELL, ETC., CRITICAL CONDITION.

REFERENCES:

REPORT DATE 12/02/86  C-185
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  
SUBSYSTEM: ARPCS  
MDAC ID: 285  

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 3/3  
ABORT: 3/3  

ITEM: PRESSURE SENSOR (2)  
FAILURE MODE: OUT OF TOLERANCE (FULL/ZERO OUTPUT)  

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  
SAIIDI  
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS  
2) AMC  
3) N2 ASSEMBLY  
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE  
PART NUMBER: ME449-0177-2901  

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION, ELECTRICAL failure, PIECE PART FAILURE  

EFFECTS/RATIONALE:  
INABILITY TO DETECT PRESSURE OF REGULATED N2 IN H2O TANKS  
PRESSURIZATION LINE. NO OTHER EFFECT.

REFERENCES:

REPORT DATE 12/02/86  
C-186
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 286

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: ISOLATION VALVE-REGULATOR OUTLET
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SAME AS MDAC ID 277. NO EFFECT, VALVE IS NOMINALLY OPEN.
REDUCES OPERATIONAL FLEXIBILITY TO ISOLATE N2 LINE.

REFERENCES:

REPORT DATE 12/02/86  C-187
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 287

ITEM: ISOLATION VALVE-REGULATOR OUTLET
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF REDUNDANT LEG TO PRESSURIZE THE H2O TANKS. CABIN PRESSURE AND THE OTHER N2 LEG ARE AVAILABLE.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 288

HIGHEST CRITICALITY
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: ISOLATION VALVE-REGULATOR OUTLET
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION CORROSION CONTAMINATION
EFFECTS/RATIONALE: SAME EFFECT AS MDAC ID 283.

REFERENCES:

REPORT DATE 12/02/86 C-189
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: 1/1

SUBSYSTEM: ARPCS
MDAC ID: 289

ITEM: H2O ALTERNATE PRESSURE VALVE (1)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE, EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
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LIFTOFF: 1/1 TAL: 1/1
ONORBIT: 1/1 AOA: 1/1
DEORBIT: 1/1 ATO: 1/1
LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION, PIECE PART FAILURE

EFFECTS/RATIONALE:
N2 SUPPLY VENTED TO THE CABIN THROUGH THIS VALVE. CABIN WILL VENT EXCESS PRESSURE, POTENTIAL LOSS OF LIFE/VEHICLE AFTER N2 IS DEPLETED DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE.

REFERENCES:

REPORT DATE 12/02/86 C-190
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 290

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: H2O ALTERNATE PRESSURE VALVE (1)
FAILURE MODE: FAILED CLOSED, INTERNAL LEAKAGE, EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO PRESSURIZE THE H2O SUPPLY TANKS FROM CABIN ATMOSPHERE. TOTAL LOSS OF REDUNDANCY WILL RESULT IN LOSS OF WATER FOR FES OPERATION CRITICAL DURING ASCENT ENTRY.

REFERENCES:

REPORT DATE 12/02/86 C-191
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 291

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: SWITCH, S28 (1)
FAILURE MODE: FAILURE TO TRANSFER, INADVERTANTLY CLOSES, FAILS TO OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT

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LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7101

CAUSES: VIBRATION SHOCK CORROSION

EFFECTS/RATIONALE:
LOSS OF SWITCHING FUNCTION TO USE CABIN ATMOSPHERE IN ORDER TO PRESSURIZE THE WATER TANKS. SAME AS MDAC ID 290.

REFERENCES:

REPORT DATE 12/02/86  C-192
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
HIGHEST CRITICALITY: HDW/FUNC
SUBSYSTEM: ARPCS
MDAC ID: 292
FLIGHT: 1/1
ABORT: 1/1

ITEM: SWITCH, S28 (1)
FAILURE MODE: FAILURE TO TRANSFER, PREMATURE OPERATION INADVERTANTLY OPENS

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7101

CAUSES: VIBRATION SHOCK CORROSION

EFFECTS/RATIONALE:
SAME AS MDAC ID 289.

REFERENCES:

REPORT DATE 12/02/86 C-193
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/1R
MDAC ID: 293  ABORT: 3/1R

ITEM: CIRCUIT BREAKER, CB15 (1)
FAILURE MODE: FAILED OPEN (INADVERTENTLY OPENS)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF POWER TO OPEN THE TANK SOLENOID VALVE. SAME AS H2O
ALTERNATE PRESSURE VALVE FAILED CLOSED, MDAC ID 290.

REFERENCES:

REPORT DATE 12/02/86  C-194
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 294  ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB15 (1)
FAILURE MODE: FAILED CLOSED (INADVERTANTLY CLOSED)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIDDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF OVERLOAD CIRCUIT PROTECTION. OTHERWISE, NO EFFECT.

REFERENCES:

REPORT DATE 12/02/86  C-195
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 295  ABORT: 3/3

ITEM: RESISTOR, A3R3,5.1K (1)
FAILURE MODE: SHORTS, OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT

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RTLS: 3/3  TAL: 3/3  AOA: 3/3  ATO: 3/3

REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: RLR05C512GR

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:
NO EFFECT. LOSS OF SWITCH POSITION INDICATION (S28).

REFERENCES:

REPORT DATE 12/02/86  C-196
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:          10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:     ARPCS                      FLIGHT:   3/1R
MDAC ID:       296                        ABORT:   3/1R

ITEM:          FILTER
FAILURE MODE:  RESTRICTED FLOW (CLOGGED)

LEAD ANALYST:  R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD:  M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
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LOCATION:  CREW MODULE
PART NUMBER:

CAUSES:  CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO PRESSURIZE H2O TANKS FROM CABIN
PRESSURIZATION. SAME AS H2O ALTERNATE PRESSURE VALVE FAILED
CLOSED, MDAC ID 290.

