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HOUSTON DIVISION

SPACE TRANSPORTATION SYSTEM ENGINEERING AND OPERATIONS SUPPORT

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INDEPENDENT ORBITER ASSESSMENT ANALYSIS OF THE ATMOSPHERIC  
REVITALIZATION PRESSURE CONTROL SUBSYSTEM

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PREPARED BY: M.J. Salidi  
M.J. Salidi  
ARPCS Lead  
Independent Orbiter  
Assessment

PREPARED BY: R.E. Duffy  
R.E. Duffy  
Analyst  
Independent Orbiter  
Assessment

PREPARED BY: T.D. McLaughlin  
T.D. McLaughlin  
Analyst  
Independent Orbiter  
Assessment

APPROVED BY: G.W. Knori  
G.W. Knori  
Technical Manager  
Independent Orbiter  
Assessment

APPROVED BY: W.F. Huning  
W.F. Huning  
Deputy Program Manager  
STSEOS

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Independent Orbiter Assessment  
Analysis of the Atmospheric Revitalization  
Pressure Control Subsystem

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:

- o Atmospheric Make-up and Control
  - oo Auxiliary Oxygen Assembly
  - oo Oxygen Assembly
  - oo Nitrogen Assembly
  
- o Atmospheric Vent and Control
  - oo Positive Relief Vent Assembly
  - oo Negative Relief Vent Assembly
  - oo 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.

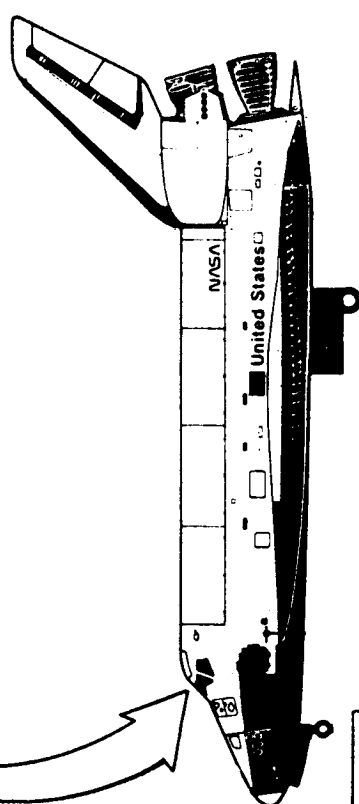


Summary of IOA Failure Modes By Criticality (HW/F)							
Criticality:	1/1	2/1R	2/2	3/1R	3/2R	3/3	TOTAL
Number :	28	59	2	24	32	121	266

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

Summary of IOA Potential Critical Items (HW/F)						
Criticality:	1/1	2/1R	2/2	3/1R	3/2R	TOTAL
Number :	28	59	2	-	-	89

ARPCS ANALYSIS SUMMARY		
CRIT.	#FM	#PCI
1/1	28	28
2/1R	59	59
2/2	2	2



AUXILIARY OXYGEN ASSEMBLY		
CRIT.	#FM	#PCI
1/1	15	15
2/1R	0	0
2/2	0	0

OXYGEN ASSEMBLY		
CRIT.	#FM	#PCI
1/1	6	6
2/1R	25	25
2/2	0	0

CABIN VENT ASSEMBLY		
CRIT.	#FM	#PCI
1/1	0	0
2/1R	1	1
2/2	0	0

NITROGEN ASSEMBLY		
CRIT.	#FM	#PCI
1/1	7	7
2/1R	24	24
2/2	2	2

POSITIVE RELIEF VENT ASSEMBLY		
CRIT.	#FM	#PCI
1/1	0	0
2/1R	5	5
2/2	0	0

NEGATIVE RELIEF VENT ASSEMBLY		
CRIT.	#FM	#PCI
1/1	0	0
2/1R	4	4
2/2	0	0

CRIT - CRITICALITY  
 FM - FAILURE MODE  
 PCI - POTENTIAL CRITICAL ITEM

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 performance impact due to failure modes. The subsystem 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 spacelab 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.



