INDEPENDENT ORBITER ASSESSMENT

ASSESSMENT
OF THE
ACTIVE
THERMAL CONTROL
SUBSYSTEM

12 FEBRUARY 1988

MCDONNELL DOUGLAS ASTRONAUTICS COMPANY
HOUSTON DIVISION

SPACE TRANSPORTATION SYSTEM ENGINEERING AND OPERATIONS SUPPORT

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Independent Orbiter Assessment
Assessment of the Active Thermal Control System FMEA/CIL

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 Modes and Effects Analysis (FMEA) and Critical Items List (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, PCN-2, 6 April 1987.

The IOA effort first completed an analysis of the Active Thermal Control System (ATCS) hardware, generating draft failure modes and potential critical items. To preserve independence, this analysis was accomplished without reliance upon the results contained within the NASA FMEA/CIL documentation.

The IOA results were then compared to the available NASA FMEA/CIL data which consisted of a summary listing of ATCS EPD&C FMEA/CILs dated 1 October 1987, a summary listing of ATCS mechanical FMEA/CILs dated 1 October 1987, and the ATCS waiverable mechanical CILs presented to the Level I/II Review Board and contained in the document numbered SSV88-12. Discrepancies from the comparison were documented, and where enough information was available, recommendations for resolution of the discrepancies were made. This report documents the results of that comparison for the Orbiter ATCS hardware.

The IOA product for the ATCS independent analysis consisted of 310 failure mode "worksheets" that resulted in 101 Potential Critical Items (PCI) being identified. A comparison was made to the available NASA data identified above which consisted of 252 FMEAs and 109 CIL items. The difference in the number of IOA analysis worksheets and NASA FMEAs can be explained by the different levels of analysis detail performed to identify failure modes. The comparison determined if there were any results found by the IOA which were not included in the NASA baseline, and, if there were any areas in which IOA recommended a criticality different than the one recommended by NASA. The discrepancies are covered in the following sections of this report. Due to budget re-evaluations, the IOA project was terminated before the discrepancies could be discussed with the NASA subsystem manager. Therefore, it should be kept in mind when reviewing this report that the discrepancies exist from the IOA point of view with no input from the NASA subsystem manager.

Figure 1 presents a comparison of the available NASA data and the IOA recommended criticalities. In many cases, one NASA FMEA was matched to multiple IOA worksheets. Again due to budget and time constraints, no attempt was made to consolidate these multiple worksheets into a single FMEA. This results in a larger number of IOA FMEA worksheets than NASA FMEAs. It should also be noted

that the number of issues relates to the number of IOA worksheets with different criticalities. The number of CIL issues reflects the number of items which should or should not be on the CIL. If IOA and NASA criticalities are different, but both will appear on the CIL, the discrepancy will add to the overall issue count, but not to the CIL issue count.

ATCS ASSESSMENT OVERVIEW

ATCS ASSESSMENT SUMMARY

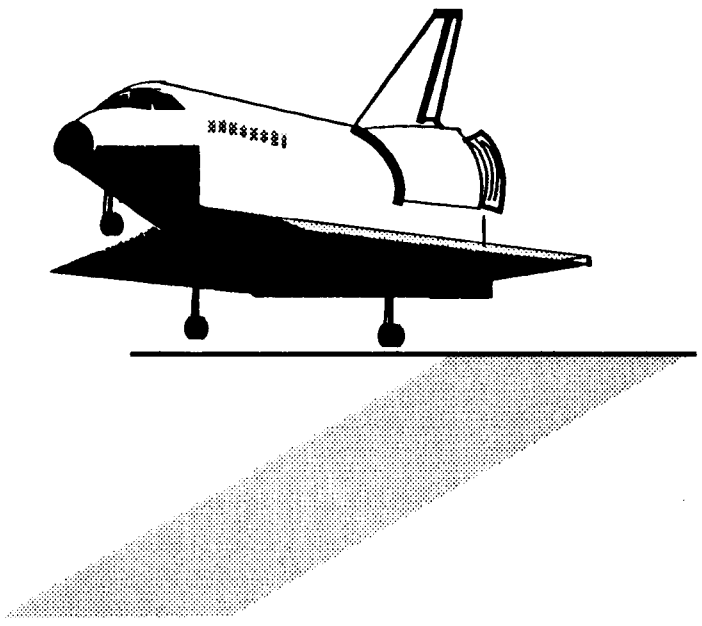
	IOA	NASA	ISSUES
FMEA	374	252	101
CIL	147	109	30

FCL

	IOA	NASA	ISSUES
FMEA	119	87	31
CIL	66	52	10

RFCA

	IOA	NASA	ISSUES
FMEA	52	43	6
CIL	25	19	6



FES

	IOA	NASA	ISSUES
FMEA	163	85	55
CIL	33	17	11

ABS

	IOA	NASA	ISSUES
FMEA	40	37	9
CIL	23	21	3

Figure 1 - ATCS FMEA/CIL ASSESSMENT OVERVIEW

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 re-evaluating the FMEA/CIL for the Space Shuttle design. The MDAC is providing an independent assessment of the proposed Post 51-L 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 proposed Post 51-L NASA and Prime Contractor FMEA/CIL. 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 FMEA/CIL which is documented in this report.

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 Ground Rules and Assumptions

The ground rules and assumptions used in the IOA are defined in Appendix B. The subsystem specific ground rules were defined to provide necessary additions and clarifications to the ground rules and assumptions contained in NSTS 22206.

3.0 SUBSYSTEM DESCRIPTION

3.1 Design and Function

The Active Thermal Control Subsystem (ATCS) is made up of four major systems consisting of the Freon Coolant Loop (FCL), Radiator and Flow Control Assembly (RFCA), Flash Evaporator System (FES), and Ammonia Boiler System (ABS). The ATCS is shown schematically in Figure 2.

Freon Coolant Loops

The Orbiter ATCS continuously circulates Freon 21 through two independent Freon Coolant Loops (FCL). Each loop consists of two redundant pumps, one accumulator, flow control valves, and several heat exchangers.

The FCL transfers heat from many orbiter systems while dumping the excess to either Ground Support Equipment (GSE) or the environment, depending upon mission phase. The main components that require cooling by the FCL are the three fuel cell stacks, equipment mounted to midbody coldplates, payload water coolant loop, and aft avionics/rate gyro assembly coldplates. Furthermore, the FCL is designed to provide heat to the hydraulic fluid and cabin oxygen.

During the prelaunch phase, heat is transferred from the FCL through the GSE heat exchanger. After lift-off, the General Purpose Computer (GPC) sends a command to initiate cooling of the FCL by the FES which continues until the payload bay doors are opened on-orbit. While the shuttle is on-orbit, heat removal from the FCLs is performed primarily by the radiators. The FES is available, however, to supplement the radiators as required.

Prior to de-orbit prep, the radiators are cold soaked. This cold-soaking allows the radiators to act as heat sinks when the payload bay doors are closed during entry. The primary heat extraction mechanism during entry is the FES, however. Additionally, the ABS will act as a supplement to the cold-soaked radiators when it is activated and the FES deactivated by GPC command at an altitude of 120K ft.

Radiator and Flow Control Assembly

The radiator is used as the primary method of rejecting heat from the Orbiter while on-orbit and as the secondary method during ascent and entry. Eight panels make up the radiator, four on each payload bay door. To increase heat rejection, the two forward panels on each door can be deployed. Once deployed, the forward panels are capable of radiating heat from both sides. The basic heat rejection capability from the panels is 61,000 BTU/hr, but is dependent on the Orbiter attitude.