REFERENCES:

REPORT DATE 12/02/86   C-197
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 297

ITEM: O2/N2 CONTROL VALVE, LV1&LV2 (2)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF OXYGEN FLOW INTO THE CABIN, RESULTING IN NITROGEN RICH CABIN. OXYGEN FROM LEH #5 FLOWING CONTINUOUSLY, BUT NOT ADEQUATE FOR NOMINAL ACTIVITY. LOSS OF REDUNDANT LEG BY ISOLATING THE LINE.

REFERENCES:

REPORT DATE 12/02/86 C-198
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 298

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: O2/N2 CONTROL VALVE, LV1&LV2 (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
GRADUAL INCREASE IN THE PPO2 IN CABIN RESULTING IN O2 RICH CABIN-FIRE HAZARD. LOSS OF REDUNDANT LEG.

REFERENCES:

REPORT DATE 12/02/86 C-199
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 299

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: O2/N2 CONTROL VALVE, LV1&LV2 (2)
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
FLOW OF UNREGULATED N2 INTO THE COMPARTMENT AREA CAUSING OVERPRESSURIZATION AND POSSIBLE STRUCTURAL DAMAGE. POTENTIAL LOSS OF LIFE/VEHICLE AFTER N2 IS DEPLETED, DUE TO THE INABILITY TO MAINTAIN CABIN PRESSURE.

REFERENCES:

REPORT DATE 12/02/86 C-200
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 300  ABORT: 3/3

ITEM: POSITION INDICATOR/N2/O2 CONTROLLER VALVE
FAILURE MODE: FULL OPEN/FULL CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: CONTAMINATION, CORROSION, ELECTRICAL, PART FAILURE

EFFECTS/RATIONALE:
NO EFFECT. LOSS OF INDICATION CAN BE MADE UP WITH CHECKS ON PRESSURE MEASUREMENTS, FLOWS (O2/N2) AND OTHER INSTRUMENTATION.

REFERENCES:

REPORT DATE 12/02/86  C-201
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 2/1R
MDAC ID: 301  ABORT: 2/1R

ITEM: SWITCH, S16&S19/O2/N2 CONTROLLER VALVE (2)
FAILURE MODE: FAILED CLOSED-VALVE IS CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL-PANEL L2
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LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7206

CAUSES: VIBRATION, CORROSION, CONTAMINATION, ELECTRICAL, PART FAILURE

EFFECTS/RATIONALE:
SEE MDAC ID 298.

REFERENCES:

REPORT DATE 12/02/86  C-202
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 302

HIGHEST CRITICALITY

FLIGHT: 3/1R
ABORT: 3/1R

ITEM: SWITCH, S16&S19/O2/N2 CONTROLLER VALVE (2)
FAILURE MODE: FAILED OPEN-VALVE IS OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL-PANEL L2

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LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7206

CAUSES: VIBRATION, CORROSION CONTAMINATION, PART FAILURE

EFFECTS/RATIONALE:
SEE MDAC ID 297.

REFERENCES:

REPORT DATE 12/02/86 C-203
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 303

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: SWITCH, S16&S19/O2/N2 CONTROLLER VALVE (2)
FAILURE MODE: FAILED AUTO-VALVE OPERATES

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIID
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL-PANEL L2

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7206

CAUSES: VIBRATION, CORROSION CONTAMINATION, PART FAILURE

EFFECTS/RATIONALE:
NO EFFECT, EXCEPT INABILITY TO CLOSE/OPEN VALVE MANUALLY IF REQUIRED.

REFERENCES:

REPORT DATE 12/02/86  C-204
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 304  ABORT: 3/3

ITEM: RESISTOR, 5.1K/O2/N2 VALVE SWITCH (5)
FAILURE MODE: SHORTS, OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL-PANEL L2
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: RLR05C512GR

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:
NO EFFECT. LOSS OF SWITCH POSITION INDICATION (S16, 17, 19).

REFERENCES:

REPORT DATE 12/02/86  C-205
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 305

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: SWITCH S17/PPO2 SENSOR A&B (1)
FAILURE MODE: FAILS ON NORMAL OR REVERSE (CONDUCTS SIGNAL)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL-PANEL L2
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CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
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ONORBIT: 3/3 AOA: 3/3
DEORBIT: 3/3 ATO: 3/3
LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7301

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
NO EFFECT. LOOSE THE FLEXIBILITY TO SWITCH CONTROLLERS.

REFERENCES:

REPORT DATE 12/02/86 C-206
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 306  ABORT: 3/3

ITEM: SWITCH S17/PPO2 SENSOR A&B (1)
FAILURE MODE: FAILS TO CONDUCT (ANY POSITION—NO SIGNAL)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL—PANEL L2
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7301

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOOSE THE ABILITY TO OPERATE O2/N2 CONTROL VALVE IN AUTO MODE.
NO SIGNAL FROM PPO2 — MANUAL OPERATION AND CREW INCONVENIENCE.

REFERENCES:

REPORT DATE 12/02/86  C-207
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 307

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/2R
ABORT: 3/2R

ITEM: O2/N2 CONTROLLER (2)
FAILURE MODE: OUT OF TOLERANCE HIGH (SENSES HIGH PP02).