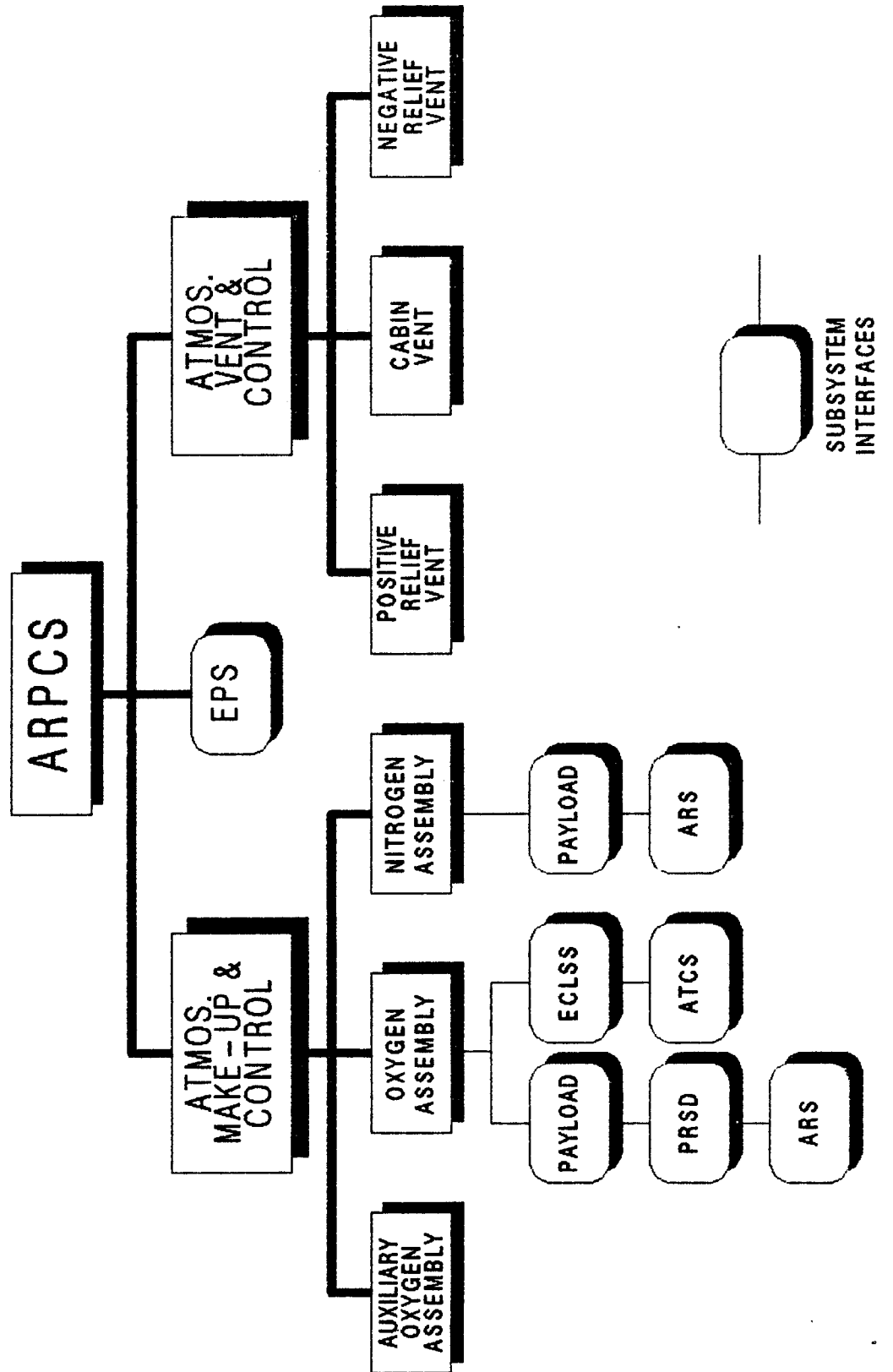


Figure 2 - ARPCS BREAKDOWN

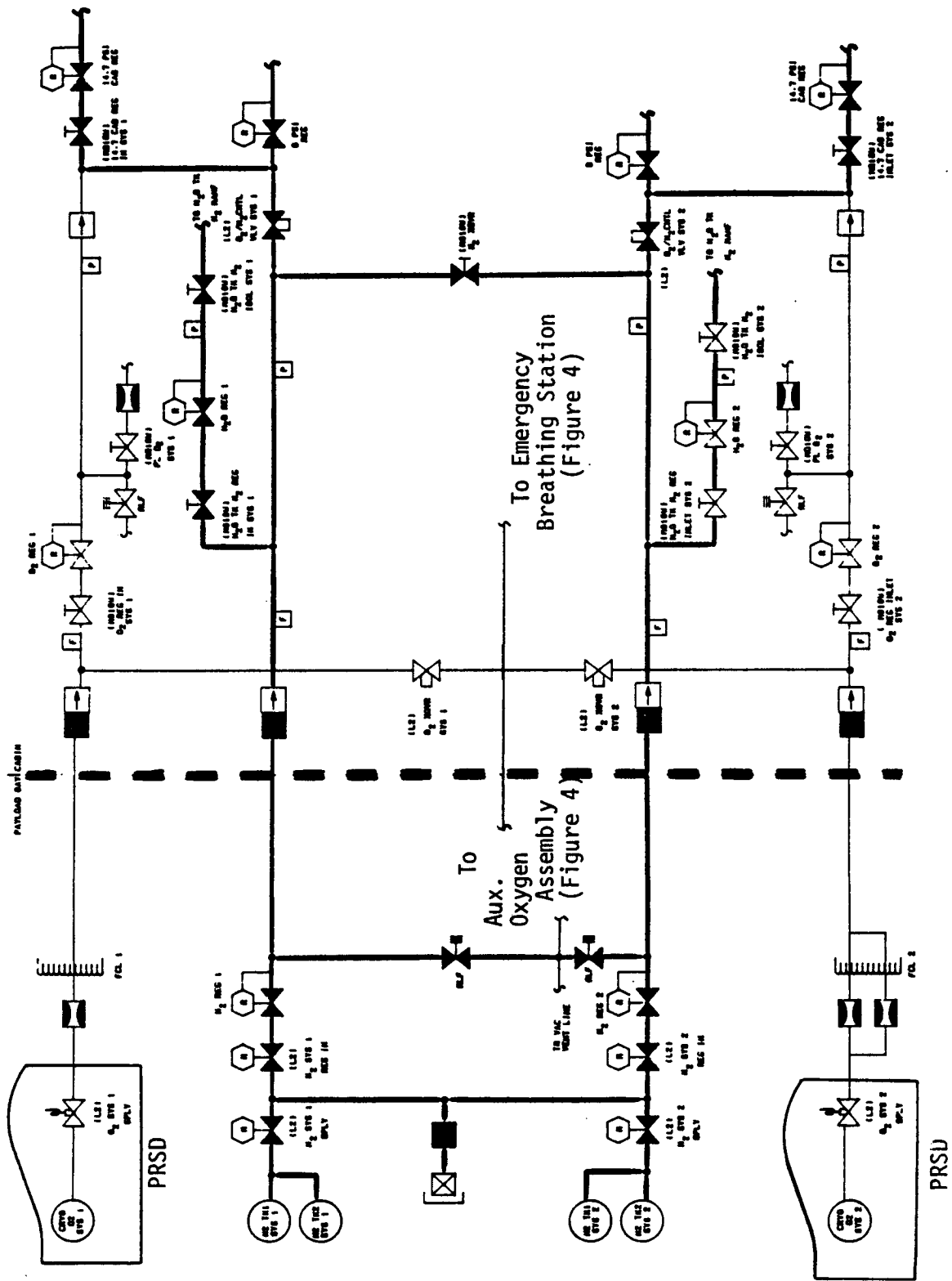


Figure 3 - ATMOSPHERIC MAKE-UP AND CONTROL

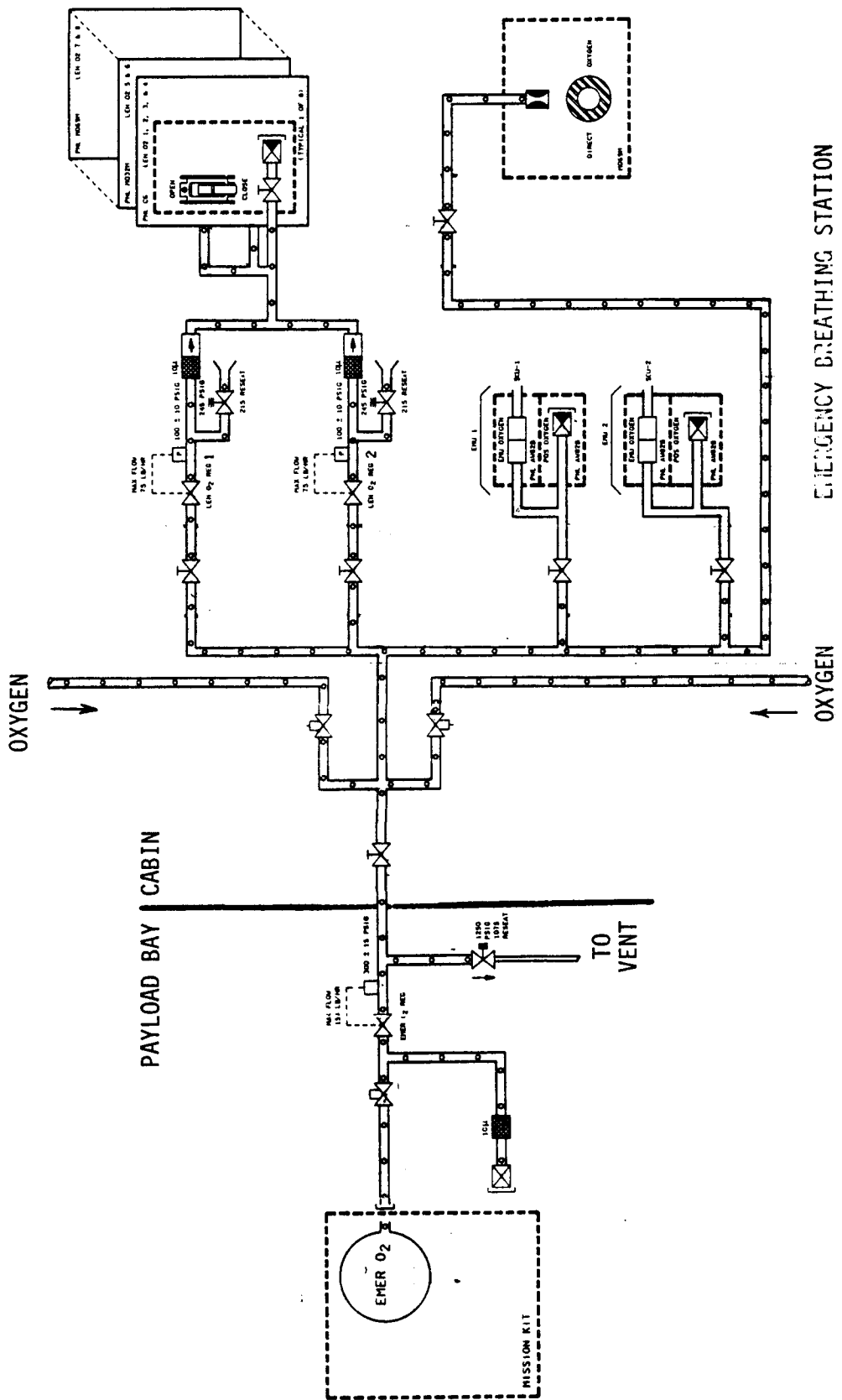


Figure 4 - AUXILIARY OXYGEN ASSEMBLY

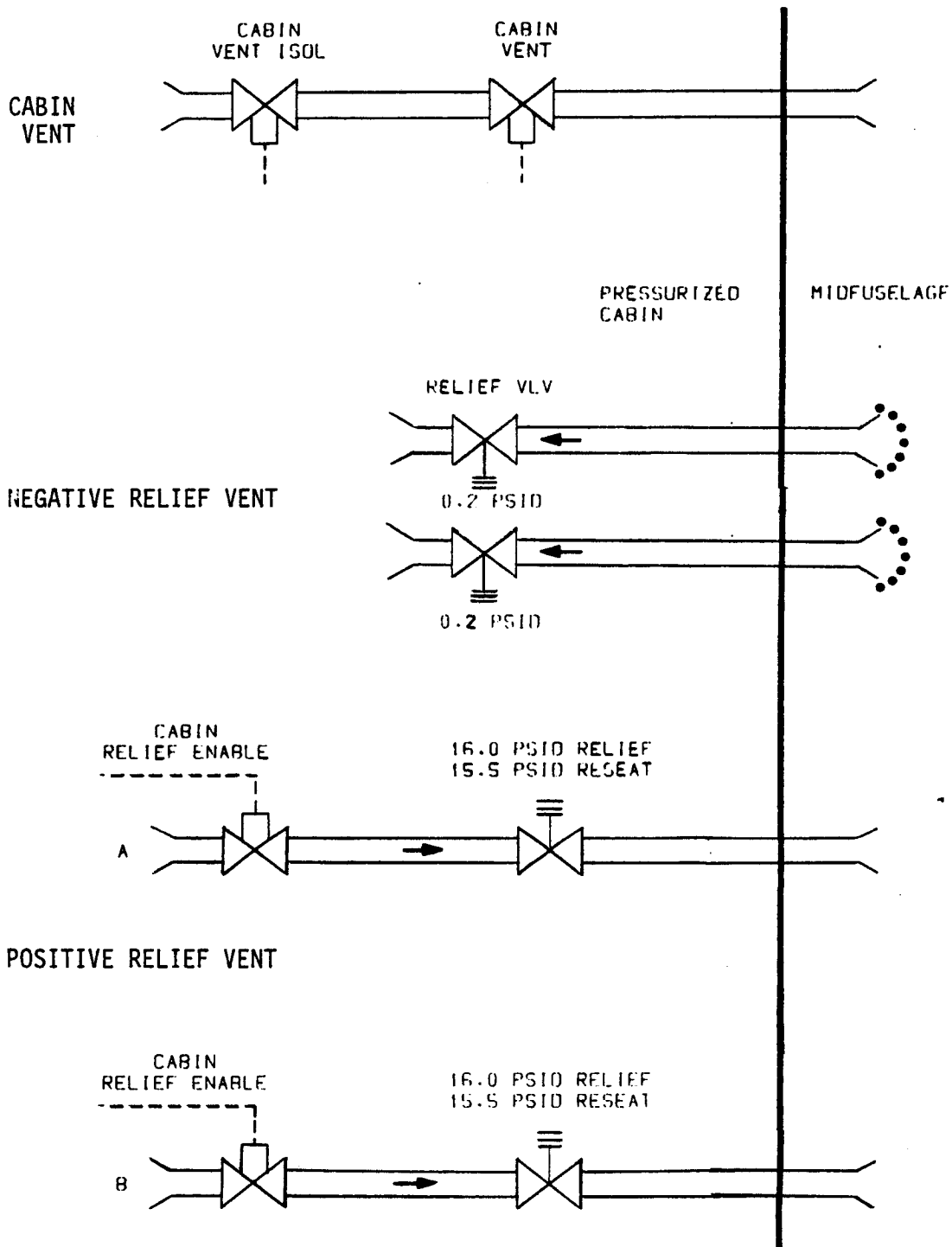


Figure 5 - ATMOSPHERIC VENT AND CONTROL

#### 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 I SUMMARY OF IOA FAILURE MODES AND CRITICALITIES							
Criticality	1/1	2/1R	2/2	3/1R	3/2R	3/3	TOTAL
Auxiliary Oxygen	15	-	-	-	-	20	35
Oxygen	6	25	-	10	10	26	77
Nitrogen	7	24	2	14	18	53	118
Pos. Relief Vent	-	5	-	-	4	7	16
Neg. Relief Vent	-	4	-	-	-	2	6
Cabin vent	-	1	-	-	-	13	14
TOTAL	28	59	2	24	32	121	266

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 II SUMMARY OF IOA POTENTIAL CRITICAL ITEMS						
Criticality	1/1	2/1R	2/2	3/1R	3/2R	TOTAL
Auxiliary Oxygen	15	-	-	-	-	15
Oxygen	6	25	-	-	-	31
Nitrogen	7	24	2	-	-	33
Pos. Relief Vent	-	5	-	-	-	5
Neg. Relief Vent	-	4	-	-	-	4
Cabin vent	-	1	-	-	-	1
TOTAL	28	59	2	-	-	89

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 O<sub>2</sub>/N<sub>2</sub> 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 III - ARPCS HARDWARE ITEMS

MDAC-ID	CRITICALITY		ITEM
	FLIGHT	ABORT	
AUXILIARY OXYGEN ASSEMBLY			
101	3/3	3/3	PRESSURE SENSOR-V61P2166A(1)
102	3/3	3/3	TEMPERATURE SENSOR- V61T2216A(1)
* 103	1/1	1/1	AUX. O2 SUPPLY TANK (1)
* 104	1/1	1/1	AUX. O2 SUPPLY TANK (1)
105	3/3	3/3	PRESSURE SENSOR-V61P2161A (1)
106	3/3	3/3	SUPPLY VALVE-LV5(1)
* 107	1/1	1/1	SUPPLY VALVE-LV5(1)
* 108	1/1	1/1	SUPPLY VALVE-LV5(1)
109	3/3	3/3	POSITION INDICATION, DS8 (1)
110	3/3	3/3	DIODE, DS8 (2)
111	3/3	3/3	SINGLE PHASE MOTOR/SHUTOFF VALVE (1)
* 112	1/1	1/1	SINGLE PHASE MOTOR/SHUTOFF VALVE (1)
113	3/3	3/3	SWITCH-S12
* 114	1/1	1/1	SWITCH-S12
115	3/3	3/3	RESISTOR, A9R2, 5.1K (1)
116	3/3	3/3	RESISTOR, A9R2, 5.1K (1)
117	3/3	3/3	CIRCUIT BREAKER-CB16
118	3/3	3/3	CIRCUIT BREAKER-CB16
* 119	1/1	1/1	QUICK DISCONNECT/GSE (1)
120	3/3	/NA	QUICK DISCONNECT/GSE (1)
121	3/3	3/3	QUICK DISCONNECT/GSE (1)
122	3/3	/NA	FILTER, 10 MICRONS (1)
123	3/3	/NA	FILTER, 10 MICRONS (1)
124	3/3	/NA	CAP/GSE DISCONNECT
* 125	1/1	1/1	CAP/GSE DISCONNECT
126	3/3	3/3	PRESSURE REGULATOR/300 PSIG (1)
* 127	1/1	1/1	PRESSURE REGULATOR/300 PSIG (1)
* 128	1/1	1/1	PRESSURE REGULATOR/300 PSIG (1)
* 129	1/1	1/1	RELIEF VALVE, 1250 PSIG.
130	3/3	3/3	RELIEF VALVE, 1250 PSIG.
* 131	1/1	1/1	RELIEF VALVE, 1250 PSIG.
132	3/3	3/3	ISOLATION VALVE (1)
* 133	1/1	1/1	ISOLATION VALVE (1)
* 134	1/1	1/1	ISOLATION VALVE (1)
* 135	1/1	1/1	LINES AND FITTINGS
OXYGEN ASSEMBLY			
136	3/3	3/3	PRESSURE SENSOR-V64P0202A(1)
137	3/3	3/3	CROSSOVER VALVE-LV3 AND LV4 (2)
* 138	2/1R	2/1R	CROSSOVER VALVE-LV3 AND LV4 (2)
* 139	2/1R	2/1R	CROSSOVER VALVE-LV3 AND LV4 (2)
140	3/3	3/3	SWITCH-S15 AND S18 (2)
* 141	2/1R	2/1R	SWITCH-S15 AND S18 (2)
142	3/3	3/3	RESISTOR-A12R1 & R2/5.1K (2)
* 143	2/1R	2/1R	CIRCUIT BREAKER-CB19 & CB20 (2)