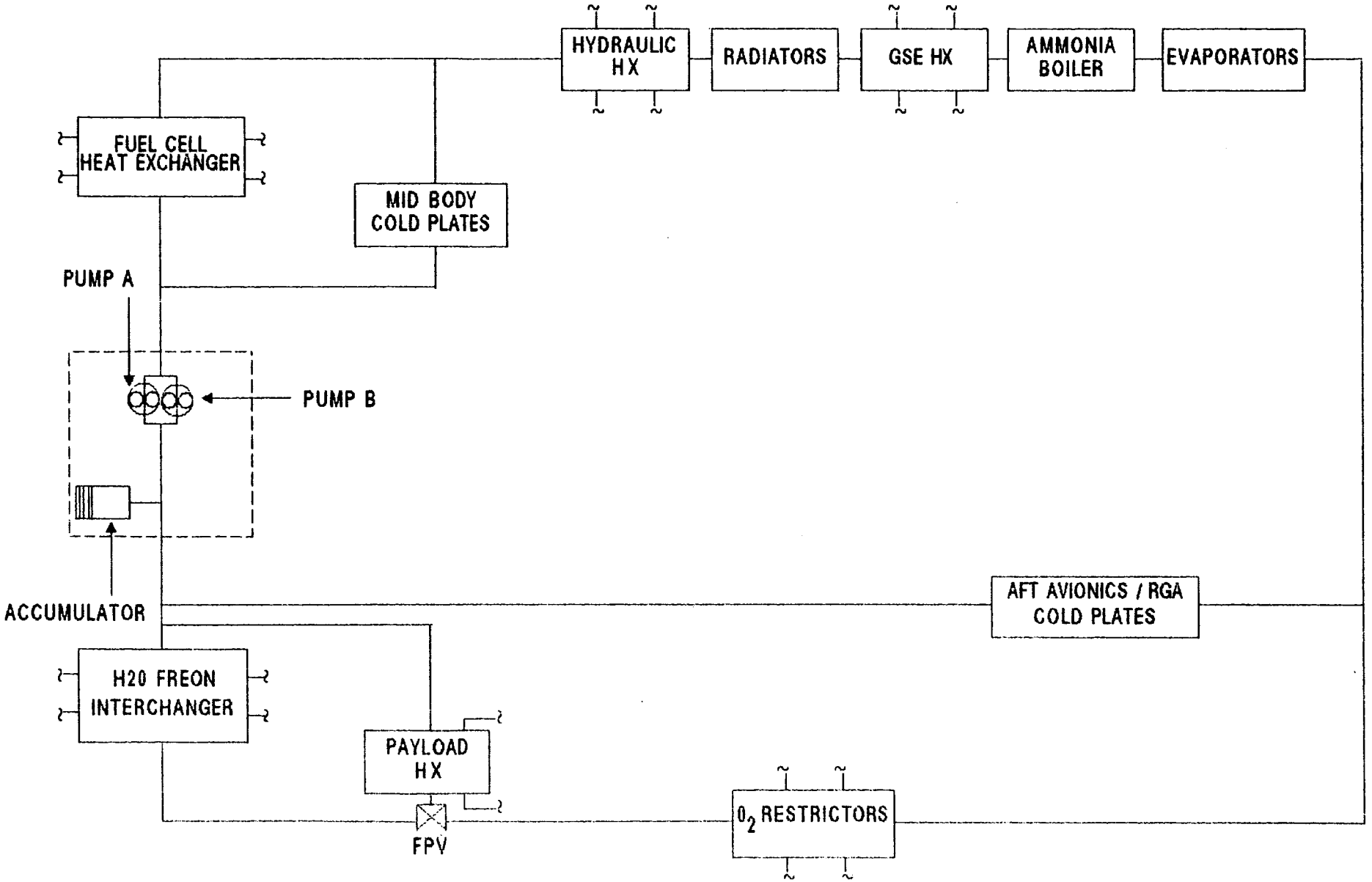


Figure 2 - ACTIVE THERMAL CONTROL SUBSYSTEM DIAGRAM

The Flow Control Assembly (FCA) is located downstream of the radiator panels. The main components of the FCA are the bypass valve, flow control valve, mode control valve and several controllers. The main purpose of the FCA is to control flow by either bypassing the radiator panels completely, as during a cold soak, or, by allowing only a certain percentage of warm freon to bypass the panels.

Flash Evaporator System

There are two flash evaporators: a high load evaporator which is sized to reject 95,000 BTU/hr; and a topping evaporator, sized to reject 35,500 BTU/hr. Both evaporators are used to reject these heat loads from the freon coolant loops during ascent at altitudes above 140,000 and during entry at altitudes above 120,000 ft. Additionally, the topping evaporator can be used to supplement the radiators during on-orbit operations.

The basic concept behind the operation of the flash evaporators is to flash water at its triple point pressure. To facilitate this flashing, the evaporators are cylindrical with a finned inner core. The hot Freon 21 from the FCLs flows around the finned core and water is sprayed onto the core from the nozzles in each evaporator. The water is vaporized and this process removes approximately 1,000 BTU per pound of water. In addition to the finned core, Freon 21 also flows through an anti-carryover device (ACOD) inside the evaporator to reduce the amount of water droplets in the exit ducts.

The water used for the flash evaporator operation comes from the supply water subsystem via two feedlines. A series of heaters maintain the desired temperature in both feedlines. An accumulator in each feedline maintains the required operating pressure. Each feedline separates in the vicinity of the evaporators so that each evaporator has an inlet valve/nozzle combination from each feedline. This yields redundant water supply paths for each evaporator.

Following vaporization in the flash evaporators, the water vapor is vented overboard via heated exit ducts terminating in heated nozzles. The topping evaporator has dual exit ducts terminating in sonic nozzles and is configured to provide non-propulsive venting. The high load evaporator has only one exit duct and gives a propulsive venting effect when used. There are concerns about the use of the high load evaporator when the vernier jets are being used to control the vehicle. For these reasons, and also to prevent possible payload contamination from the high load evaporator venting, the high load evaporator is not used while on-orbit.

The flash evaporator operation is controlled by three controllers (primary A, primary B, and secondary). The primary controllers operate in conjunction with a given feedline (A or B) and are capable of controlling both the topping and high load evaporators simultaneously. When using the secondary controller with the

high load evaporator, it is necessary to select either the A or the B feedline. The secondary controller will use both feedlines simultaneously when controlling the topping evaporator.

The controllers operate by opening the evaporator valve/nozzle at a frequency determined by the temperature of the Freon 21 loop at the appropriate evaporator exit. The primary controllers will set this pulsing at a frequency so that the topping evaporator is activated at an FCL exit temperature of 62 degrees F; and is inhibited when the exit temperature reaches a lower limit of 43 degrees F. Included in the primary controller circuitry is over- and under-temperature shutdown logic to protect the evaporators.

Ammonia Boiler System

The Ammonia Boiler System (ABS) is capable of cooling the freon coolant loop below 120,000 feet and until the GSE is connected by evaporating liquid anhydrous ammonia. The system configuration consists of two independent redundant paths to supply ammonia to the boiler. The main components of the ABS are the shell and tube heat exchanger, two controllers, six control valves, and two storage tanks. Ammonia tank control valves are operated by the controllers to deplete one tank before switching to the alternate tank. Since one tank will typically provide all the required cooling, the order of tank usage is switched from flight to flight. However, due to current entry configuration of the radiators/FES, operation the ABS is not required and is maintained as a contingency backup.

3.2 Interfaces and Locations

The location of the ATCS components on the Orbiter are shown in Figure 3.

The ATCS interfaces with the Air Revitalization System (ARS) at the H2O/Freon interchanger. At the interchanger, heat collected by the ARS is transferred to freon. The heat is then transferred to Ground Support Equipment (GSE) or into space via the radiators. The Electrical Power System (EPS) and pressurization systems also have heat removed by the ATCS. The hydraulic system is warmed at the hydraulic heat exchanger by hot freon.

The Active Thermal Control System interfaces with the Electrical Power Distribution & Control (EPD&C) system, the Display and Control (D&C) system, the instrumentation system, and GPC software. The EPD&C system provides the electric power and the control assemblies for motors and valves. The D&C system provides the capability for the crew to monitor, configure or manually control the systems where necessary. The instrumentation system processes the performance parameters required for system monitoring and control. The GPC software provides automatic control.

3.3 Hierarchy

Figure 4 illustrates the hierarchy of the ATCS hardware and the corresponding subcomponents. Figures 5 through 22 comprise the detailed system representations.