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PART PIECE FAILURE

EFFECTS/RATIONALE:
LOSS OF CONTROLLER SIGNAL OR CONTINUOUS HIGH SIGNAL WILL KEEP THE O2/N2 CONTROL VALVE OPEN (FLOWING N2). OPERATION CAN BE SWITCHED TO THE REDUNDANT CONTROLLER. ULTIMATELY MANUAL OPERATION CAN BE MAINTAINED WITH PP02 SENSOR C. LOSS OF ALL REDUNDANCIES WILL ABORT THE MISSION WITH CREW IN LEH AND PCS CONFIGURED TO FLOW N2 TO MAINTAIN PRESSURE.

REFERENCES:

REPORT DATE 12/02/86 C-208
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 308

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: O2/N2 CONTROLLER (2)
FAILURE MODE: OUT OF TOLERANCE LOW (SENSES LOW PP02)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PART PIECE FAILURE

EFFECTS/RATIONALE:
CONTROLLER OUT OF TOLERANCE HIGH WILL EVENTUALLY CREATE IN O2 RICH ENVIRONMENT THEREFORE CREATING A FIRE HAZARD.

REFERENCES:

REPORT DATE 12/02/86 C-209
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 309

HIGHEST CRITICALITY

HDW/FUNC

ARPCS FLIGHT: 3/2R
ABORT: 3/2R

ITEM: O2/N2 CONTROLLER (2)
FAILURE MODE: INABILITY TO OPERATE (NO SIGNAL)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN

SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL

CRITICALITIES

FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: 3/2R RTLS: 3/2R
LIFTOFF: 3/2R TAL: 3/2R
ONORBIT: 3/2R AOA: 3/2R
DEORBIT: 3/2R ATO: 3/2R
LANDING/SAFING: 3/3


LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION, PIECE PART
FAILURE

EFFECTS/RATIONALE:
LOSS OF CONTROLLER SIGNAL WILL PREVENT 28V POWER TO SOLENOID, 
HENCE VALVE WILL BE IN CLOSED POSITION. LOSS OF REDUNDANT LEG-
ABORT DECISION.

REFERENCES:

REPORT DATE 12/02/86 C-210
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 310

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: PPO2 SENSORS A+B (2)
FAILURE MODE: FAILS TO SENSE (ZERO OUTPUT SIGNAL)

LEAD ANALYST: R. DUFFY / T. MCCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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LOCATION: CREW MODULE

PART NUMBER: MC250-0002-0060

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
ZERO OUTPUT SIGNAL WILL CAUSE THE CONTROLLER TO CLOSE THE O2/N2 CONTROL VALVE, THUS EVENTUALLY CREATING AN O2 RICH CABIN AND A FIRED HAZARD.

REFERENCES:

REPORT DATE 12/02/86 C-211
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 311

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/2R

ITEM: PPO2 SENSORS A+B (2)
FAILURE MODE: FULL OUTPUT SIGNAL

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002-0060

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
5V OUTPUT SIGNAL WILL CAUSE THE CONTROLLER TO OPEN THE O2/N2 CONTROL VALVE AND FLOW REGULATED N2 TO THE CABIN. LEH'S IS CONTINUOUSLY FLOWING O2, THUS MAINTAINING CREW METABOLIC REQUIREMENTS. LOSS OF REDUNDANT LEG-ABORT DECISION.

REFERENCES:

REPORT DATE 12/02/86  C-212
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 312

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 2/2

ITEM: PPO2 SENSOR-C (1)
FAILURE MODE: OUT OF TOLERANCE (FULL/ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002-0060

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:
BASED ON ITS USEAGE FOR VOTING PURPOSES ON THE OTHER TWO SENSORS, THE LOSS OF THIS SENSOR ASSUMES MALFUNCTION WITH SENSORS A&B. THEREFORE, LOSS OF ABILITY TO DETECT PPO2 LEVEL IN THE CABIN. PPO2 MEASUREMENT IS CRITICAL FOR DETECTING HIGH (FIRE HAZARD), OR LOW (CREW CURVIVAL) OXYGEN LEVEL IN THE CABIN, AND ALSO FOR OPERATION OF THE P2/N2 VALVE IN "AUTO" MODE (CREW CONVENIENCE).

REFERENCES:

REPORT DATE 12/02/86 C-213
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 313

ITEM: SWITCH, PPO2 CONTROLLER (2)
FAILURE MODE: FAILED IN "NORMAL" POSITION

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO SWITCH TO EMERGENCY PPO2 LEVEL. HOWEVER, IN EMERGENCY CONDITIONS (E.G., CABIN LEAK). THE ARPCS WILL BE CONFIGURED TO FLOW N2 ONLY REGARDLESS OF PPO2 LEVEL.

REFERENCES:

REPORT DATE 12/02/86 C-214
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86    HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS    FLIGHT: 3/3
MDAC ID: 314    ABORT: 3/3

ITEM: SWITCH, PPO2 CONTROLLER (2)
FAILURE MODE: FAILED IN "EMERGENCY" POSITION, OR NORMAL
POSITION W/NO CONTACT

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN    SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REduNDANCY SCREENS: A [ ]    B [ ]    C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO AUTOMATICALLY REGULATE PPO2 TO NORMAL (3.2 PSIA) LEVEL. HOWEVER APRCS CAN BE MAINTAINED MANUALLY. CREW INCONVENIENCE.