\* Potential Critical Item



TABLE III - ARPCS HARDWARE ITEMS, CONTINUED

MDAC-ID	CRITICALITY		ITEM
	FLIGHT	ABORT	
-----			
OXYGEN ASSEMBLY, CONTINUED			
144	3/3	3/3	CIRCUIT BREAKER-CB19 & CB20 (2)
* 145	2/1R	2/1R	FILTER-10 MICRONS (2)
146	3/3	3/3	FILTER-10 MICRONS (2)
* 147	2/1R	2/1R	ORIFICE- LOOP1&2 (3)
148	3/1R	3/1R	ORIFICE- LOOP1&2 (3)
* 149	2/1R	2/1R	ORIFICE- LOOP1&2 (3)
* 150	2/1R	2/1R	LINES AND FITTINGS
151	3/3	3/3	LEH O2 SUPPLY VALVE (2)
* 152	2/1R	2/1R	LEH O2 SUPPLY VALVE (2)
* 153	2/1R	2/1R	LEH O2 SUPPLY VALVE (2)
* 154	2/1R	2/1R	LEH O2 REGULATOR (2)
* 155	2/1R	2/1R	LEH O2 REGULATOR (2)
* 156	2/1R	2/1R	LEG O2 REGULATOR (2)
* 157	2/1R	2/1R	RELIEF VALVE-245 PSIG (2)
158	3/3	3/3	RELIEF VALVE-245 PSIG (2)
* 159	2/1R	2/1R	FILTER-10 MICRONS (2)
160	3/3	3/3	FILTER-10 MICRONS (2)
161	3/3	3/3	CHECK VALVE
* 162	2/1R	2/1R	CHECK VALVE
163	3/3	3/3	LEH O2 SHUTOFF VALVE/CREW (8)
* 164	1/1	1/1	LEH O2 SHUTOFF VALVE/CREW (8)
* 165	1/1	1/1	LEH O2 SHUTOFF VALVE/CREW (8)
* 166	1/1	1/1	QUICK DISCONNECTS (8)
167	3/3	3/3	QUICK DISCONNECTS (8)
* 168	1/1	1/1	QUICK DISCONNECTS (8)
169	3/3	3/3	QUICK DISCONNECTS (8)
170	3/3	/NA	LEH #5, BLEED ORIFICE
* 171	1/1	/NA	LEH #5, BLEED ORIFICE
172	3/3	/NA	LEH #5, BLEED ORIFICE
173	3/3	3/3	CAP/LEH Q.DSCNT (8)
* 174	1/1	1/1	SHUTOFF VALVE/DIRECT OXYGEN (1)
* 175	2/1R	2/1R	SHUTOFF VALVE/DIRECT OXYGEN (1)
* 176	2/1R	2/1R	ORIFICE-DIRECT BLEED (1)
* 177	2/1R	2/1R	FILTER/CHECK VALVE (2)
178	3/3	3/3	FILTER/CHECK VALVE (2)
* 179	2/1R	2/1R	FILTER/CHECK VALVE (2)
180	3/2R	3/2R	FLOW SENSOR MT11&MT12 (2)
181	3/3	3/3	SWITCH-O2 FLOW,S5 (1)
182	3/3	3/3	C&W-O2/N2 FLOW (1)
183	3/3	3/3	PRESSURE SENSOR, REG INLET-MT3&4
184	3/3	3/3	REGULATOR INLET SOV (2)
185	3/2R	3/3	REGULATOR INLET SOV (2)
* 186	2/1R	2/1R	REGULATOR INLET SOV (2)
187	3/1R	3/3	REGULATOR - 100 PSIG (2)
188	3/2R	3/3	REGULATOR - 100 PSIG (2)

\* Potential Critical Item

TABLE III - ARPCS HARDWARE ITEMS, CONTINUED

MDAC-ID	CRITICALITY		ITEM
	FLIGHT	ABORT	
OXYGEN ASSEMBLY, CONTINUED			
* 189	2/1R	2/1R	REGULATOR - 100 PSIG (2)
190	3/1R	3/3	RELIEF VALVE, 245 PSIG (2)
191	3/2R	3/3	RELIEF VALVE, 245 PSIG (2)
192	3/3	3/3	PRESSURE SENSOR (2)
193	3/3	3/3	CHECK VALVE (2)
194	3/2R	3/3	CHECK VALVE (2)
195	3/1R	3/1R	CHECK VALVE (2)
196	3/1R	3/1R	LINES & FITTINGS
197	3/3	3/3	SHUTOFF VALVE (2)
198	3/1R	3/1R	SHUTOFF VALVE (2)
199	3/3	3/3	SHUTOFF VALVE (2)
200	3/2R	3/2R	SHUTOFF VALVE (2)
201	3/1R	3/1R	SHUTOFF VALVE (2)
202	3/2R	3/2R	ORIFICE (2)
203	3/1R	3/1R	ORIFICE (2)
204	3/3	3/3	PRESSURE SENSOR, MT7 & MT8 (2)
205	3/1R	3/1R	14.7 PSI REG INLET SOV (2)
206	3/2R	3/3	14.7 PSI REG INLET SOV (2)
* 207	2/1R	3/2R	14.7 PSI REG INLET SOV (2)
* 208	2/1R	3/3	14.7 PSI REGULATOR
209	3/2R	3/3	14.7 PSI REGULATOR (2)
* 210	2/1R	2/1R	8 PSI REGULATOR (2)
211	3/1R	3/1R	8 PSI REGULATOR (2)
NITROGEN ASSEMBLY			
* 212	2/1R	2/1R	N2 TANKS (4)
213	3/3	3/3	TEMPERATURE SENSOR (4)
* 214	1/1	1/1	LINES & FITTINGS - TP27 & TP28
215	3/3	/NA	GSE QUICK DISCONNECT (1)
* 216	1/1	1/1	GSE QUICK DISCONNECT (1)
217	3/3	/NA	GSE CAP (1)
* 218	1/1	1/1	GSE CAP (1)
219	3/3	/NA	GSE FILTER (1)-10 MICRONS
220	3/3	/NA	GSE FILTER (1)-10 MICRONS
221	3/3	3/3	PRESSURE SENSOR (2)
222	3/2R	3/3	ISOLATION VALVE (2)
223	3/2R	3/3	ISOLATION VALVE (2)
* 224	2/1R	2/1R	ISOLATION VALVE (2)
225	3/3	3/3	POSITION INDICATION, DS8&DS9 (2)
226	3/3	3/3	DIODE, DS8&DS9 (4)
227	3/3	3/3	RESISTOR, DS8&S9, 5.1K (4)
228	3/2R	3/3	SWITCH-S10&S11, MMU ISOL VLV (2)
229	3/2R	3/3	SWITCH-S10&S11, MMU ISOL VLV (2)
230	3/2R	3/3	CIRCUIT BREAKER 69&74-MMU ISOL VLV (2)
231	3/3	3/3	CIRCUIT BREAKER 69&74-MMU ISOL VLV (2)

\* Potential Critical Item

TABLE III - ARPCS HARDWARE ITEMS, CONTINUED

MDAC-ID	CRITICALITY		ITEM
	FLIGHT	ABORT	
-----			
NITROGEN ASSEMBLY, CONTINUED			
* 232	2/1R	3/3	LINES & FITTINGS
233	3/3	3/3	N2 SYSTEM SUPPLY ISOL VLV-LV3&LV4 (2)
* 234	2/1R	2/1R	N2 SYSTEM SUPPLY ISOL VLV-LV3&LV4 (2)
* 235	2/1R	2/1R	N2 SYSTEM SUPPLY ISOL VLV-LV3&LV4 (2)
236	3/3	3/3	MOTOR/N2 SYSTEM ISOL VLV (2)
* 237	2/1R	2/1R	MOTOR/N2 SYSTEM ISOL VLV (2)
238	3/3	3/3	POSITION INDICATION, DS6&DS10 (2)
239	3/3	3/3	DIODE, DS6&DS10 (4)
240	3/2R	3/3	SWITCH, S13&S21/N2-SYSTEM ISOL VLV (2)
* 241	2/1R	3/3	SWITCH, S13&S21/N2-SYSTEM ISOL VLV (2)
242	3/3	3/3	CIRCUIT BREAKER CB17& CB18 (2)
243	3/3	3/3	CIRCUIT BREAKER CB17& CB18 (2)
244	3/3	3/3	RESISTOR A10R1&A17R1(5.1K) (2)
245	3/3	3/3	REGULATOR INLET VALVE LV1 & LV2 (2)
* 246	2/1R	2/1R	REGULATOR INLET VALVE LV1 & LV2 (2)
* 247	2/1R	2/1R	REGULATOR INLET VALVE LV1 & LV2 (2)
248	3/3	/NA	SINGLE PHASE MOTOR/N2 REG INLET VLV (2)
249	3/3	3/3	SINGLE PHASE MOTOR/N2 REG INLET VLV (2)
250	3/3	3/3	POSITION INDICATION, DS7 & DS11 (2)
251	3/3	3/3	DIODE, DS7 & DS11 (4)
252	3/3	3/3	SWITCH, S14 & S22/REG. INLET VLV (2)
* 253	2/1R	2/1R	SWITCH, S14 & S22/REG. INLET VLV (2)
254	3/3	3/3	CIRCUIT BREAKER CB20 & CB21 (2)
255	3/3	3/3	CIRCUIT BREAKER CB20 & CB21 (2)
256	3/3	3/3	RESISTOR, A18R1 & A11R1 (5.1K) (2)
* 257	2/1R	2/1R	NITROGEN REGULATOR VALVE (200 PSIG)
* 258	2/1R	2/1R	NITROGEN REGULATOR VALVE (200 PSIG)
* 259	2/1R	2/1R	NITROGEN REGULATOR VALVE (200 PSIG)
260	3/3	3/3	NITROGEN REGULATOR VALVE (200 PSIG)
* 261	2/1R	2/1R	NITROGEN RELIEF VALVE (275 PSIG) (2)
* 262	2/1R	2/1R	NITROGEN RELIEF VALVE (275 PSIG) (2)
* 263	1/1	1/1	LINES & FITTINGS
264	3/3	3/3	FILTER/CHECK VALVE, AFTER N2 REG (2)
* 265	2/1R	2/1R	FILTER/CHECK VALVE, AFTER N2 REG (2)
* 266	2/1R	2/1R	FILTER/CHECK VALVE, AFTER N2 REG (2)
267	3/2R	3/2R	FLOW SENSOR (2)
268	3/3	3/3	PRESSURE SENSOR (2)
269	3/2R	3/2R	SHUTOFF VALVE (2) (PNL M010W)
270	3/2R	3/3	SHUTOFF VALVE (2)
* 271	2/1R	2/1R	SHUTOFF VALVE (2)
272	3/2R	3/3	ORIFICE 10 LBM/HR (2)
* 273	2/1R	2/1R	ORIFICE 10 LBM/HR (2)
274	3/3	3/3	CROSSOVER VALVE (1)
275	3/3	3/3	CROSSOVER VALVE (1)
* 276	1/1	1/1	CROSSOVER VALVE (1)