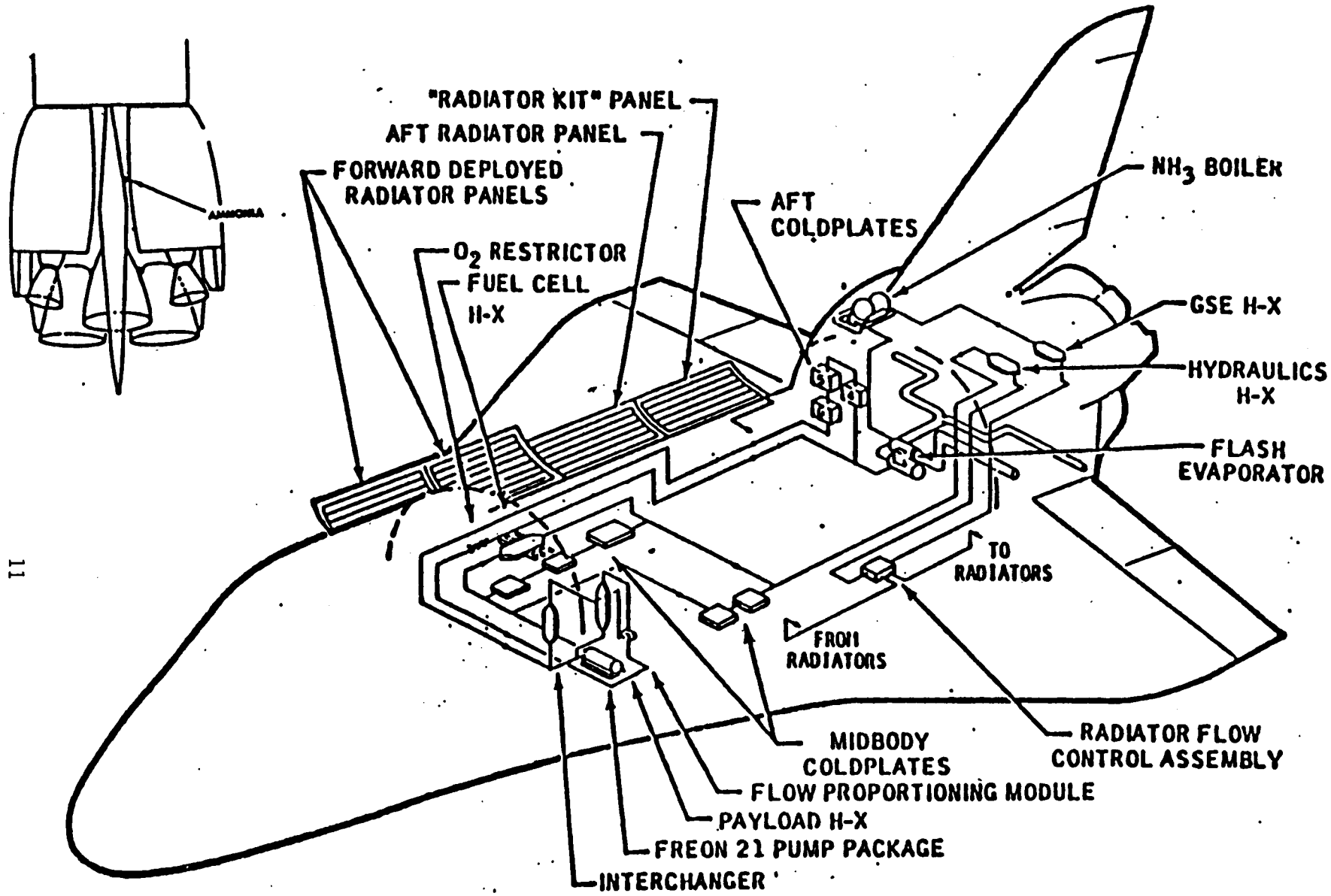


Figure 3 - ACTIVE THERMAL CONTROL SUBSYSTEM COMPONENT LOCATION

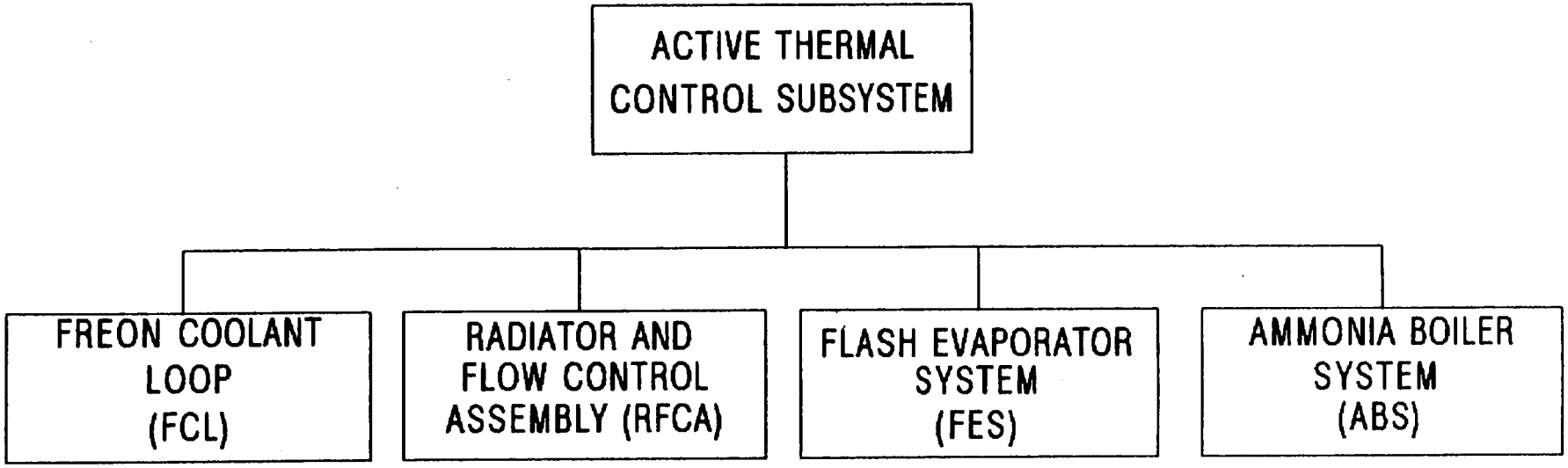


Figure 4 - ACTIVE THERMAL CONTROL SUBSYSTEM ANALYSIS HIERARCHY