REFERENCES:

REPORT DATE 12/02/86    C-215
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 315

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTORS/10K (2)
FAILURE MODE: FAILED OPEN, SHORT

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE

PART NUMBER:

CAUSES: ELECTRICAL, THERMAL STRESS, CONTAMINATION, CORROSION, ANY CONTACT

EFFECTS/RATIONALE:
LOSS OF PPO2 CONTROLLER SWITCH INDICATION.

REFERENCES:

REPORT DATE 12/02/86 C-216
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 316

ITEM: CIRCUIT BREAKER, CB18&CB19 (2)
FAILURE MODE: FAILED CLOSED (CONDUCTING)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF OVERLOAD CIRCUIT PROTECTION, OTHERWISE NO EFFECT.

REFERENCES:

REPORT DATE 12/02/86 C-217
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 317

HIGHEST CRITICALITY
HDW/FUNC: FLIGHT: 2/1R
ABORT: 2/1R

ITEM: CIRCUIT BREAKER, CB18&CB19 (2)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF POWER TO PPO2 CONTROLLER SWITCH, PPO2 SENSOR, O2/N2 CONTROLLER, O2 FLOW SENSOR, AND N2 FLOW SENSOR ON THE AFFECTED LEG. LOSS OF REDUNDANCY WILL INHIBIT OPERATION OF O2/N2 CONTROL VALVES. POTENTIAL LOSS OF LIFE/VEHICLE DUE TO INABILITY TO MAINTAIN CABIN PRESSURE. MISSION ABORT, RETURN ON CABIN VOLUME.

REFERENCES:

REPORT DATE 12/02/86 C-218
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 318

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: SWITCH, S6/PPO2 SELECTOR (1)
FAILURE MODE: FAILED IN ONE POSITION

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7101

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
NO EFFECT - LOSS OF METER-READING OF PPO2 SENSORS. PASS/BFS DISPLAYS ARE AVAILABLE WITH PPO2 MEASUREMENTS.

REFERENCES:

REPORT DATE 12/02/86 C-219
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 319

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: METER, M4/PPO2 READING (1)
FAILURE MODE: ANY FAILURE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0238

CAUSES: SHOCK, VIBRATION

EFFECTS/RATIONALE:
LOSS OF METER READING OF PPO2 LEVEL-DATA AVAILABLE FROM PASS/BFS DISPLAYS.

REFERENCES:

REPORT DATE 12/02/86 C-220
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 320

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: SWITCH, S5/O2/N2 FLOW SELECTOR (1)
FAILURE MODE: FAILED IN ANY POSITION, OR FAILURE TO TRANSFER

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0093-5025

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF METER READING OF REDUNDANT O2/N2 FLOW—DATA AVAILABLE FROM PASS/BFS DISPLAYS.

REFERENCES:

REPORT DATE 12/02/86 C-221
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 321

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: METER, M3/O2/N2 FLOW READING (1)
FAILURE MODE: ANY FAILURE (OUT OF TOLERANCE)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0238

CAUSES: VIBRATION, SHOCK

EFFECTS/RATIONALE: LOSS OF METER READING OF ANY O2/N2 FLOW SENSORS—DATA AVAILABLE FROM PASS/BFS DISPLAYS.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY:  
SUBSYSTEM: ARPCS  FLIGHT: 3/2R  
MDAC ID: 322  ABORT: 3/3  

ITEM: CABIN PRESSURE SENSOR (1)  
FAILURE MODE: OUT OF TOLERANCE (FULL/ZERO OUTPUT)  

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS  
2) AMC  
3) N2 ASSEMBLY  
4) O2/N2 CNTRL PANEL  
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK CONTamination, CORROSION, PIECE PART FAILURE

EFFECTS/RATIONALE:
WITHOUT CABIN PRESSURE INDICATION, PRESSURE LEVELS CANNOT BE SET OR VERIFIED. ALTERNATE MEANS OF PRESSURE INDICATION CAN BE MADE THROUGH THE AIRLOCK METER, AND OTHERS SUCH AS THE PPO2 SENSOR AND DP/DT SENSOR. MOST CRITICAL FOR EVA MISSIONS AND 10.2 PSIA MANUAL OPERATION.

REFERENCES:

REPORT DATE 12/02/86  C-223
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 323

ITEM: METER, M4/CABIN PRESSURE READING (1)
FAILURE MODE: ANY FAILURE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAISID

SUBSYS LEAD: M. SAIID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0238

CAUSES: VIBRATION, SHOCK

EFFECTS/RATIONALE:
LOSS OF METER READING OF CABIN PRESSURE. DATA AVAILABLE THROUGH THE COMPUTERS.

REFERENCES:

REPORT DATE 12/02/86 C-224
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 324

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: CABIN DP/DT SENSOR (1)
FAILURE MODE: FAILS TO SENSE, OUT OF TOLERANCE (FULL/ZERO OUTPUT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL

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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
CABIN RATE OF CHANGE OF PRESSURE MAY BE ALSO DETECTED BY CABIN P,
AIRLOCK TO PAYLOAD DP GAGE, AND C&W KLAXON IF DP/DT > .05. CREW
INCONVENIENCE TO MONITOR CHANGE OF PRESSURE OVER LONG PERIOD.

REFERENCES:

REPORT DATE 12/02/86 C-225
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

SUBSYSTEM: ARPCS
MDAC ID: 325

ITEM: METER, M3/DP/DT READING (1)
FAILURE MODE: ANY FAILURE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0238

CAUSES: SHOCK, VIBRATION, LEAKAGE
EFFECTS/RATIONALE:
DP/DT MEASUREMENT IS AVAILABLE ON PASS AND BFS DISPLAYS - NO EFFECT.