\* Potential Critical Item

TABLE III - ARPCS HARDWARE ITEMS, CONTINUED

MDAC-ID	CRITICALITY		ITEM
	FLIGHT	ABORT	
-----			
NITROGEN ASSEMBLY, CONTINUED			
277	3/3	3/3	SHUTOFF VALVE, H2O TANK REG INLET (2)
278	3/2R	3/2R	SHUTOFF VALVE, H2O TANK REG INLET (2)
279	3/1R	3/1R	SHUTOFF VALVE, H2O TANK REG INLET (2)
280	3/1R	3/1R	REGULATOR, 15.5-17 PSIG (2)
281	3/2R	3/2R	REGULATOR, 15.5-17 PSIG (2)
282	3/1R	3/1R	REGULATOR, 15.5-17 PSIG (2)
283	3/1R	3/1R	RELIEF VALVE
284	3/1R	3/1R	RELIEF VALVE
285	3/3	3/3	PRESSURE SENSOR (2)
286	3/3	3/3	ISOLATION VALVE-REGULATOR OUTLET
287	3/2R	3/2R	ISOLATION VALVE-REGULATOR OUTLET
288	3/1R	3/1R	ISOLATION VALVE-REGULATOR OUTLET
* 289	1/1	1/1	H2O ALTERNATE PRESSURE VALVE (1)
290	3/1R	3/1R	H2O ALTERNATE PRESSURE VALVE (1)
291	3/1R	3/1R	SWITCH, S28 (1)
* 292	1/1	1/1	SWITCH, S28 (1)
293	3/1R	3/1R	CIRCUIT BREAKER, CB15 (1)
294	3/3	3/3	CIRCUIT BREAKER, CB15 (1)
295	3/3	3/3	RESISTOR, A3R3,5.1K (1)
296	3/1R	3/1R	FILTER
297	3/1R	3/1R	O2/N2 CONTROL VALVE, LV1&LV2 (2)
* 298	2/1R	2/1R	O2/N2 CONTROL VALVE, LV1&LV2 (2)
* 299	2/1R	2/1R	O2/N2 CONTROL VALVE, LV1&LV2 (2)
300	3/3	3/3	POS. INDICATOR/N2/O2 CONT. VALVE (1)
* 301	2/1R	2/1R	SWITCH, S16&S19/O2/N2 CONT. VALVE (2)
302	3/1R	3/1R	SWITCH, S16&S19/O2/N2 CONT. VALVE (2)
303	3/3	3/3	SWITCH, S16&S19/O2/N2 CONT. VALVE (2)
304	3/3	3/3	RESISTOR, A13R1&2, A14R1, A15R1&2 5.1K (5)
305	3/3	3/3	SWITCH S17/PPO2 SENSOR A&B (1)
306	3/3	3/3	SWITCH S17/PPO2 SENSOR A&B (1)
307	3/2R	3/2R	O2/N2 CONTROLLER (2)
308	3/1R	3/1R	O2/N2 CONTROLLER (2)
309	3/2R	3/2R	O2/N2 CONTROLLER (2)
310	3/1R	3/1R	PPO2 SENSORS A+B (2)
311	3/2R	3/2R	PPO2 SENSORS A+B (2)
* 312	2/2	2/2	PPO2 SENSOR-C (1)
313	3/3	3/3	SWITCH, PPO2 CONTROLLER (2)
314	3/3	3/3	SWITCH, PPO2 CONTROLLER (2)
315	3/3	3/3	RESISTORS/10K (2)
316	3/3	3/3	CIRCUIT BREAKER, CB18&CB19 (2)
* 317	2/1R	2/1R	CIRCUIT BREAKER, CB18&CB19 (2)
318	3/3	3/3	SWITCH, S6/PPO2 SELECTOR (1)
319	3/3	3/3	METER, M4/PPO2 READING (1)
320	3/3	3/3	SWITCH, S5/O2/N2 FLOW SELECTOR (1)
321	3/3	3/3	METER, M3/O2/N2 FLOW READING (1)

\* Potential Critical Item

TABLE III - ARPCS HARDWARE ITEMS, CONTINUED

MDAC-ID	CRITICALITY		ITEM
	FLIGHT	ABORT	
			-----
			POSITIVE RELIEF VALVE ASSEMBLY, CONTINUED
322	3/2R	3/3	CABIN PRESSURE SENSOR (1)
323	3/3	3/3	METER, M4/CABIN PRESSURE READING (1)
324	3/2R	3/3	CABIN DP/DT SENSOR (1)
325	3/3	3/3	METER, M3/DP/DT READING (1)
326	3/3	3/3	CIRCUIT BREAKER, CB16/DP/DT (1)
* 327	2/2	3/3	CIRCUIT BREAKER, CB16/DP/DT (1)
328	3/3	3/3	KLAXON/DP/DT (1)
			-----
			POSITIVE RELIEF VALVE ASSEMBLY
* 329	2/1R	2/1R	LINES & FITTINGS
330	3/2R	3/2R	ISOLATION VALVE/MOTOR DRIVEN (2)
* 331	2/1R	2/1R	ISOLATION VALVE/MOTOR DRIVEN (2)
332	3/2R	3/2R	MOTOR/ISOLATION VALVE (2)
333	3/3	/NA	MOTOR/ISOLATION VALVE (2)
334	3/3	3/3	POSITION INDICATION, DS1, DS2 (2)
335	3/2R	3/2R	SWITCH, S1&S2/POS RELIEF VALVE (2)
336	3/3	/NA	SWITCH, S1&S2/POSITIVE RELIEF VALVE (2)
* 337	2/1R	2/1R	SWITCH, S1&S2/POSITIVE RELIEF VALVE (2)
338	3/2R	3/2R	CIRCUIT BREAKER, CB17&CB22 (2)
339	3/3	3/3	CIRCUIT BREAKER, CB17&CB22 (2)
340	3/3	3/3	RESISTOR, A1R1 & A2R1, 5.1K (2)
341	3/3	3/3	DIODE, DS1 & DS2 (4)
* 342	2/1R	2/1R	RELIEF VALVE, 16 PSIA
			-----
			CABIN VENT ASSEMBLY
* 343	2/1R	2/1R	RELIEF VALVE, 16 PSIA
* 344	2/1R	2/1R	FILTER (2)
345	3/3	3/3	FILTER (2)
346	3/3	/NA	FILTER (1)
347	3/3	/NA	FILTER (1)
* 348	2/1R	2/1R	VENT VALVE, MOTORIZED (2)
349	3/3	3/3	VENT VALVE, MOTORIZED (2)
350	3/3	/NA	SINGLE PHASE MOTOR (2)
351	3/3	/NA	SWITCH, S3 & S4
352	3/3	/NA	SWITCH, S3 & S4
353	3/3	/NA	SWITCH, S3 & S4
354	3/3	/NA	SWITCH, S3 & S4
355	3/3	/NA	POSITION INDICATION, DS3, DS4 (2)
356	3/3	/NA	RESISTOR, A3R1, A4R1, 5.1K (2)
357	3/3	3/3	DIODE, DS3 & DS4 (4)
358	3/3	3/3	CIRCUIT BREAKER, CB22 & CB34 (2)
359	3/3	/NA	CIRCUIT BREAKER, CB22 & CB34 (2)
			-----
			NEGATIVE RELIEF VALVE ASSEMBLY
* 360	2/1R	2/1R	RELIEF VALVE (2)
* 361	2/1R	2/1R	RELIEF VALVE (2)

\* Potential Critical Item

TABLE III - ARPCS HARDWARE ITEMS, CONCLUDED

MDAC-ID	CRITICALITY		ITEM
	FLIGHT	ABORT	
-----			
			NEGATIVE RELIEF VALVE ASSEMBLY, CONTINUED
* 362	2/1R	2/1R	CAP (2)
363	3/3	3/3	CAP (2)
* 364	2/1R	2/1R	DEBRIS SCREEN (2)
365	3/3	3/3	DEBRIS SCREEN (2)
366	3/2R	3/3	CHECK VALVE (2)

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\* Potential Critical Item

## 5.0 REFERENCES

1. JSC-ECLSS 2102, Environmental Control and Life Support Systems Workbook, November 21, 1983
2. JSC-19935, Environmental Systems Console Handbook, Basic Rev. A, October 15, 1985
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
6. JSC-V61-File III, Operations and Maintenance Requirements and Specification Document, February 06, 1986
7. NSTS-22206, Instruction for Preparation of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL), October 1986

APPENDIX A  
ACRONYMS

AOA	-	Abort Once Around
ARPCS	-	Atmospheric Revitalization and Pressure Control Subsystem
ARS	-	Air Revitalization System
ATCS	-	Active Thermal Control Subsystem
ATO	-	Abort to Orbit
BFS	-	Back-up Flight System
CIL	-	Critical Item List
CO	-	Carbon Monoxide
CO2	-	Carbon Dioxide
CRT	-	Cathode Ray Tube
C/W	-	Caution and Warning
CRIT	-	Criticality
dc	-	Direct Current
ECLSS	-	Environmental Control and Life Support Subsystem
EMU	-	Extravehicular Mobility Unit
EPS	-	Electrical Power Subsystem
EVA	-	Extravehicular Activity
F	-	Fahrenheit
FES	-	Flash Evaporator System
FM	-	Failure Mode
FMEA	-	Failure Mode and Effect Analysis
GN2	-	Gaseous Nitrogen
GSE	-	Ground Support Equipment
GPC	-	General Purpose Computer
H2O	-	Water
IMU	-	Inertial Measurement Unit
IOA	-	Independent Oriber Assessment
LEH	-	Launch and Entry Helmets
LiOH	-	Lithium Hydroxide
MDAC	-	McDonnell Douglas Astronautics Company
NA	-	Not Applicable
NASA	-	National Aeronautics and Space Administration
N2	-	Nitrogen
NSTS	-	National Space Transportation System
OMRSD	-	Operational Maintenance Requirements and Specifications Document
OPS	-	Operational Sequence
O2	-	Oxygen
OMS	-	Orbital Maneuvering System
PCI	-	Potential Critical Items
PPO2	-	Partial Pressure of Oxygen
psi	-	Pounds Per Square Inch
psia	-	Pounds Per Square Inch Absolute
psid	-	Pounds Per Square Inch Differential
psig	-	Pounds Per Square Inch Gage
RI	-	Rockwell International
RMS	-	Remote Manipulator System
RTLS	-	Return to Launch Site



RTLS - Return to Landing Site  
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 crogenic 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.