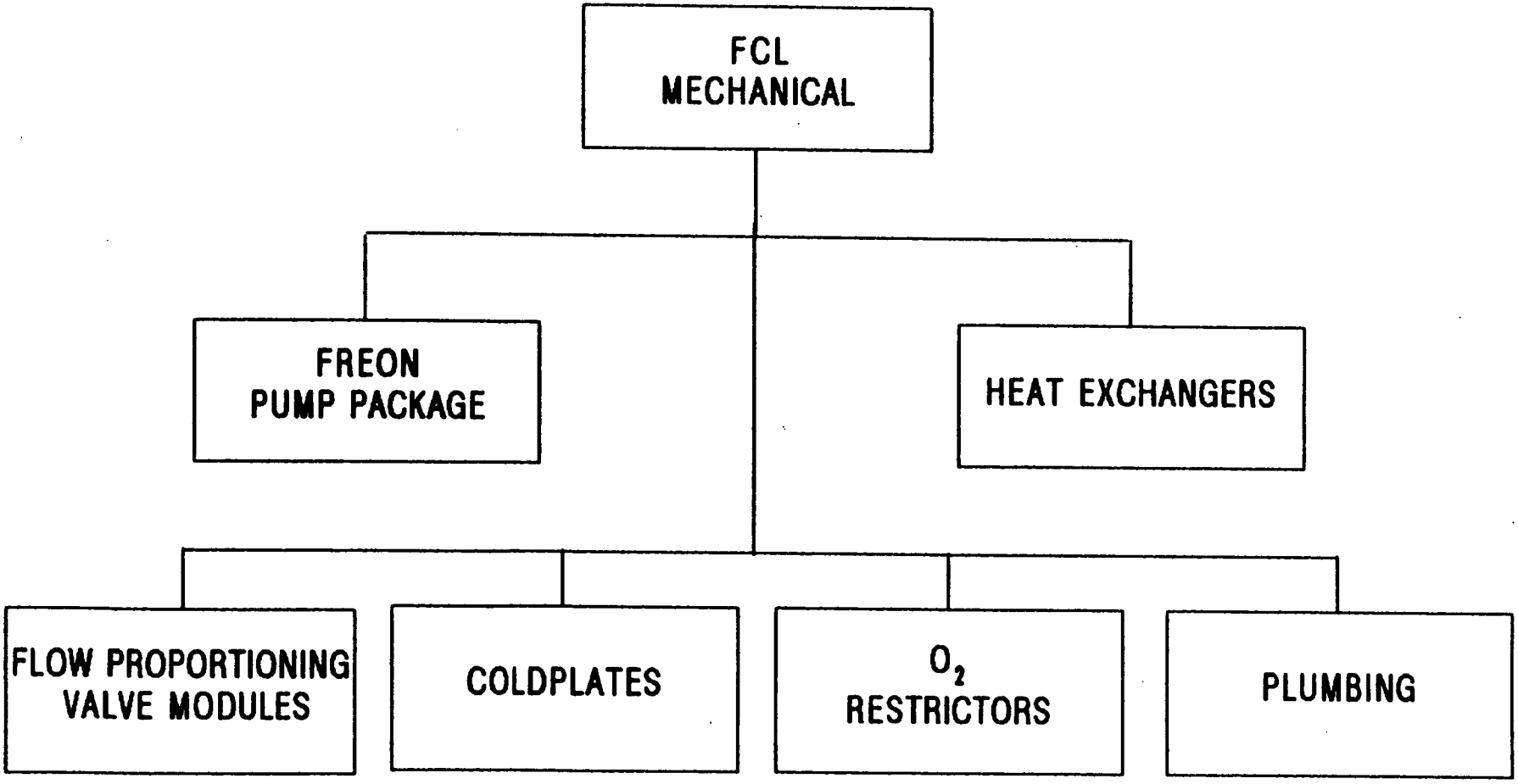


Figure 5 - FREON COOLANT LOOP MECHANICAL

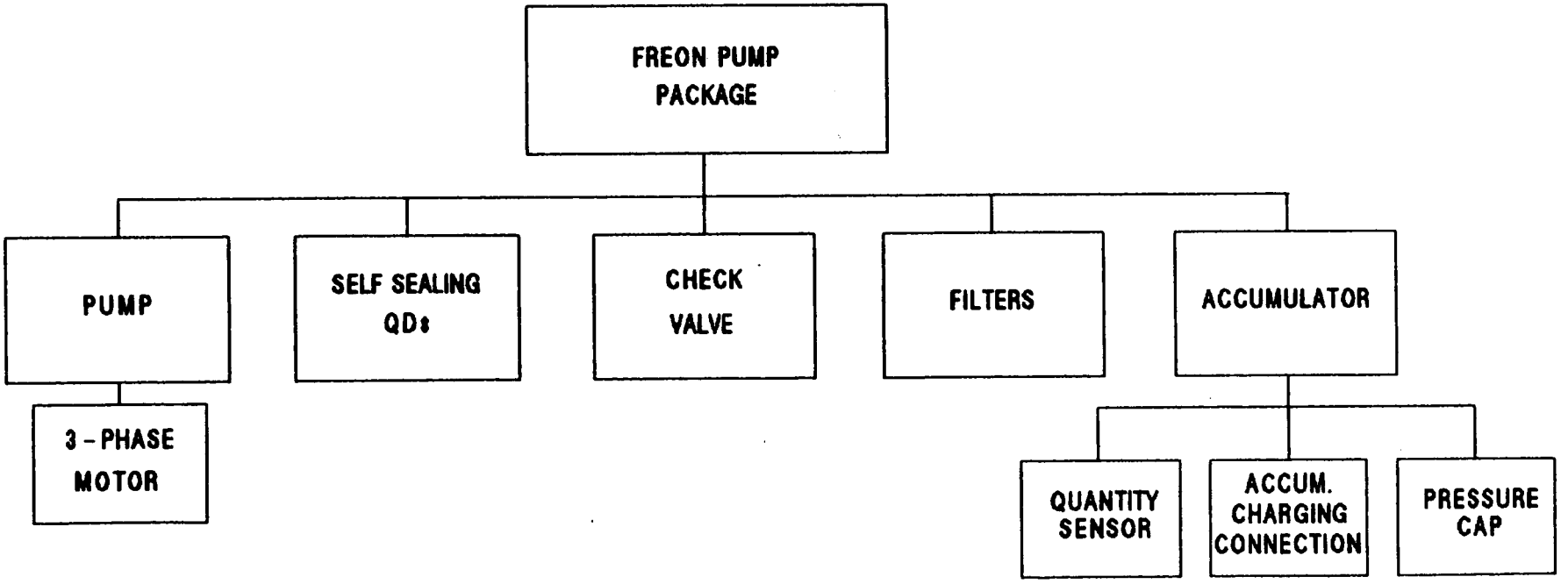


Figure 6 - FREON PUMP PACKAGE

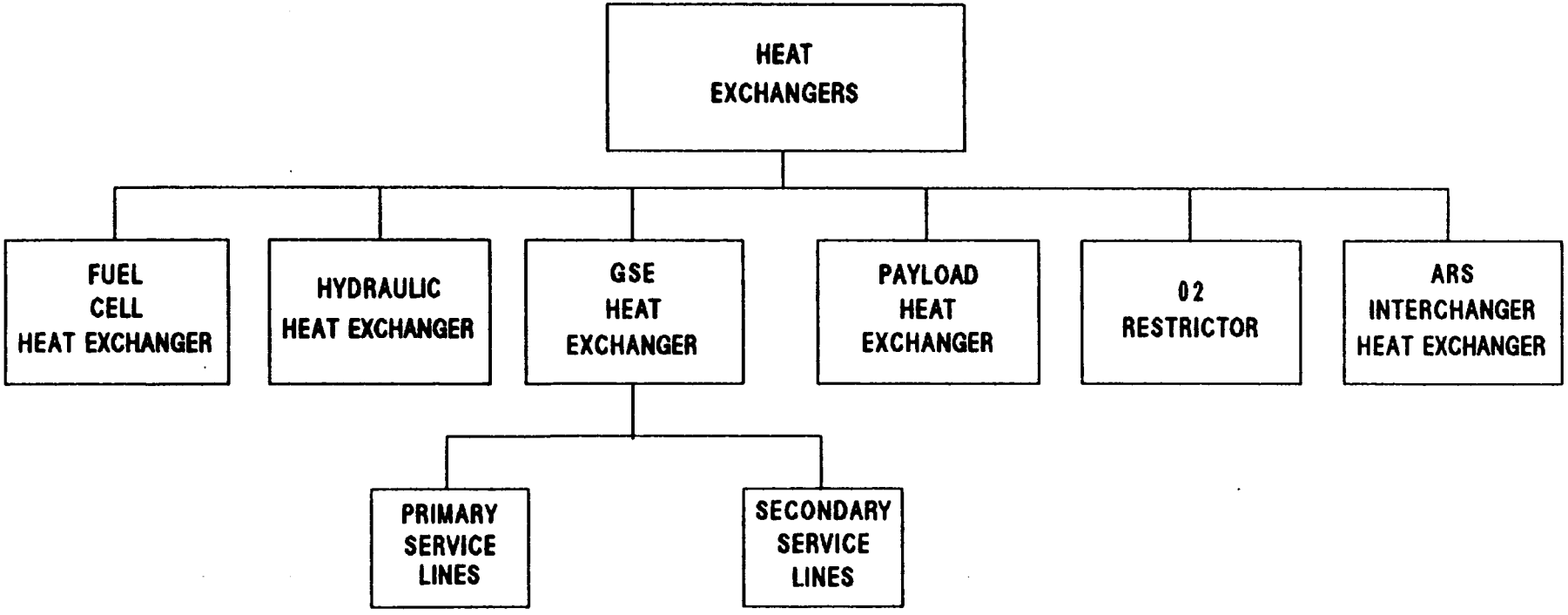


Figure 7 - HEAT EXCHANGERS