REFERENCES:

REPORT DATE 12/02/86 C-226
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS FLIGHT: 3/3
MDAC ID: 326 ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB16/DP/DT (1)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI
SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF CIRCUIT OVERLOAD PROTECTION - NO EFFECT.

REFERENCES:

REPORT DATE 12/02/86 C-227
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 2/2
MDAC ID: 327  ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB16/DP/DT (1)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF POWER TO DP/DT SENSOR, PPO2-C SENSOR, AND C&W KLAXON. THE DP/DT AND PPO2-C ARE CONSIDERED CRITICAL FOR MISSION COMPLETION.

REFERENCES:

REPORT DATE 12/02/86  C-228
**INDEPENDENT ORBITER ASSESSMENT**

**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

**DATE:** 10/29/86

**SUBSYSTEM:** ARPCS

**MDAC ID:** 328

**HIGHEST CRITICALITY**

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**ITEM:** KLAXON/DP/DT (1)

**FAILURE MODE:** ANY CREDIBLE FAILURE

**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN

**SIIIDI**

**SUBSYS LEAD:** M. SIIIDI

**BREAKDOWN HIERARCHY:**

1. ARPCS
2. AMC
3. N2 ASSEMBLY
4. O2/N2 CNTRL PANEL
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**REDUNDANCY SCREENS:** A [ ] B [ ] C [ ]

**LOCATION:** CREW MODULE

**PART NUMBER:**

**CAUSES:** ELECTRICAL, PIECE PART FAILURE

**EFFECTS/RATIONALE:**

LOSS OF AUDIBLE C&W SOUND ALERTING CREW TO HIGH DP/DT. NOT ESSENTIAL, SINCE ON-BOARD METER, AND PASS/BFS DISPLAYS WILL PROVIDE FOR MONITORING OF DP/DT.

**REFERENCES:**

**REPORT DATE 12/02/86** C-229
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 329

ITEM: LINES & FITTINGS
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SATTID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) N2 ASSEMBLY
4) O2/N2 CNTRL PANEL
5)
6)
7)
8)
9)

CRITICALITIES

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LOCATION: CREW MODULE
PART NUMBER: V070-613130

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF O2 AND N2 FROM THE AFFECTED LEG. OVERPRESSURIZATION OF THE COMPARTMENT AREA FROM UNREGULATED O2 OR N2. LOSS OF ONE REDUNDANT LEG.

REFERENCES:

REPORT DATE 12/02/86 C-230
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 330

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/2R

ITEM: ISOLATION VALVE/MOTOR DRIVEN (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SATIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: 3/2R RTLS: 3/2R
LIFTOFF: 3/2R TAL: 3/2R
ONORB: 3/2R AOA: 3/2R
DEORBIT: 3/2R ATO: 3/2R
LANDING/SAFING: 3/2R


LOCATION: CREW MODULE
PART NUMBER: MC250-0002-0050

CAUSES: VIBRATION, SHOCK, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO ISOLATE CREW CABIN FROM THE VENT LINE. NO EFFECT SINCE IT IS NOMINALLY OPEN, HOWEVER, IT IS ONE-STEP FROM LOSS OF LIFE/VEHICLE (I.E.-RELIEF VALVE FAILED OPEN).

REFERENCES:

REPORT DATE 12/02/86 C-231
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 331

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: ISOLATION VALVE/MOTOR DRIVEN (2)
FAILURE MODE: FAILED CLOSED, EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. McMCLAUGHLIN
SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002-0050

CAUSES: VIBRATION, SHOCK, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO VENT HIGH PRESSURE CABIN IF NEEDED. LOSS OF REDUNDANCY MAY RESULT IN CREATING POTENTIAL CONDITION FOR STRUCTURAL FAILURE-POSSIBLE LOSS OF LIFE/VEHICLE. DURING ON-ORBIT, THE CABIN CAN BE VENTED THROUGH AIRLOCK EQUALIZATION VALVE.

REFERENCES:

REPORT DATE 12/02/86 C-232
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/2R
MDAC ID: 332  ABORT: 3/2R

ITEM: MOTOR/ISOLATION VALVE (2)
FAILURE MODE: LOSS OF OUTPUT, (VALVE IN OPEN POSITION)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIID

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LOCATION: CREW MODULE
PART NUMBER: 

CAUSES:

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO ISOLATE THE CREW CABIN FROM THE VENT LINE. NOMINALLY VALVE IS OPEN, AND WILL REMAIN OPEN WITHOUT POWER, SEE MDAC ID 330.

REFERENCES:

REPORT DATE 12/02/86  C-233
**INDEPENDENT ORBITER ASSESSMENT**

**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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**ITEM:**          MOTOR/ISOLATION VALVE (2)

**FAILURE MODE:** LOSS OF OUTPUT (VALVE IN CLOSED POSITION)

**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN  
**SUBSYS LEAD:** M. SAIIDI

**BREAKDOWN HIERARCHY:**
1) ARPCS  
2) AMC  
3) POSITIVE RELIEF VENT  
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**LOCATION:**  CREW MODULE

**PART NUMBER:**

**CAUSES:**

**EFFECTS/RATIONALE:**
VALVE IS CHECKED OUT PRELAUNCH, AND REMAINS OPEN THROUGHOUT MISSION. THERE IS NO MANUAL OVERRIDE.

**REFERENCES:**

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**REPORT DATE 12/02/86  C-234**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

**DATE:** 10/29/86  
**SUBSYSTEM:** ARPCS  
**MDAC ID:** 334  
**HIGHEST CRITICALITY**  
**FLIGHT:** 3/3  
**ABORT:** 3/3