APPENDIX C  
DETAILED ANALYSIS

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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 101 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)
- 5)
- 6)
- 7)
- 8)
- 9)

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: 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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 102 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. SAIIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) AUX. O2 (SUPPLY TANK)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 103 ABORT: 1/1

ITEM: AUX. O2 SUPPLY TANK (1)  
FAILURE MODE: RUPTURE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) AUX. O2 ASSY (SUPPLY TANK)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 104 ABORT: 1/1

ITEM: AUX. O2 SUPPLY TANK (1)  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) AUX. O2 ASSY (SUPPLY TANK)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 105 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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: 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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES	
	HDW/FUNC	ABORT
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: 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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	1/1
MDAC ID:	107	ABORT:	1/1

ITEM: SUPPLY VALVE-LV5(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)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 108 ABORT: 1/1

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

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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

LOCATION: MID-FUSELAGE  
PART NUMBER: MC250-0002

CAUSES: VIBRATION, MECHANICAL SHOCK, CORROSION, FATIGUE

EFFECTS/RATIONALE:

SAME AS AUX. O2 TANK EXTERNAL LEAKAGE, MDAC ID 104.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 109 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)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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: MC432-0222-0029

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

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 110 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)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 111 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.  
SAIDI

BREAKDOWN HIERARCHY:

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

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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 112 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)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 113 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

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

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: 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:

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)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/2	RTLS:	3/3
LIFTOFF:	1/1	TAL:	3/3
ONORBIT:	1/1	AOA:	3/3
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	3/3		

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	3/3
MDAC ID:	115	ABORT:	3/3

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

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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: RLR05C512GR

CAUSES: SHOCK, VIBRATION, THERMAL STRESS

EFFECTS/RATIONALE:  
LOSS OF VALVE POSITION INDICATION.

REFERENCES:

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 SUBSYS LEAD: M.  
SAIIDI

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: 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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 117 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

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

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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 118 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)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 119 ABORT: 1/1

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

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

BREAKDOWN HIERARCHY:

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

CRITICALITIES			
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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 120 ABORT: /NA

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

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	3/3		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 121 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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: MC276-0010-0310

CAUSES: CORROSION, BINDING, JAMMING

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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

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

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	3/3	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	3/3	ATO:	/NA
LANDING/SAFING:	3/3		

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	3/3
MDAC ID:	123	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)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 124 ABORT: /NA

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

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	3/3		

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:

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.  
SAIID

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 126 ABORT: 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)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 127 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.  
SAIDI

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 128 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.  
SAIID

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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		

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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 130 ABORT: 3/3

ITEM: RELIEF VALVE, 1250 PSIG.  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: VIBRATION, SHOCK, CORROSION

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

REFERENCES:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	1/1
MDAC ID:	131	ABORT:	1/1

ITEM: RELIEF VALVE, 1250 PSIG.  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 132 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)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	1/1
MDAC ID:	133	ABORT:	1/1

ITEM: ISOLATION VALVE (1)  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 134 ABORT: 1/1

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

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)

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	1/1
MDAC ID:	135	ABORT:	1/1

ITEM:                    LINES AND FITTINGS  
FAILURE MODE:        EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

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

CRITICALITIES			
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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 136 ABORT: 3/3

ITEM: PRESSURE SENSOR-V64P0202A(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) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 137 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:

NO EFFECT, THE VALVE IS NOMINALLY OPEN THROUGHOUT THE MISSION.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 138 ABORT: 2/1R

ITEM: CROSSOVER VALVE-LV3 AND LV4 (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)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 139 ABORT: 2/1R

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	2/1R	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 140 ABORT: 3/3

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.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES	
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 141 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 142 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: 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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 144 ABORT: 3/3

ITEM: CIRCUIT BREAKER-CB19 & CB20 (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)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: MC454-0026-2030

CAUSES: PIECE FAILURE, SHOCK, THERMAL STRESS, VIBRATION

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 145 ABORT: 2/1R

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 146 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: 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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 147 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 148 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 SUBSYS LEAD: M.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [\*P ] C [ P ]

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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 151 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

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

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: 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:

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES	
	HDW/FUNC	ABORT
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	

REDUNDANCY SCREENS:    A [ 2 ]                      B [\*P ]                      C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 153 ABORT: 2/1R

ITEM: LEH O2 SUPPLY VALVE (2)  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

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

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		

REDUNDANCY SCREENS: A [ 2 ] B [\*P ] C [ P ]

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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 154 ABORT: 2/1R

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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		

REDUNDANCY SCREENS: A [ 2 ] B [\*P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 155 ABORT: 2/1R

ITEM: LEH O2 REGULATOR (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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [\*P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	2/1R
MDAC ID:	156	ABORT:	2/1R

ITEM: LEG O2 REGULATOR (2)  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

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

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		

REDUNDANCY SCREENS:    A [ 2 ]            B [\*P ]            C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 157 ABORT: 2/1R

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

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

BREAKDOWN HIERARCHY:

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

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		

REDUNDANCY SCREENS: A [ 2 ] B [\*P ] C [ P ]

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:

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
- 5)
- 6)
- 7)
- 8)
- 9)

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: 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:

C-2

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.  
SAIDI

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [\*P ] C [ P ]

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:

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 SUBSYS LEAD: M.  
SAIDI

BREAKDOWN HIERARCHY:

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

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: MC250-0002

CAUSES: VIBRATION, SHOCK, CORROSION

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 161 ABORT: 3/3

ITEM: CHECK VALVE  
FAILURE MODE: FAILED OPEN

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

BREAKDOWN HIERARCHY:

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

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: 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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 162 ABORT: 2/1R

ITEM: CHECK VALVE  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 163 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.  
SAIID

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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: 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:

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.  
SAIID

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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 CREWMEMBER,  
POTENTIAL LOSS OF LIFE/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 165 ABORT: 1/1

ITEM: LEH O2 SHUTOFF VALVE/CREW + PASSENGER (8)  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 166 ABORT: 1/1

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

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

BREAKDOWN HIERARCHY:

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

CRITICALITIES

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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 167 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

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

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: F361-2660-3

CAUSES: BINDING, JAMMING, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:  
NO EFFECT, CREW INCONVENIENCE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 168 ABORT: 1/1

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

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

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 169 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

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

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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
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.  
SAIID

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:



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.  
SAIID

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	1/1	ATO:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 172 ABORT: /NA

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 173 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

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

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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 174 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.  
SAIDI

BREAKDOWN HIERARCHY:

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

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/2	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	2/2	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	3/3		

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:

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. MCLAUGHLIN SUBSYS LEAD: M.  
SAIIDI

BREAKDOWN HIERARCHY:

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

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/2	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 176 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/2	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: CREW MODULE  
PART NUMBER:

CAUSES: CONTAMINATION, CORROSION

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 177 ABORT: 2/1R

ITEM: FILTER/CHECK VALVE (2)  
FAILURE MODE: FAILED CLOSED, RESTRICTED FLOW

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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  
USAGE CAN BE MAINTAINED BY THE UNAFFECTED LEG.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 178 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 179 ABORT: 2/1R

ITEM: FILTER/CHECK 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) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

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
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 181 ABORT: 3/3

ITEM: SWITCH-O2 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 182 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: SHORT, ELECTRICAL

EFFECTS/RATIONALE:

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	3/3
MDAC ID:	183	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)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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:        MC250-0002

CAUSES:    ELECTRICAL, CONTAMINATION, CORROSION, PIECE PART FAILURE

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 184 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL (OXYGEN REGULATOR)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 185 ABORT: 3/3

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

LEAD ANALYST: R. DUFFY / T. MCLAUGHLIN  
SAIID

SUBSYS LEAD: M.

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL (OXYGEN REGULATOR)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES	
	HDW/FUNC	ABORT
PRELAUNCH:	3/2R	RTLS: 3/3
LIFTOFF:	3/3	TAL: 3/3
ONORBIT:	3/2R	AOA: 3/3
DEORBIT:	3/3	ATO: 3/3
LANDING/SAFING:	3/3	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 186 ABORT: 2/1R

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL (OXYGEN REGULATOR)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 187 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/1R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 188 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 189 ABORT: 2/1R

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

LOCATION: CREW MODULE  
PART NUMBER: MC250-0002

CAUSES: VIBRATION, CORROSION, SHOCK, PIECE PART FAILURE

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

REFERENCES:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/1R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

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)  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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 PSIA REGULATION. THIS IS LOSS OF REDUNDANCY AND MISSION ABORT DECISION.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 192 ABORT: 3/3

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	3/3
MDAC ID:	193	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)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 194 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 195 ABORT: 3/1R

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 196 ABORT: 3/1R

ITEM: LINES & FITTINGS  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATC:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 197 ABORT: 3/3

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL, P/L INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:

NO EFFECT, SINCE THE LINE IS CAPPED TIGHT AT THE END TO HOLD FLOW.

REFERENCES:

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
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: MC250-0002

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:  
NO EFFECT

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 200 ABORT: 3/2R

ITEM: SHUTOFF VALVE (2)  
FAILURE MODE: FAILED CLOSED (WITH S/L)

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL, P/L INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	3/3	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		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 201 ABORT: 3/1R

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL, P/L INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 202 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
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 203 ABORT: 3/1R

ITEM: ORIFICE (2)  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL, P/L INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 204 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 205 ABORT: 3/1R

ITEM: 14.7 PSI REG 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, CABIN REGULATION
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 206 ABORT: 3/3

ITEM: 14.7 PSI REG INLET SOV (2)  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL, CABIN REGULATION
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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 PSIA REGULATION. CABIN  
CAN BE MAINTAINED AT 14.7 OR 8.0 PSIA FROM THE REDUNDANT LEG, OR  
8.0 PSIA AT AFFECTED LEG.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	2/1R
MDAC ID:	207	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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	3/2R	RTLS:	3/2R
LIFTOFF:	3/2R	TAL:	3/2R
ONORBIT:	2/1R	AOA:	3/2R
DEORBIT:	3/2R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS:    A [ 1 ]            B [ P ]            C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 208 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/1R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 209 ABORT: 3/3

ITEM: 14.7 PSI REGULATOR (2)  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 210 ABORT: 2/1R

ITEM: 8 PSI REGULATOR (2)  
FAILURE MODE: FAILED OPEN

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL, 8 PSI REGULATION
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 211 ABORT: 3/1R

ITEM: 8 PSI REGULATOR (2)  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) O2 ASSY.
- 4) O2/N2 CONTROL PANEL, 8 PSI REGULATION
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/1R	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ F ]

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:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

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: 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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 214 ABORT: 1/1

ITEM: LINES & FITTINGS - TP27 & TP28  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	1/1
LIFTOFF:	3/2R	TAL:	1/1
ONORBIT:	3/2R	AOA:	1/1
DEORBIT:	3/2R	ATO:	1/1
LANDING/SAFING:	3/3		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 215 ABORT: /NA

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 216 ABORT: 1/1

ITEM: GSE QUICK DISCONNECT (1)  
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 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 217 ABORT: /NA

ITEM: GSE CAP (1)  
FAILURE MODE: INABILITY TO MATE, DEMATE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	3/3		

REDUNDANCY 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 218 ABORT: 1/1

ITEM: GSE CAP (1)  
FAILURE MODE: EXTERNAL LEAK, INTERNAL LEAK

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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		

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 219 ABORT: /NA

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

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	3/3		

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:

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  
FAILURE MODE: OPEN

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY TANKS
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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

LOCATION: MID-FUSELAGE  
PART NUMBER: MC250-0002

CAUSES: MISHANDLING, SHOCK

EFFECTS/RATIONALE:  
NO SIGNIFICANT IMPACT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 221 ABORT: 3/3

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
- 5)
- 6)
- 7)
- 8)
- 9)

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: ELECTRICAL, VIBRATION, SHOCK