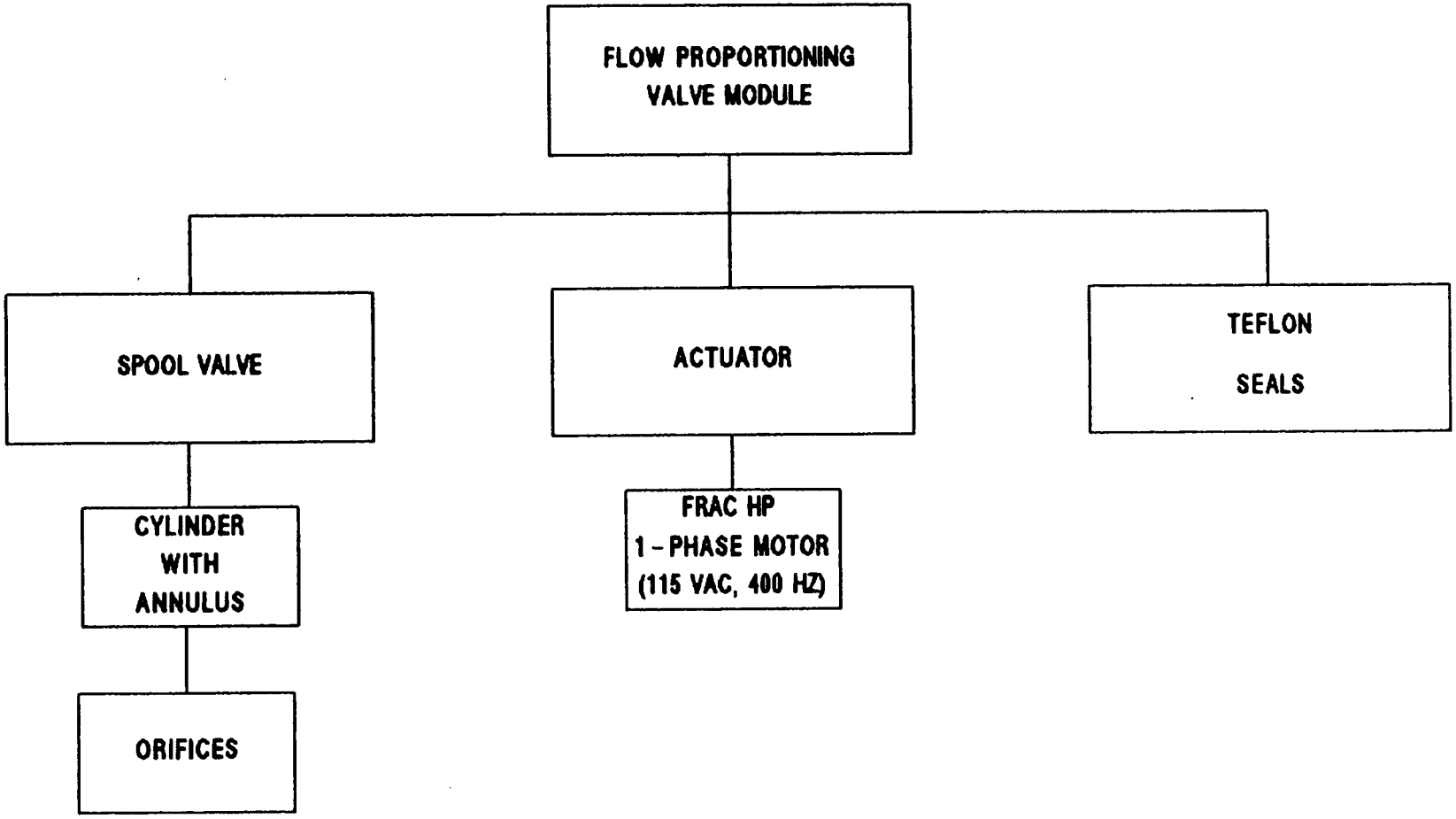


Figure 8 - FLOW PROPORTIONING VALVE MODULE

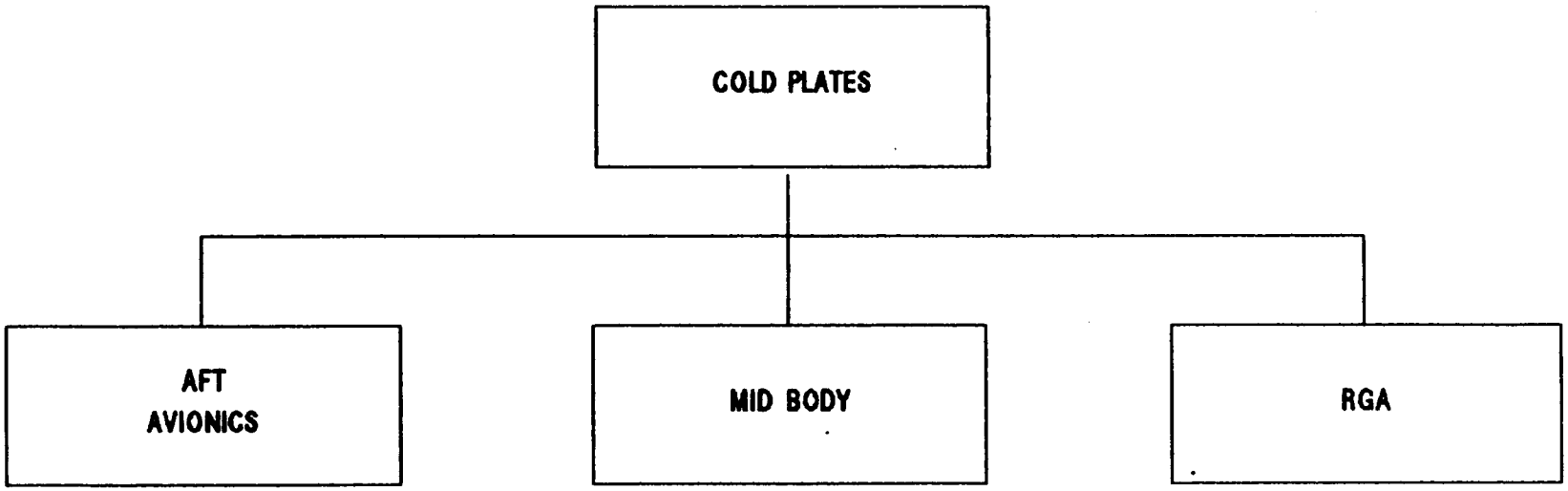


Figure 9 - COLD PLATES

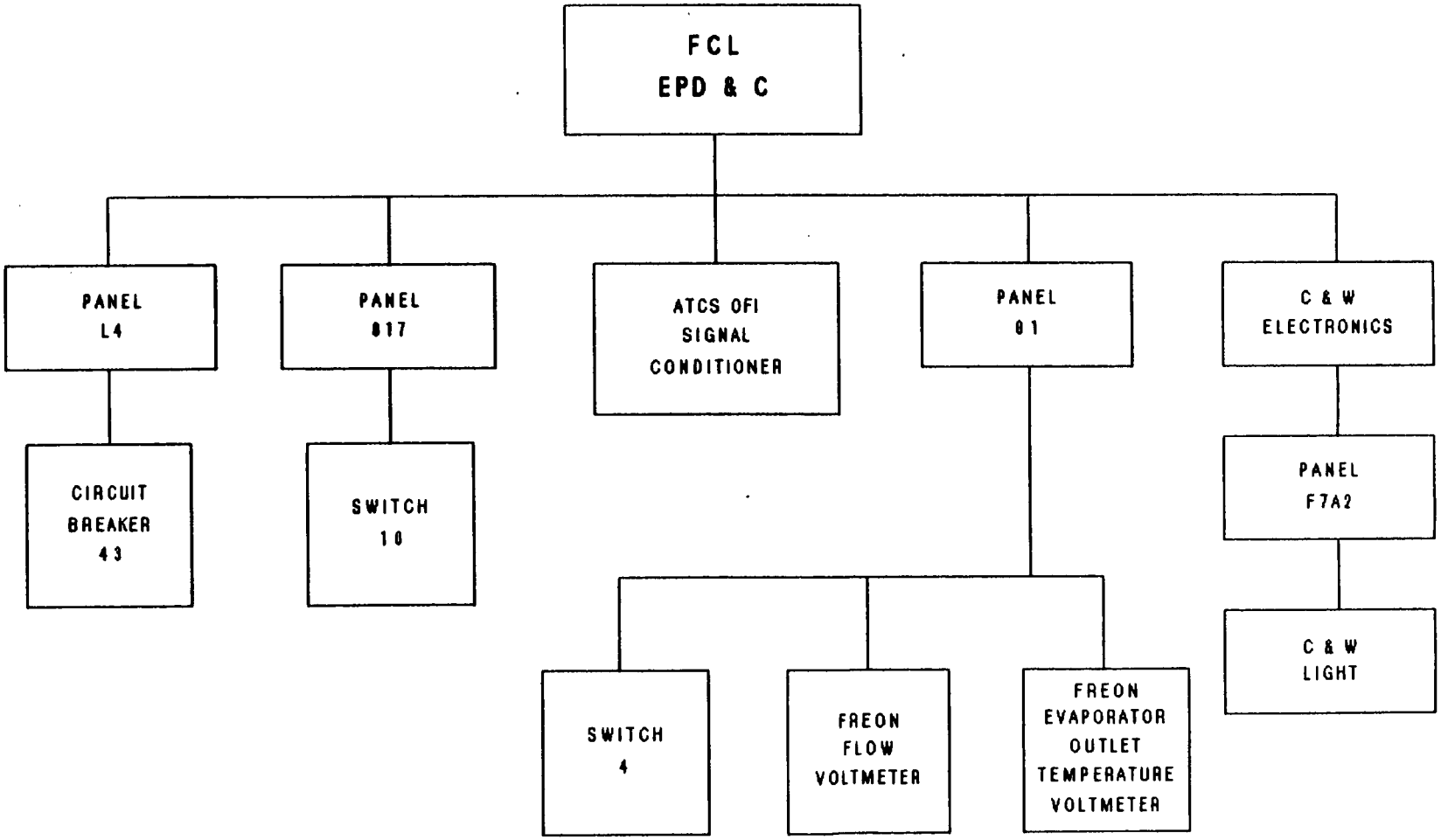
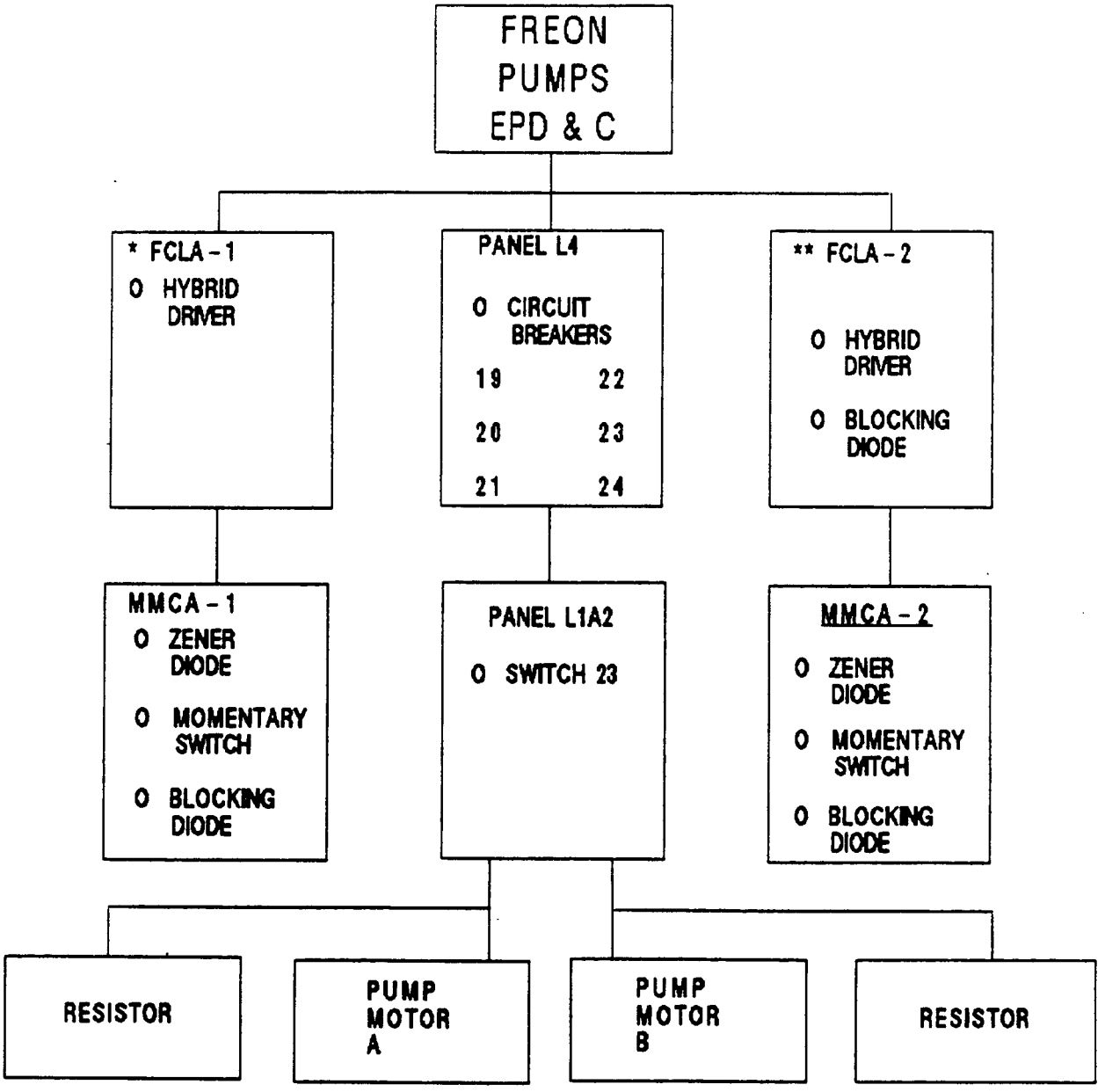