**ITEM:** POSITION INDICATION, DS1, DS2 (2)  
**FAILURE MODE:** ANY CREDIBLE FAILURE, (SHORT, OPEN, CONTINUOUSLY OPEN OR CLOSED)

**LEAD ANALYST:** R. DUFFY / T. MCLAUGHLIN  
**SUBSYS LEAD:** M. SAIIDI

**BREAKDOWN HIERARCHY:**
1) ARPCS  
2) AMC  
3) POSITIVE RELIEF VENT  
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**REDUNDANCY SCREENS:**  
A [ ] B [ ] C [ ]

**LOCATION:** CREW MODULE  
**PART NUMBER:** MC432-0222-0029

**CAUSES:** ELECTRICAL, PIECE PART FAILURE, SHOCK, VIBRATION

**EFFECTS/RATIONALE:**  
LOSS OF VALVE POSITION INDICATION, NO OTHER EFFECT.

**REFERENCES:**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 335

HIGHEST CRITICALITY:
FLIGHT: 3/2R
ABORT: 3/2R

ITEM: SWITCH, S1&S2/POSITIVE RELIEF VALVE (2)
FAILURE MODE: FAILED ENABLED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7205

CAUSES: VIBRATION, SHOCK, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF SWITCHING ACTION TO CLOSED POSITION; HOWEVER VALVE IS TO REMAIN IN "OPEN" POSITION THROUGHOUT MISSION. ONE FAILURE AWAY FROM LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86 C-236
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS       FLIGHT: 3/3
MDAC ID: 336           ABORT: /NA

ITEM: SWITCH, S1&S2/POSITIVE RELIEF VALVE (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN    SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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9) ...

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7205

CAUSES: VIBRATION, SHOCK, BINDING/JAMMING

EFFECTS/RATIONALE:
APPLICABLE ONLY DURING PRELAUNCH CHECKOUT—NO CREW ACTION IS
ASSIGNED TO SWITCH TO CLOSED POSITION DURING MISSION; I.E.,
SWITCH SHOULD BE IN "ENABLE" POSITION.

REFERENCES:

REPORT DATE 12/02/86  C-237
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 337

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: SWITCH, S1&S2/POSITIVE RELIEF VALVE (2)
FAILURE MODE: PREMASTRELY CLOSES (INADVERTENTLY CLOSES)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LOCATION: CREW MODULE
PART NUMBER: ME452-0102-7205

CAUSES: VIBRATION, SHOCK, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO VENT CABIN, SAME AS MDAC ID 331.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/2R
MDAC ID: 338  ABORT: 3/2R

ITEM: CIRCUIT BREAKER, CB17&CB22 (2)
FAILURE MODE: FAILED OPEN, DOES NOT CONDUCT, PREMATURELY OPENS

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF POWER TO POSITIVE RELIEF VALVE SWITCH, POSITION INDICATION, AND MOTOR. VALVE WILL GO/REMAIN IN OPEN POSITION. ONE STEP AWAY FROM LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86  C-239
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 339

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB17&CB22 (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO SIGNIFICANT EFFECT, EXCEPT LOSS OF CIRCUIT OVERLOAD PROTECTION.

REFERENCES:

REPORT DATE 12/02/86 C-240
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 340

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, A1R1 & A2R1, 5.1K (2)
FAILURE MODE: ANY FAILURE (OPEN, SHORT, ANY CONTACT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE: LOSS OF VALVE POSITION INDICATION, NON-ESSENTIAL.

REFERENCES:

REPORT DATE 12/02/86 C-241
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 341

ITEM: DIODE, DS1 & DS2 (4)
FAILURE MODE: FAILED OPEN, SHORTS, OUT OF TOLERANCE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
4)
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION. NO EFFECT, NON-ESSENTIAL ITEM.

REFERENCES:

REPORT DATE 12/02/86  C-242
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 2/1R
MDAC ID: 342  ABORT: 2/1R

ITEM: RELIEF VALVE, 16 PSIA
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002-0050

CAUSES: SHOCK, VIBRATION, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF CABIN PRESSURE RESULTING IN POSSIBLE LOSS OF CREW/VEHICLE. THE CREW WILL CLOSE THE ISOLATION VALVE TO INHIBIT THE FLOW OUT OF THE CABIN AND SUBSEQUENT POSITIVE RELIEF VENT OPERATION IS LOST.

REFERENCES:

REPORT DATE 12/02/86  C-243
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 343

HIGHEST CRITICALITY: HDW/FUNC FLIGHT: 2/1R
ABORT: 2/1R

ITEM: RELIEF VALVE, 16 PSIA
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002-0050

CAUSES: SHOCK, VIBRATION, CONTAMINATION CORROSION

EFFECTS/RATIONALE:
LOSS OF VENTING FUNCTION WHEN NEEDED. POSSIBLE LOSS OF LIFE/VEHICLE DUE TO OVERPRESSURIZATION.

REFERENCES:

REPORT DATE 12/02/86 C-244
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC FLIGHT: 2/1R
SUBSYSTEM: ARPCS  ABORT: 2/1R
MDAC ID: 344

ITEM: FILTER (2)  FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LOCATION: CREW MODULE

PART NUMBER:

CAUSES: CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SEE MDAC ID 343, RELIEF VALVE FAILED CLOSED.

REFERENCES:

REPORT DATE 12/02/86 C-245
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS FLIGHT: 3/3
MDAC ID: 345 ABORT: 3/3

ITEM: FILTER (2)
FAILURE MODE: OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) POSITIVE RELIEF VENT
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LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
NO EFFECT.