EFFECTS/RATIONALE:  
LOSS OF TANKS PRESSURE INDICATION-TANK PRESSURE CAN BE CHECKED  
DOWNSTREAM.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 222 ABORT: 3/3

ITEM: ISOLATION 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) N2 SUPPLY PANEL/40V61A16
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 223 ABORT: 3/3

ITEM: ISOLATION VALVE (2)  
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2 SUPPLY PANEL/40V61A16
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 224 ABORT: 2/1R

ITEM: ISOLATION 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 SUPPLY PANEL/40V61A16
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 225 ABORT: 3/3

ITEM: POSITION INDICATION, DS8&DS9 (2)  
FAILURE MODE: INABILITY TO LATCH PROPERLY

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL/PAYLOAD INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 226 ABORT: 3/3

ITEM: DIODE, DS8&DS9 (4)  
FAILURE MODE: OPEN, SHORTS, OUT OF TOLERANCE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL/PAYLOAD INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

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

REFERENCES:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 227 ABORT: 3/3

ITEM: RESISTOR, DS8&S9,5.1K (4)  
FAILURE MODE: ANY CREDIBLE FAILURE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL/PAYLOAD INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

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: CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:  
LOSS OF VALVE POSITION INDICATION. NO EFFECT, NOT MISSION  
ESSENTIAL.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 228 ABORT: 3/3

ITEM: SWITCH-S10&S11, 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/PAYLOAD INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 229 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/O2 SUPPLY PANEL/PAYLOAD INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 230 ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB69&CB74-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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 232 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
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/1R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 233 ABORT: 3/3

ITEM: N2 SYSTEM SUPPLY ISOL. VLV-LV3&LV4 (2)  
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 234 ABORT: 2/1R

ITEM: N2 SYSTEM SUPPLY ISOL. VLV-LV3&LV4 (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) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 235 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 236 ABORT: 3/3

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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:

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:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 238 ABORT: 3/3

ITEM: POSITION INDICATION, DS6&DS10 (2)  
FAILURE MODE: IMPROPER CONTACT, NO CONTACT

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: MC432-0222-0029

CAUSES: CORROSION, CONTAMINATION BINDING/JAMMING, ELECTRICAL

EFFECTS/RATIONALE:  
LOSS OF BARBER POLE INDICATION. TELEMETRY DATA IS AVAILABLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 239 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 240 ABORT: 3/3

ITEM: SWITCH, S13&S21/N2-SYSTEM ISOL VLV (2)  
FAILURE MODE: FAILED OPEN, INTERMEDIATE POSITION

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 241 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 242 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, PARTS FAILURE,  
CORROSION

EFFECTS/RATIONALE:  
NO EFFECT, EXCEPT FOR LOSS OF OVER-LOAD CIRCUIT PROTECTION.

REFERENCES:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 243 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 244 ABORT: 3/3

ITEM: RESISTOR A10R1&A17R1(5.1K)/N2-SUPPLY ISOL. VLV (2)  
FAILURE MODE: FAILED OPEN, SHORT, GROUND

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 245 ABORT: 3/3

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
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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

EFFECTS/RATIONALE:

VALVES ARE NOMINALLY OPEN. LOSS OF CAPABILITY TO ISOLATE ONE N2  
LEG.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 246 ABORT: 2/1R

ITEM: REGULATOR INLET VALVE LV1 & LV2/ N2 SYSTEM (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/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
 SUBSYSTEM: ARPCS FLIGHT: 2/1R  
 MDAC ID: 247 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
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
 SUBSYSTEM: ARPCS FLIGHT: 3/3  
 MDAC ID: 248 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
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATC:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 249 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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:

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 250 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.
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES	
	HDW/FUNC	ABORT
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: MC432-0222-0029

CAUSES: CORROSION, CONTAMINATION, BINDING, JAMMING, ELECTRICAL

EFFECTS/RATIONALE:

VALVE POSITION INDICATOR DOES NOT OPERATE. SYSTEM FUNCTION IS NOT AFFECTED.

REFERENCES:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 251 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.
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: JANTXVIN 4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 252 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: ME452-0102-7205

CAUSES: CORROSION, BINDING, JAMMING, PIECE PART FAILURE

EFFECTS/RATIONALE:  
SAME AS VALVE FAILED OPEN, MDAC ID 245.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 253 ABORT: 2/1R

ITEM: SWITCH, S14 & S22/REG. INLET VALVE (2)  
FAILURE MODE: NO CONTACT, VALVE 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
- 5)
- 6)
- 7)
- 8)
- 9)

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:	2/1R		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 254 ABORT: 3/3

ITEM: CIRCUIT BREAKER CB20 & CB21/REG. INLET VALVE (2)  
FAILURE MODE: CLOSE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CORROSION, PART FAILURE

EFFECTS/RATIONALE:  
SYSTEM IS OPERATIONAL BUT WITHOUT CIRCUIT OVERLOAD PROTECTION.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 255 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 256 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: RLRO5C512GR

CAUSES: VIBRATION, SHOCK, THERMAL STRESS

EFFECTS/RATIONALE:

VALVE POSITION INDICATOR DOES NOT OPERATE. SYSTEM FUNCTION IS NOT AFFECTED.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 257 ABORT: 2/1R

ITEM: NITROGEN REGULATOR VALVE (200 PSIG)  
FAILURE MODE: FAILED OPEN, 2ND STAGE REGULATOR, INTERNAL  
LEAKEAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL - REGULATOR ASSY
- 5)
- 6)
- 7)
- 8)
- 9)

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:	2/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 258 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL - REGULATOR ASSY
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 259 ABORT: 2/1R

ITEM: NITROGEN REGULATOR VALVE (200 PSIG)  
FAILURE MODE: EXTERNAL LEAK

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL - REGULATOR ASSY
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 260 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL - REGULATOR ASSY
- 5)
- 6)
- 7)
- 8)
- 9)

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, 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 261 ABORT: 2/1R

ITEM: NITROGEN RELIEF VALVE (275 PSIG) (2)  
FAILURE MODE: FAILED OPEN, INTERNAL OR 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
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 262 ABORT: 2/1R

ITEM: NITROGEN RELIEF VALVE (275 PSIG) (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) N2/O2 SUPPLY PANEL - REGULATOR ASSY
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	1/1
MDAC ID:	263	ABORT:	1/1

ITEM:                    LINES & FITTINGS  
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.
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
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		

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

LOCATION:                CREW MODULE AND MID-FUSELAGE  
PART NUMBER:        V070-634465

CAUSES:    SHOCK, VIBRATION, CORROSION, PART FAILURE

EFFECTS/RATIONALE:

1) IF THE LEAK IS BETWEEN THE TANK AND THE N2 SUPPLY VALVE, THE LEAK CAN BE ISOLATED AND THE REMAINING N2 SUPPLY CAN BE USED TO RETURN. 2) IF THE LEAK IS BETWEEN THE N2 SUPPLY VALVE AND THE SHUTOFF VALVE TO THE REGULATOR, THE SYSTEM IS NOT REDUNDANT AND N2 WILL BE DEPLETED UNTIL THE SYSTEMS ARE NOT OPERABLE. 3) IF THE LEAK IS AT THE TEST PORTS OR DOWNSTREAM FROM THE REGULATOR VALVE, THE LEAK CAN BE ISOLATED AND THE REDUNDANT SYSTEM USED.

REFERENCES:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: MC250-0002

CAUSES: VIBRATION, SHOCK, PIECE FAILURE, CONTAMINATION

EFFECTS/RATIONALE:  
NO MAJOR EFFECT, POSSIBLE CONTAMINATION OF ITEMS DOWNSTREAM.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 265 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 266 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) N2/O2 SUPPLY PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 267 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
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 268 ABORT: 3/3

ITEM: PRESSURE SENSOR (2)  
FAILURE MODE: OUT OF TOLERANCE (FULL/ZERO OUTPUT)

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 269 ABORT: 3/2R

ITEM: SHUTOFF VALVE (2) (PNL M010W)  
FAILURE MODE: FAILED OPEN

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CONTROL PANEL, PAYLOAD INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 270 ABORT: 3/3

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)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 271 ABORT: 2/1R

ITEM: SHUTOFF VALVE (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 CONTROL PANEL, PAYLOAD INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 272 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 4 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 273 ABORT: 2/1R

ITEM: ORIFICE 10 LBM/HR (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 CONTROL PANEL, PAYLOAD INTERFACE
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	2/1R		

REDUNDANCY SCREENS: A [ 4 ] B [ F ] C [ P ]

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 CAPABILITY TO MAINTAIN PRESSURE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 274 ABORT: 3/3

ITEM: CROSSOVER VALVE (1)  
FAILURE MODE: FAILED OPEN

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CONTROL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 275 ABORT: 3/3

ITEM: CROSSOVER VALVE (1)  
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
- 5)
- 6)
- 7)
- 8)
- 9)

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: MC250-0002

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

EFFECTS/RATIONALE:  
VALVE NOMINALLY CLOSED. REDUCES OPERATIONAL FLEXIBILITY.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 276 ABORT: 1/1

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 277 ABORT: 3/3

ITEM: SHUTOFF VALVE, H2O TANK REGULATOR INLET VALVE (2)  
FAILURE MODE: FAILED OPEN (INTERNAL LEAKAGE)

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: MC250-0002

CAUSES: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:

NO EFFECT, VALVE NOMINALLY OPEN. REDUCES OPERATIONAL FLEXIBILITY  
TO ISOLATE N2 LINE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 278 ABORT: 3/2R

ITEM: SHUTOFF VALVE, H2O TANK REGULATOR INLET 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) O2/N2 CONTROL PANEL, WATER MANAGEMENT
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 279 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES	
	HDW/FUNC	ABORT
PRELAUNCH:	3/2R	RTLS: 3/1R
LIFTOFF:	3/1R	TAL: 3/1R
ONORBIT:	3/1R	AOA: 3/1R
DEORBIT:	3/1R	ATO: 3/1R
LANDING/SAFING:	3/3	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 280 ABORT: 3/1R

ITEM: REGULATOR, 15.5-17 PSIG (2)  
FAILURE MODE: FAILED OPEN

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 281 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)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

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. MCLAUGHLIN SUBSYS LEAD: M.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 283 ABORT: 3/1R

ITEM: RELIEF VALVE  
FAILURE MODE: FAILED OPEN (EXTERNAL LEAKAGE)

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 285 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, WATER MANAGEMENT
- 5)
- 6)
- 7)
- 8)
- 9)

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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 286 ABORT: 3/3

ITEM: ISOLATION VALVE-REGULATOR OUTLET  
FAILURE MODE: FAILED OPEN

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 287 ABORT: 3/2R

ITEM: ISOLATION VALVE-REGULATOR OUTLET  
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
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 288 ABORT: 3/1R

ITEM: ISOLATION VALVE-REGULATOR OUTLET  
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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES	
	HDW/FUNC	ABORT
PRELAUNCH:	3/2R	RTLS: 3/1R
LIFTOFF:	3/1R	TAL: 3/1R
ONORBIT:	3/1R	AOA: 3/1R
DEORBIT:	3/1R	ATO: 3/1R
LANDING/SAFING:	3/3	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: CREW MODULE  
PART NUMBER: MC250-0002

CAUSES: SHOCK, VIBRATION CORROSION CONTAMINATION

EFFECTS/RATIONALE:  
SAME EFFECT AS MDAC ID 283.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 289 ABORT: 1/1

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
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

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		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 290 ABORT: 3/1R

ITEM: H2O ALTERNATE PRESSURE VALVE (1)  
FAILURE MODE: FAILED CLOSED, INTERNAL LEAKAGE, EXTERNAL LEAKAGE

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 291 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
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/21	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 1/1  
MDAC ID: 292 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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		

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:

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 (INADVERTANTLY OPENS)

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CORROSION

EFFECTS/RATIONALE:  
LOSS OF OVERLOAD CIRCUIT PROTECTION. OTHERWISE, NO EFFECT.