Figure 10 - FCL EPD&C



* ONLY USED DURING GROUND SERVICING.

** GPC COMMANDS PUMP MOTOR B "ON" IF MAIN BUS A OUTPUT IS LESS THAN 20V.

Figure 11 - FREON PUMPS EPD&C

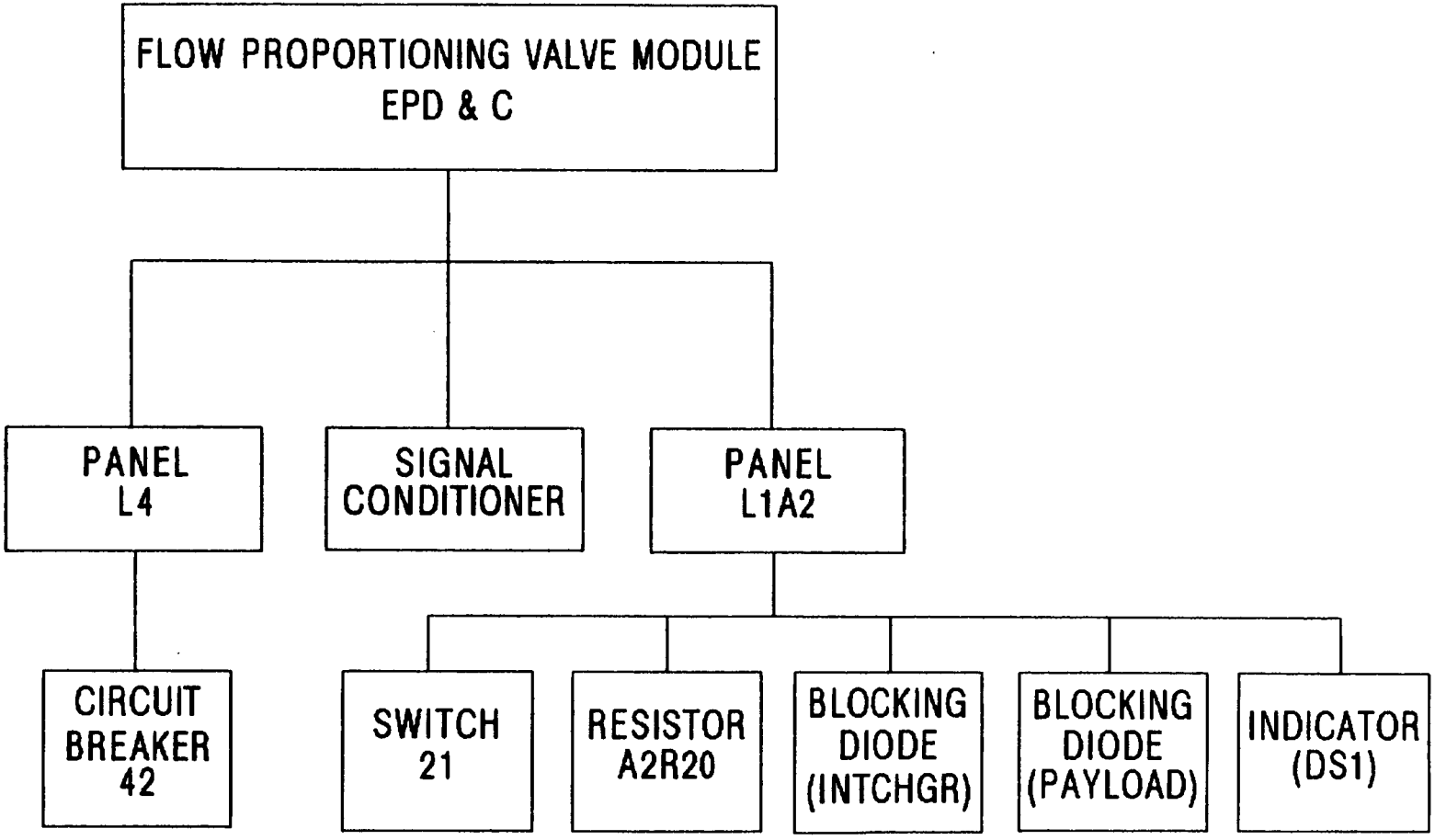