REFERENCES:

REPORT DATE 12/02/86 C-246
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 346  ABORT: /NA

ITEM: FILTER (1)
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: R. DUFFY / T. MCCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE

PART NUMBER:

CAUSES: CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
THE CLOGGED FILTER WILL PREVENT ADEQUATE CABIN PRESSURE CHECKOUT DURING PRE-LAUNCH OPERATION. SYSTEM IS INOPERATIVE DURING REST OF MISSION (NOT USED), THEREFORE FAILURE IS N/A.

REFERENCES:

REPORT DATE 12/02/86  C-247
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 347

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: FILTER (1)
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
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3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: SHOCK, VIBRATION

EFFECTS/RATIONALE:
NO EFFECT.

REFERENCES:

REPORT DATE 12/02/86 C-248
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
HIGHEST CRITICALITY
SUBSYSTEM: ARPCS
MDAC ID: 348
HDW/FUNC

ABORT:
2/1R

ITEM:
VENT VALVE, MOTORIZED (2)
FAILURE MODE:
FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002-0090

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF CABIN PRESSURE IN A SHORT PERIOD IF BOTH VALVES FAILED
OPEN. NO CABIN COOLING, CREW DEPRIVED OF O2, NO PRESSURIZATION-
LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86 C-249
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 349

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: VENT VALVE, MOTORIZED (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC250-0002-0090

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ADEQUATE PRELAUNCH PROCEDURE TO VERIFY CABIN PRESSURE CHECKOUT - OTHERWISE, THE VALVES ARE INOPERATIVE DURING MISSION.

REFERENCES:

REPORT DATE 12/02/86 C-250
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86

SUBSYSTEM: ARPCS
MDAC ID: 350

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: SINGLE PHASE MOTOR (2)
FAILURE MODE: LOSS OF OUTPUT

LEAD ANALYST: R. DUFFY / T. MCCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:
LOSS OF ADEQUATE PRELAUNCH PROCEDURE TO VERIFY CABIN PRESSURE CHECKOUT - LAUNCH DELAY..

REFERENCES:

REPORT DATE 12/02/86 C-251
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 351

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: SWITCH, S3 & S4
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO ISOLATE THE CREW CABIN FROM VENT LINE DURING PRE-LAUNCH CABIN PRESSURE CHECKOUT. SWITCH IS INOPERATIVE THROUGHOUT THE MISSION.

REFERENCES:

REPORT DATE 12/02/86 C-252
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 352  ABORT: /NA

ITEM: SWITCH, S3 & S4
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
UNABLE TO PERFORM CABIN PRESSURE CHECKOUT DURING PRELAUNCH - LAUNCH DELAY.

REFERENCES:

REPORT DATE 12/02/86  C-253
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 353  ABORT: /NA

ITEM: SWITCH, S3 & S4  FAILURE MODE: FAILED IN THE CENTER POSITION

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE: SAME AS FAILED CLOSED.

REFERENCES:

REPORT DATE 12/02/86  C-254
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 354  ABORT: /NA

ITEM: SWITCH, S3 & S4
FAILURE MODE: DOES NOT CONDUCT

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
SAME AS FAILED CLOSED, MDAC ID 352.

REFERENCES:

REPORT DATE 12/02/86  C-255
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 355
HIGHEST CRITICALITY HDW/FUNC: FLIGHT: 3/3
ABORT: /NA

ITEM: POSITION INDICATION, DS3, DS4 (2)
FAILURE MODE: ANY FAILURE (FULL OPEN, FULL CLOSE, NO CONTACT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: MC432-0222-0029

CAUSES: SHOCK, CORROSION, VIBRATION, CONTAMINATION, PIECE PART FAILURE

EFFECTS/RATIONALE:
NO EFFECT, VALVES ARE CHECKED OUT PRE-LAUNCH.

REFERENCES:

REPORT DATE 12/02/86 C-256
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 356

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, A3R1, A4R1, 5.1K (2)
FAILURE MODE: ANY FAILURE (OPEN, SHORT)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: 

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT, LOSS OF VALVE POSITION INDICATION.

REFERENCES:

REPORT DATE 12/02/86 C-257
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 357

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE, DS3 & DS4 (4)
FAILURE MODE: OPEN SHORTS OUT OF TOLERANCE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF VALVE POSITION INDICATION. NO EFFECT, NON-ESSENTIAL ITEM.

REFERENCES:

REPORT DATE 12/02/86 C-258
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 358

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB22 & CB34 (2)
FAILURE MODE: FAILED CLOSED

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIDI

BREAKDOWN HIERARCHY:
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2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:
CAUSES: CORROSION, SHOCK, VIBRATION

EFFECTS/RATIONALE:
LOSS OF POSSIBLE CIRCUIT OVERLOAD PROTECTION. ALSO LOSS OF DISABLING CABIN VENT THROUGHOUT THE MISSION. HIGHER RISK OF INADVERTANT OPERATION OF THE SWITCHES.

REFERENCES:

REPORT DATE 12/02/86 C-259
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 359

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB22 & CB34 (2)
FAILURE MODE: OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) CABIN VENT
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: CREW MODULE
PART NUMBER:

CAUSES: CORROSION, SHOCK, VIBRATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PERFORM THE CABIN PRESSURE CHECKOUT DURING PRELAUNCH. OTHERWISE THE CB'S ARE INTENTIONALLY PULLED THROUGH THE MISSION.