REFERENCES:

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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: RLR05C512GR

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:  
NO EFFECT. LOSS OF SWITCH POSITION INDICATION (S28).

REFERENCES:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CONTROL PANEL, WATER MANAGEMENT
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 297 ABORT: 3/1R

ITEM: O2/N2 CONTROL VALVE, LV1&LV2 (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) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 298 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 299 ABORT: 2/1R

ITEM: O2/N2 CONTROL VALVE, LV1&LV2 (2)  
FAILURE MODE: EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL-PANEL L2
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

LOCATION: CREW MODULE  
PART NUMBER: ME452-0102-7206

CAUSES: VIBRATION, CORROSION, CONTAMINATION, ELECTRICAL, PART  
FAILURE

EFFECTS/RATIONALE:  
SEE MDAC ID 298.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 302 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL-PANEL L2
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

LOCATION: CREW MODULE  
PART NUMBER: ME452-0102-7206

CAUSES: VIBRATION, CORROSION CONTAMINATION, PART FAILURE

EFFECTS/RATIONALE:  
SEE MDAC ID 297.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	3/3
MDAC ID:	303	ABORT:	3/3

ITEM: SWITCH, S16&S19/O2/N2 CONTROLLER VALVE (2)  
FAILURE MODE: FAILED AUTO-VALVE OPERATES

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
- 5)
- 6)
- 7)
- 8)
- 9)

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:    ME452-0102-7206

CAUSES:    VIBRATION, CORROSION CONTAMINATION, PART FAILURE

EFFECTS/RATIONALE:  
NO EFFECT, EXCEPT INABILITY TO CLOSE/OPEN VALVE MANUALLY IF REQUIRED.

REFERENCES:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL-PANEL L2
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: RLR05C512GR

CAUSES: CONTAMINATION, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:  
NO EFFECT. LOSS OF SWITCH POSITION INDICATION (S16, 17, 19).

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 305 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.  
SAIIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL-PANEL L2
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: ME452-0102-7301

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

EFFECTS/RATIONALE:  
NO EFFECT. LOOSE THE FLEXIBILITY TO SWITCH CONTROLLERS.

REFERENCES:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL-PANEL L2
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 307 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	HDW/FUNC	CRITICALITIES	HDW/FUNC
PRELAUNCH:	3/2R	ABORT	3/2R
LIFTOFF:	3/2R	RTLS:	3/2R
ONORBIT:	3/2R	TAL:	3/2R
DEORBIT:	3/2R	AOA:	3/2R
LANDING/SAFING:	3/3	ATO:	3/2R

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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 PPO2 SENSOR C. LOSS OF ALL REDUNDANCIES  
WILL ABORT THE MISSION WITH CREW IN LEH AND PCS CONFIGURED TO  
FLOW N2 TO MAINTAIN PRESSURE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 308 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 309 ABORT: 3/2R

ITEM: O2/N2 CONTROLLER (2)  
FAILURE MODE: INABILITY TO OPERATE (NO SIGNAL)

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/1R  
MDAC ID: 310 ABORT: 3/1R

ITEM: PPO2 SENSORS A+B (2)  
FAILURE MODE: FAILS TO SENSE (ZERO OUTPUT SIGNAL)

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 311 ABORT: 3/2R

ITEM: PPO2 SENSORS A+B (2)  
FAILURE MODE: FULL OUTPUT SIGNAL

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	10/29/86	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARPCS	FLIGHT:	2/2
MDAC ID:	312	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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/2	RTLS:	2/2
LIFTOFF:	2/2	TAL:	2/2
ONORBIT:	2/2	AOA:	2/2
DEORBIT:	2/2	ATO:	2/2
LANDING/SAFING:	3/3		

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

LOCATION:            CREW MODULE  
PART NUMBER:    MC250-0002-0060

CAUSES:    CONTAMINATION, CORROSION, VIBRATION, SHOCK

EFFECTS/RATIONALE:

BASED ON ITS USAGE 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 313 ABORT: 3/3

ITEM: SWITCH, PPO2 CONTROLLER (2)  
FAILURE MODE: FAILED IN "NORMAL" POSITION

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: 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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 315 ABORT: 3/3

ITEM: RESISTORS/10K (2)  
FAILURE MODE: FAILED OPEN, SHORT

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: ELECTRICAL, THERMAL STRESS, CONTAMINATION, CORROSION,  
ANY CONTACT

EFFECTS/RATIONALE:  
LOSS OF PPO2 CONTROLLER SWITCH INDICATION.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 316 ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB18&CB19 (2)  
FAILURE MODE: FAILED CLOSED (CONDUCTING)

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CONTAMINATION, CORROSION

EFFECTS/RATIONALE:  
LOSS OF OVERLOAD CIRCUIT PROTECTION, OTHERWISE NO EFFECT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 317 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 318 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
- 5)
- 6)
- 7)
- 8)
- 9)

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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 319 ABORT: 3/3

ITEM: METER, M4/PPO2 READING (1)  
FAILURE MODE: ANY FAILURE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: MC432-0238

CAUSES: SHOCK, VIBRATION

EFFECTS/RATIONALE:

LOSS OF METER READING OF PPO2 LEVEL-DATA AVAILABLE FROM PASS/BFS  
DISPLAYS.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 320 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
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 321 ABORT: 3/3

ITEM: METER, M3/O2/N2 FLOW READING (1)  
FAILURE MODE: ANY FAILURE (OUT OF TOLERANCE)

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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 HDW/FUNC  
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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 323 ABORT: 3/3

ITEM: METER, M4/CABIN PRESSURE READING (1)  
FAILURE MODE: ANY FAILURE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: MC432-0238

CAUSES: VIBRATION, SHOCK

EFFECTS/RATIONALE:  
LOSS OF METER READING OF CABIN PRESSURE. DATA AVAILABLE THROUGH  
THE COMPUTERS.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 324 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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 325 ABORT: 3/3

ITEM: METER, M3/DP/DT READING (1)  
FAILURE MODE: ANY FAILURE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: MC432-0238

CAUSES: SHOCK, VIBRATION, LEAKAGE

EFFECTS/RATIONALE:

DP/DT MEASUREMENT IS AVAILABLE ON PASS AND BFS DISPLAYS - NO EFFECT.

REFERENCES:

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 SUBSYS LEAD: M.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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: MC454-0026-2030

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:  
LOSS OF CIRCUIT OVERLOAD PROTECTION - NO EFFECT.

REFERENCES:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/2	RTLS:	3/3
LIFTOFF:	2/2	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 328 ABORT: 3/3

ITEM: KLAXON/DP/DT (1)  
FAILURE MODE: ANY CREDIBLE FAILURE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) N2 ASSEMBLY
- 4) O2/N2 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 329 ABORT: 2/1R

ITEM: LINES & FITTINGS  
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 CNTRL PANEL
- 5)
- 6)
- 7)
- 8)
- 9)

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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 330 ABORT: 3/2R

ITEM: ISOLATION VALVE/MOTOR DRIVEN (2)  
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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:	3/2R		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 331 ABORT: 2/1R

ITEM: ISOLATION VALVE/MOTOR DRIVEN (2)  
FAILURE MODE: FAILED CLOSED, EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 333 ABORT: /NA

ITEM: MOTOR/ISOLATION VALVE (2)  
FAILURE MODE: LOSS OF OUTPUT (VALVE IN CLOSED POSITION)

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

LOCATION: CREW MODULE  
PART NUMBER:

CAUSES:

EFFECTS/RATIONALE:

VALVE IS CHECKED OUT PRELAUNCH, AND REMAINS OPEN THROUGHOUT MISSION. THERE IS NO MANUAL OVERRIDE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 334 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/2R  
MDAC ID: 335 ABORT: 3/2R

ITEM: SWITCH, S1&S2/POSITIVE RELIEF VALVE (2)  
FAILURE MODE: FAILED ENABLED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		HDW/FUNC
	HDW/FUNC	ABORT	
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		

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 337 ABORT: 2/1R

ITEM: SWITCH, S1&S2/POSITIVE RELIEF VALVE (2)  
FAILURE MODE: PREMATURELY CLOSES (INADVERTENTLY CLOSES)

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES	
	HDW/FUNC	ABORT
PRELAUNCH:	3/2R	RTLS: 2/1R
LIFTOFF:	2/1R	TAL: 2/1R
ONORBIT:	3/1R	AOA: 2/1R
DEORBIT:	2/1R	ATO: 2/1R
LANDING/SAFING:	3/3	

REDUNDANCY SCREENS: A [ 1 ] B [ P ] C [ P ]

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 339 ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB17&CB22 (2)  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: MC454-0026-2030

CAUSES: VIBRATION, SHOCK, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:  
NO SIGNIFICANT EFFECT, EXCEPT LOSS OF CIRCUIT OVERLOAD  
PROTECTION.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 340 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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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: SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:  
LOSS OF VALVE POSITION INDICATION, NON-ESSENTIAL.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 341 ABORT: 3/3

ITEM: DIODE, DS1 & DS2 (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) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

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

REFERENCES:

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.  
SAIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 343 ABORT: 2/1R

ITEM: RELIEF VALVE, 16 PSIA  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/2R	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 344 ABORT: 2/1R

ITEM: FILTER (2)  
FAILURE MODE: RESTRICTED FLOW

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: CREW MODULE  
PART NUMBER:

CAUSES: CORROSION, CONTAMINATION

EFFECTS/RATIONALE:  
SEE MDAC ID 343, RELIEF VALVE FAILED CLOSED.

REFERENCES:

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 SUBSYS LEAD: M.  
SAIIDI

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) POSITIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:  
NO EFFECT.

REFERENCES:

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. MCLAUGHLIN SUBSYS LEAD: M.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) CABIN VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 347 ABORT: /NA

ITEM: FILTER (1)  
FAILURE MODE: FAILED OPEN

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) CABIN VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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

LOCATION: CREW MODULE  
PART NUMBER:

CAUSES: SHOCK, VIBRATION

EFFECTS/RATIONALE:  
NO EFFECT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 348 ABORT: 2/1R

ITEM: VENT VALVE, MOTORIZED (2)  
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) CABIN VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2	RTLS:	3/3
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	2/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 349 ABORT: 3/3

ITEM: VENT VALVE, MOTORIZED (2)  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) CABIN VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 350 ABORT: /NA

ITEM: SINGLE PHASE MOTOR (2)  
FAILURE MODE: LOSS OF OUTPUT

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) CABIN VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 351 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
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

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
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

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
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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

LOCATION: CREW MODULE  
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:  
SAME AS FAILED CLOSED.

REFERENCES:

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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) CABIN VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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

LOCATION: CREW MODULE  
PART NUMBER:

CAUSES: SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:  
SAME AS FAILED CLOSED, MDAC ID 352.