Figure 12 - FLOW PROPORTIONING VALVE MODULE EPD&C

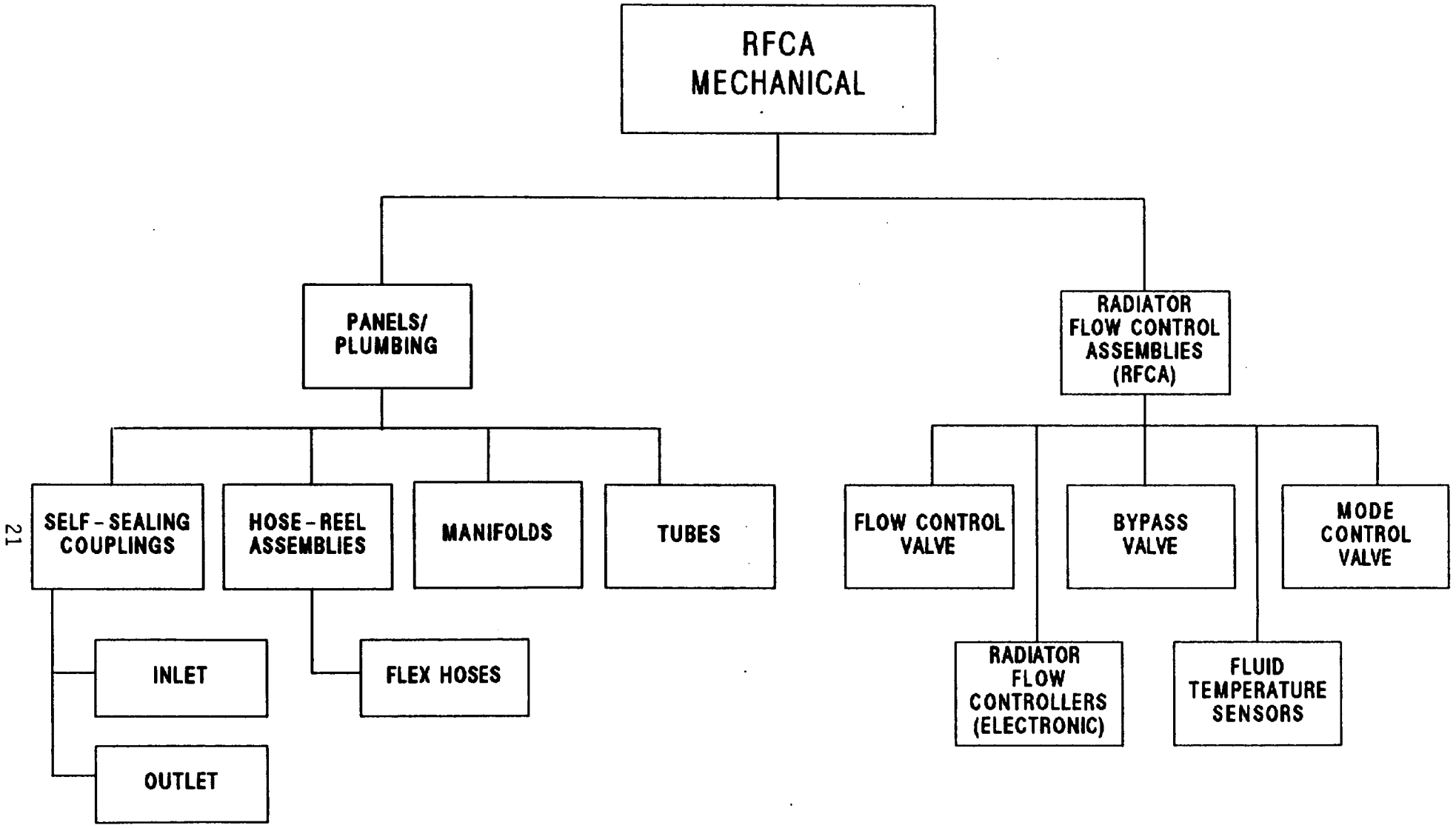


Figure 13 - RFCA MECHANICAL

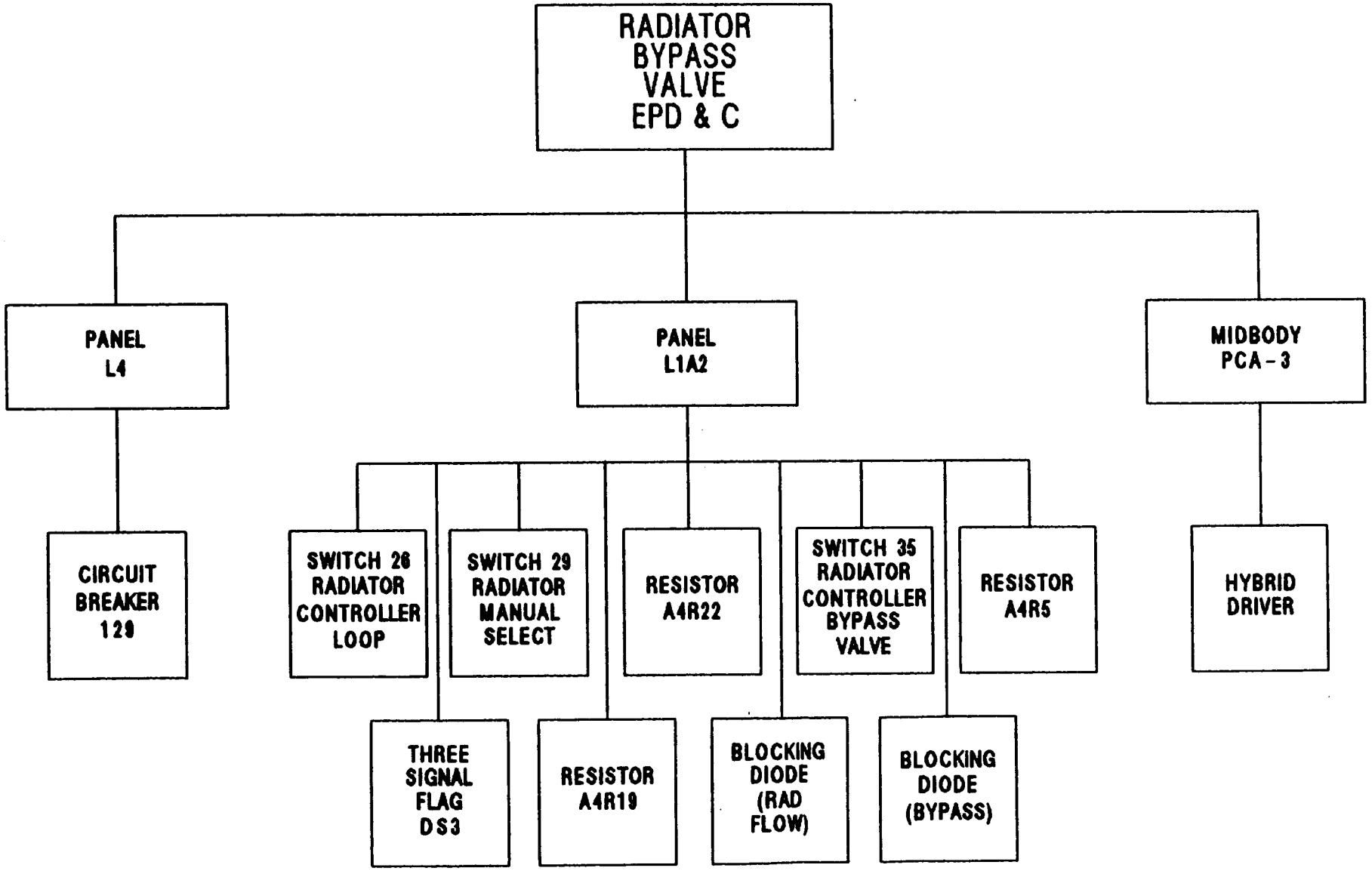


Figure 14 - RADIATOR BYPASS VALVE EPD&C