REFERENCES:

REPORT DATE 12/02/86 C-260
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 360

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: RELIEF VALVE (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) NEGATIVE RELIEF VENT
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LOCATION: CREW MODULE, BELOW HATCH
PART NUMBER: MC250-0002-0075

CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
WHEN IN USE (CABIN PRESSURE LOWER THAN AMBIENT PRESSURE) IT WILL ALLOW FLOW TO THE CABIN BY POPPING THE CAP SEALS. ONCE THE LINE IS OPEN, AND THE AMBIENT PRESSURE DECAYS TO VACUUM, IT WILL DEPRESSURIZE THE CABIN COMPLETELY RESULTING IN NO CABIN PRESSURE, COOLING, AND POSSIBLE LOSS OF LIFE/VEHICLE.

REFERENCES:

REPORT DATE 12/02/86  C-261
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 361

ITEM: RELIEF VALVE (2)
FAILURE MODE: FAILED CLOSED, EXTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) NEGATIVE RELIEF VENT
4) ...

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LOCATION: CREW MODULE, BELOW HATCH
PART NUMBER: MC250-0002-0075

CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO SAFEGUARD CREW CABIN STRUCTURAL INTEGRITY AGAINST HIGH NEGATIVE DP. NO EFFECT DURING ON-ORBIT, SINCE HIGH CABIN PRESSURE WILL ALSO SEAL THE LINE (CAP) CLOSED.

REFERENCES:

REPORT DATE 12/02/86 C-262
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 362

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: CAP (2)
FAILURE MODE: INABILITY TO POP

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) NEGATIVE RELIEF VENT
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LOCATION: CREW MODULE, BELOW HATCH
PART NUMBER: MC250-0002-0075

CAUSES: CORROSION, CONTAMINATION, BINDING/JAMMING

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO ENSURE STRUCTURAL INTEGRITY WITH HIGH NEGATIVE DP DURING ASCENT/ENTRY. SAME AS VALVE FAILED CLOSED MDAC ID 361.

REFERENCES:

REPORT DATE 12/02/86 C-263
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS  FLIGHT: 3/3
MDAC ID: 363  ABORT: 3/3

ITEM: CAP (2)
FAILURE MODE: INABILITY TO MATE, INTERNAL LEAKAGE

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) NEGATIVE RELIEF VENT
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REDUNDANCY SCREENS: A [   ]  B [   ]  C [   ]

LOCATION: CREW MODULE, BELOW HATCH
PART NUMBER: MC250-0002-0075

CAUSES: CORROSION, CONTAMINATION, BINDING/JAMMING

EFFECTS/RATIONALE:
THE NEGATIVE RELIEF VALVE IS ADEQUATE TO PREVENT FLOW AT POSITIVE
DP CONDITIONS—CAPS ARE REDUNDANT SEALS, AND NOT ESSENTIAL.

REFERENCES:

REPORT DATE 12/02/86  C-264
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: ARPCS
MDAC ID: 364

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: DEBRIS SCREEN (2)
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN
SAIIDI

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) NEGATIVE RELIEF VENT
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LOCATION: LEFT PLENUM, BELOW HATCH
PART NUMBER:

CAUSES: CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF CAPABILITY TO SAFE-GUARD AGAINST HIGH NEGATIVE DP DURING ASCENT/ENTRY.

REFERENCES:

REPORT DATE 12/02/86 C-265
INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86  
SUBSYSTEM: ARPCS  
MDAC ID: 365

ITEM: DEBRIS SCREEN (2)  
FAILURE MODE: FAILED OPEN

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  
SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:  
1) ARPCS  
2) AMC  
3) NEGATIVE RELIEF VENT  
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<td>LANDING/SAFING:</td>
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: LEFT PLENUM, BELOW HATCH

PART NUMBER: 

CAUSES: SHOCK, VIBRATION

EFFECTS/RATIONALE: 
NO EFFECT - IT IS PRIMARILY USED TO KEEP CONTAMINANTS OUT.

REFERENCES: 

REPORT DATE 12/02/86  C-266
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARPCS FLIGHT: 3/2R
MDAC ID: 366 ABORT: 3/3

ITEM: CHECK VALVE (2)
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE (WITH S/L)

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN SUBSYS LEAD: M. SAIIDI

BREAKDOWN HIERARCHY:
1) ARPCS
2) AMC
3) O2 ASSY
4) O2/N2 CONTROL PANEL
5)
6)
7)
8)
9)

CRITICALITIES

<table>
<thead>
<tr>
<th>FLIGHT PHASE</th>
<th>HDW/FUNC</th>
<th>ABORT</th>
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<td>TAL: 3/3</td>
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LOCATION: CREW MODULE
PART NUMBER: MC250-0002

CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE, CONTAMINATION

EFFECTS/RATIONALE:
SEE MDAC ID 193 (FAILED OPEN, INTERNAL LEAKAGE, WITHOUT S/L).

REFERENCES:

REPORT DATE 12/02/86 C-267
## APPENDIX D
### POTENTIAL CRITICAL ITEMS

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<thead>
<tr>
<th>MDAC-ID</th>
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<td>LOSS OF OUTPUT (VALVE IN CLOSED POSITION)</td>
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<td>CROSSOVER VALVE-LV3 AND LV4 (2)</td>
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<td>QUICK DISCONNECTS (8)</td>
<td>INABILITY TO MATE</td>
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## APPENDIX D
### POTENTIAL CRITICAL ITEMS

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<thead>
<tr>
<th>MDAC-ID</th>
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### APPENDIX D
### POTENTIAL CRITICAL ITEMS

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