REFERENCES:



INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 355 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
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 356 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
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 357 ABORT: 3/3

ITEM: DIODE, DS3 & DS4 (4)  
FAILURE MODE: OPEN SHORTS OUT OF TOLERANCE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) CABIN VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: JANTXVIN4246

CAUSES: VIBRATION, SHOCK, THERMAL STRESS, CONTAMINATION

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

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 358 ABORT: 3/3

ITEM: CIRCUIT BREAKER, CB22 & CB34 (2)  
FAILURE MODE: FAILED CLOSED

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) CABIN VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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: 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 359 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
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 360 ABORT: 2/1R

ITEM: RELIEF VALVE (2)  
FAILURE MODE: FAILED OPEN, INTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) NEGATIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	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		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 361 ABORT: 2/1R

ITEM: RELIEF VALVE (2)  
FAILURE MODE: FAILED CLOSED, EXTERNAL LEAKAGE

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) NEGATIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	3/3	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 362 ABORT: 2/1R

ITEM: CAP (2)  
FAILURE MODE: INABILITY TO POP

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) NEGATIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	3/3	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

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:



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.  
SAIID

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) NEGATIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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, 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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 2/1R  
MDAC ID: 364 ABORT: 2/1R

ITEM: DEBRIS SCREEN (2)  
FAILURE MODE: RESTRICTED FLOW

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) NEGATIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	3/3	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

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:

INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: ARPCS FLIGHT: 3/3  
MDAC ID: 365 ABORT: 3/3

ITEM: DEBRIS SCREEN (2)  
FAILURE MODE: FAILED OPEN

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

BREAKDOWN HIERARCHY:

- 1) ARPCS
- 2) AMC
- 3) NEGATIVE RELIEF VENT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

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: LEFT PLENUM, BELOW HATCH  
PART NUMBER:

CAUSES: SHOCK, VIBRATION

EFFECTS/RATIONALE:  
NO EFFECT - IT IS PRIMARILY USED TO KEEP CONTAMINANTS OUT.

REFERENCES:

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)

FLIGHT PHASE	CRITICALITIES		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

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:

APPENDIX D  
POTENTIAL CRITICAL ITEMS

MDAC-ID	FLIGHT	ITEM	FAILURE MODE
103	1/1	AUX. 02 SUPPLY TANK (1)	RUPTURE
104	1/1	AUX. 02 SUPPLY TANK (1)	EXTERNAL LEAKAGE
107	1/1	SUPPLY VALVE-LV5(1)	FAILED CLOSED, CLOGGED FILTERS
108	1/1	SUPPLY VALVE-LV5(1)	EXTERNAL LEAKAGE
112	1/1	MOTOR/SHUTOFF VALVE (1)	LOSS OF OUTPUT (VALVE IN CLOSED POSITION)
114	1/1	SWITCH-S12	SWITCH FAILED CLOSED
119	1/1	QUICK DISCONNECT/GSE (1)	EXTERNAL LEAKAGE
125	1/1	CAP/GSE DISCONNECT	EXTERNAL LEAKAGE
127	1/1	PRESSURE REGULATOR/300 PSIG (1)	FAILED CLOSED, 1ST OR SECOND STAGE
128	1/1	PRESSURE REGULATOR/300 PSIG (1)	EXTERNAL LEAKAGE, 1ST OR 2ND STAGE
129	1/1	RELIEF VALVE, 1250 PSIG.	FAILED OPEN, INTERNAL LEAKAGE
131	1/1	RELIEF VALVE, 1250 PSIG.	EXTERNAL LEAKAGE
133	1/1	ISOLATION VALVE (1)	FAILED CLOSED
134	1/1	ISOLATION VALVE (1)	EXTERNAL LEAKAGE
135	1/1	LINES AND FITTINGS	EXTERNAL LEAKAGE
138	2/1R	CROSSOVER VALVE-LV3 AND LV4 (2)	FAILED CLOSED
139	2/1R	CROSSOVER VALVE-LV3 AND LV4 (2)	EXTERNAL LEAKAGE
141	2/1R	SWITCH-S15 AND S18 (2)	SWITCH FAILED CLOSED (VALVE IS CLOSED)
143	2/1R	CIRCUIT BREAKER-CB19 & CB20 (2)	FAILED OPEN
145	2/1R	FILTER-10 MICRONS (2)	RESTRICTED FLOW, CLOGGED
147	2/1R	ORIFICE- LOOP1&2 (3)	RESTRICTED FLOW (CLOGGED) (LOOP 1)
149	2/1R	ORIFICE- LOOP1&2 (3)	EXTERNAL LEAKAGE
150	2/1R	LINES AND FITTINGS	EXTERNAL LEAKAGE
152	2/1R	LEH 02 SUPPLY VALVE (2)	FAILED CLOSED
153	2/1R	LEH 02 SUPPLY VALVE (2)	EXTERNAL LEAKAGE
154	2/1R	LEH 02 REGULATOR (2)	FAILED OPEN, LOSS OF REGULATION
155	2/1R	LEH 02 REGULATOR (2)	FAILED CLOSED
156	2/1R	LEG 02 REGULATOR (2)	EXTERNAL LEAKAGE
157	2/1R	RELIEF VALVE-245 PSIG (2)	FAILED OPEN, INTERNAL/EXTERNAL LEAKAGE
159	2/1R	FILTER-10 MICRONS (2)	RESTRICTED FLOW (CLOGGED)
162	2/1R	CHECK VALVE	FAILED CLOSED
164	1/1	LEH 02 SHUTOFF VALVE/CREW (8)	FAILED CLOSED
165	1/1	LEH 02 SHUTOFF VALVE/CREW (8)	EXTERNAL LEAKAGE
166	1/1	QUICK DISCONNECTS (8)	INABILITY TO MATE

APPENDIX D  
POTENTIAL CRITICAL ITEMS

MDAC-ID	FLIGHT	ITEM	FAILURE MODE
168	1/1	QUICK DISCONNECTS (8)	EXTERNAL LEAKAGE
171	1/1	LEH #5, BLEED ORIFICE	INABILITY TO DEMATE
174	1/1	SHUTOFF VALVE/DIRECT OXYGEN (1)	FAILED OPEN, OR EXTERNAL LEAKAGE
175	2/1R	SHUTOFF VALVE/DIRECT OXYGEN (1)	FAILED CLOSED
176	2/1R	ORIFICE-DIRECT BLEED (1)	RESTRICTED FLOW
177	2/1R	FILTER/CHECK VALVE (2)	FAILED CLOSED, RESTRICTED FLOW
179	2/1R	FILTER/CHECK VALVE (2)	EXTERNAL LEAKAGE
186	2/1R	REGULATOR INLET SOV (2)	EXTERNAL LEAKAGE
189	2/1R	REGULATOR - 100 PSIG (2)	EXTERNAL LEAKAGE
207	2/1R	14.7 PSI REG INLET SOV (2)	EXTERNAL LEAKAGE
208	2/1R	14.7 PSI REGULATOR	FAILED OPEN, EXTERNAL/INTERNAL LEAKAGE
210	2/1R	8 PSI REGULATOR (2)	FAILED OPEN
212	2/1R	N2 TANKS (4)	RUPTURE, EXTERNAL LEAKAGE
214	1/1	LINES & FITTINGS - TP27 & TP28	EXTERNAL LEAKAGE
216	1/1	GSE QUICK DISCONNECT (1)	EXTERNAL LEAKAGE
218	1/1	GSE CAP (1)	EXTERNAL/INTERNAL LEAKAGE
224	2/1R	ISOLATION VALVE (2)	EXTERNAL LEAKAGE
232	2/1R	LINES & FITTINGS	EXTERNAL LEAKAGE, DWNSTRM OF MMU ISOL.VLV
234	2/1R	N2 SUPPLY ISOL. VLV-LV3&LV4 (2)	FAILED CLOSED
235	2/1R	N2 SUPPLY ISOL. VLV-LV3&LV4 (2)	EXTERNAL LEAKAGE
237	2/1R	MOTOR/N2-SYSTEM ISOL. VLV (2)	INABILITY TO OPERATE - VALVE IS CLOSED
241	2/1R	SWITCH, S13&S21 (2)	FAILED CLOSED
246	2/1R	REG INLET VALVE LV1 & LV2 (2)	FAILED CLOSED
247	2/1R	REG INLET VALVE LV1 & LV2 (2)	EXTERNAL LEAK
253	2/1R	SWITCH, S14 & S22 (2)	NO CONTACT, VALVE CLOSED
257	2/1R	N2 REGULATOR VALVE (200 PSIG)	FAILED OPEN, 2ND STAGE REG., INT. LEAK
258	2/1R	N2 REGULATOR VALVE (200 PSIG)	FAILED CLOSED, 1ST OR 2ND STAGE REG.
259	2/1R	N2 REGULATOR VALVE (200 PSIG)	EXTERNAL LEAK
261	2/1R	N2 RELIEF VALVE (275 PSIG) (2)	FAILED OPEN, INTERNAL OR EXTERNAL LEAK
262	2/1R	N2 RELIEF VALVE (275 PSIG) (2)	FAILED CLOSED
263	1/1	LINES & FITTINGS	EXTERNAL LEAK
265	2/1R	FILTER/CHECK VALVE (2)	RESTRICTED FLOW/CLOGGED, CHK.VLV. CLOSED
266	2/1R	FILTER/CHECK VALVE (2)	EXTERNAL LEAKAGE
271	2/1R	SHUTOFF VALVE (2)	EXTERNAL LEAKAGE

APPENDIX D  
POTENTIAL CRITICAL ITEMS

MDAC-ID	FLIGHT	ITEM	FAILURE MODE
273	2/1R	ORIFICE 10 LBM/HR (2)	EXTERNAL LEAKAGE
276	1/1	CROSSOVER VALVE (1)	EXTERNAL LEAKAGE
289	1/1	H2O ALTERNATE PRESSURE VALVE (1)	FAILED OPEN, INTERNAL/EXTERNAL LEAKAGE
292	1/1	SWITCH, S28 (1)	FAILURE TO TRANSFER/INADVERTENTLY OPENS
298	2/1R	O2/N2 CONTROL VALVE, LV1&LV2 (2)	FAILED CLOSED
299	2/1R	O2/N2 CONTROL VALVE, LV1&LV2 (2)	EXTERNAL LEAKAGE
301	2/1R	SWITCH, S16&S19 (2)	FAILED CLOSED-VALVE IS CLOSED
312	2/2	PPO2 SENSOR-C (1)	OUT OF TOLERANCE (FULL/ZERO OUTPUT)
317	2/1R	CIRCUIT BREAKER, CB18&CB19 (2)	FAILED OPEN
327	2/2	CIRCUIT BREAKER, CB16/DP/DT (1)	FAILED OPEN
329	2/1R	LINES & FITTINGS	EXTERNAL LEAKAGE
331	2/1R	ISOLATION VALVE/MOTOR DRIVEN (2)	FAILED CLOSED, EXTERNAL LEAKAGE
337	2/1R	SWITCH, S1&S2 (2)	PREMATURELY CLOSES/INADVERTENTLY CLOSES
342	2/1R	RELIEF VALVE, 16 PSIA	FAILED OPEN, INTERNAL LEAKAGE
343	2/1R	RELIEF VALVE, 16 PSIA	FAILED CLOSED
344	2/1R	FILTER (2)	RESTRICTED FLOW
348	2/1R	VENT VALVE, MOTORIZED (2)	FAILED OPEN, INTERNAL LEAKAGE
360	2/1R	RELIEF VALVE (2)	FAILED OPEN, INTERNAL LEAKAGE
361	2/1R	RELIEF VALVE (2)	FAILED CLOSED, EXTERNAL LEAKAGE
362	2/1R	CAP (2)	INABILITY TO POP
364	2/1R	DEBRIS SCREEN (2)	RESTRICTED FLOW