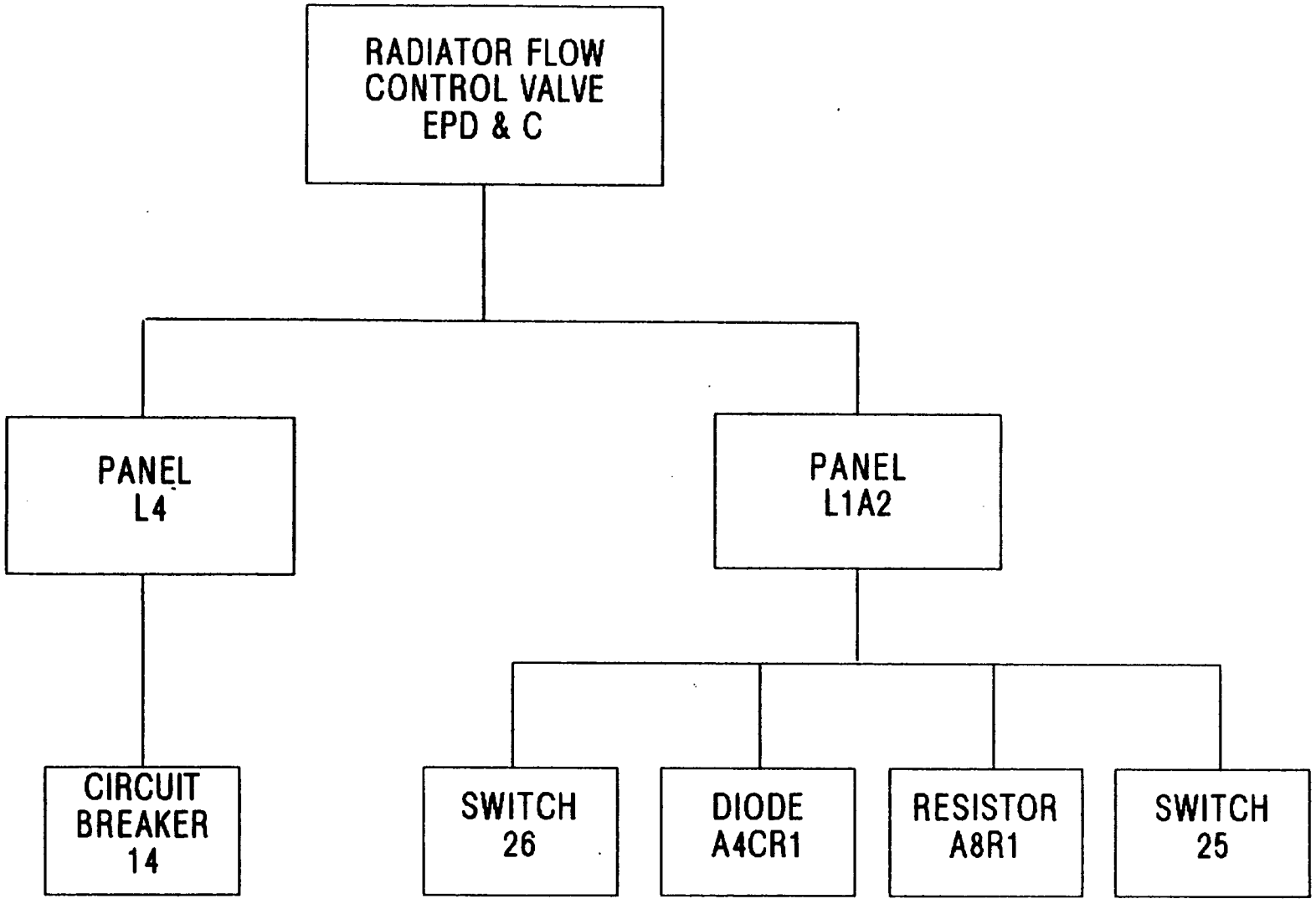


Figure 15 - RADIATOR FLOW VALVE CONTROL EPD&C

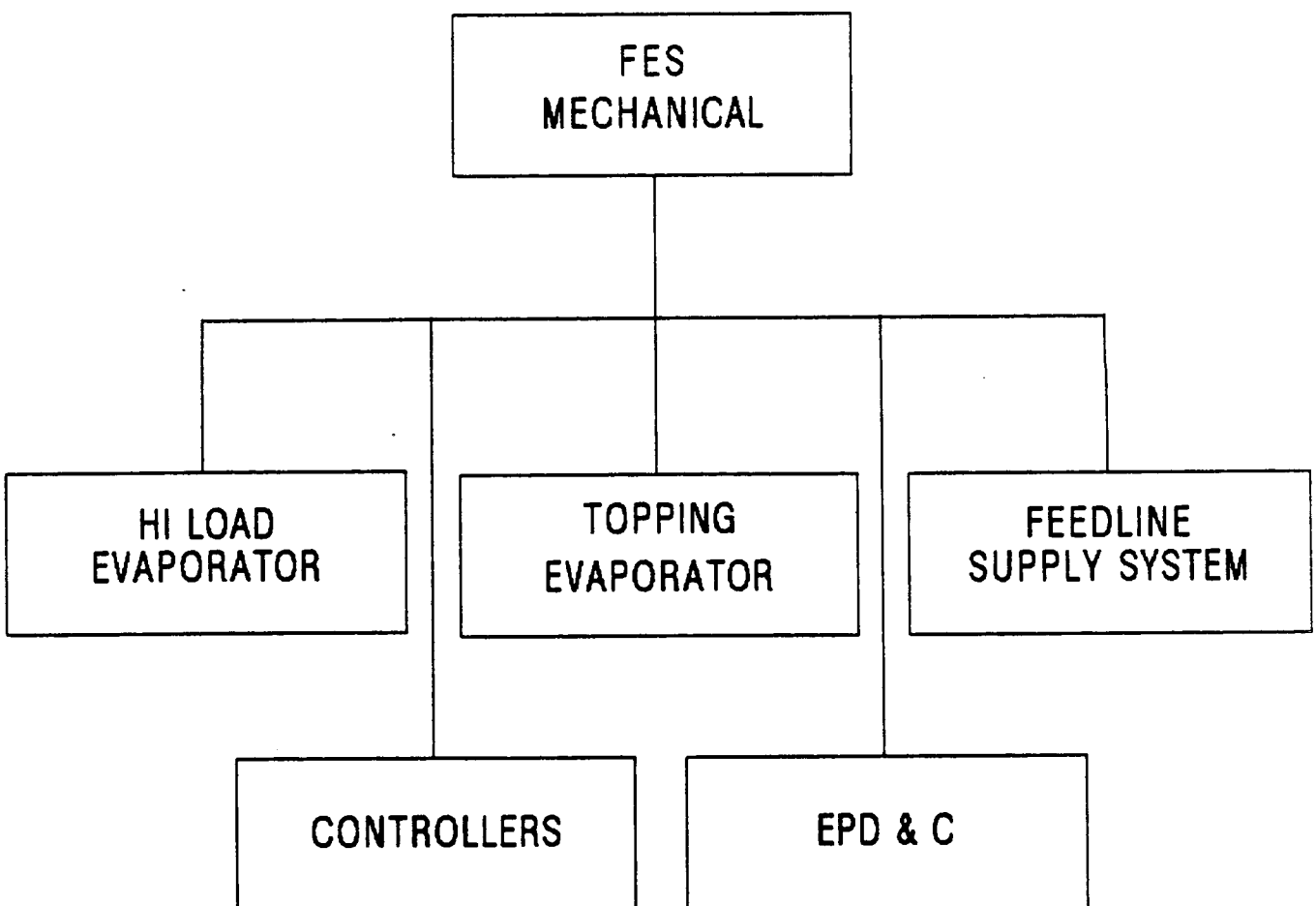


Figure 16 - FES MECHANICAL

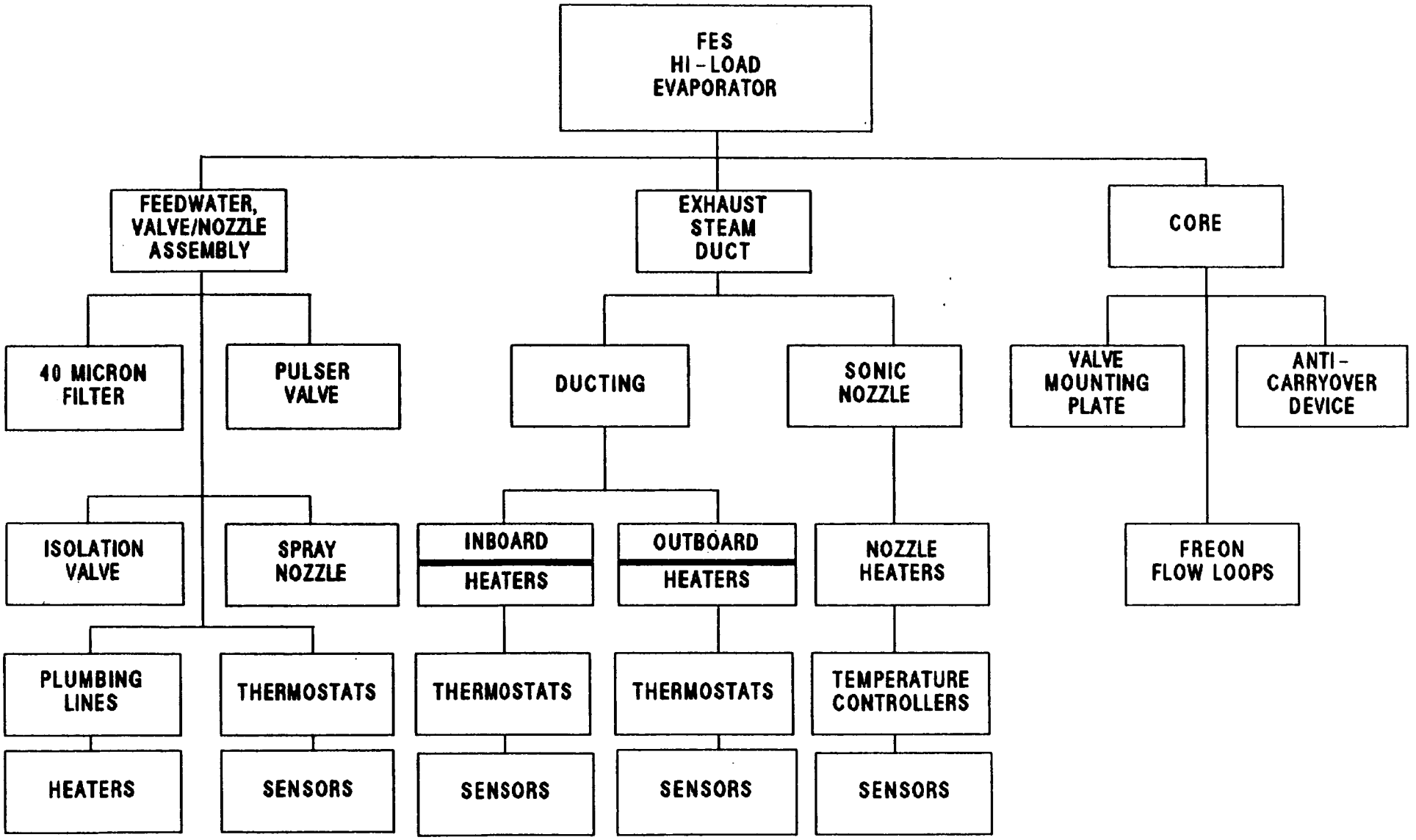


Figure 17 - FES HI-LOAD EVAPORATOR

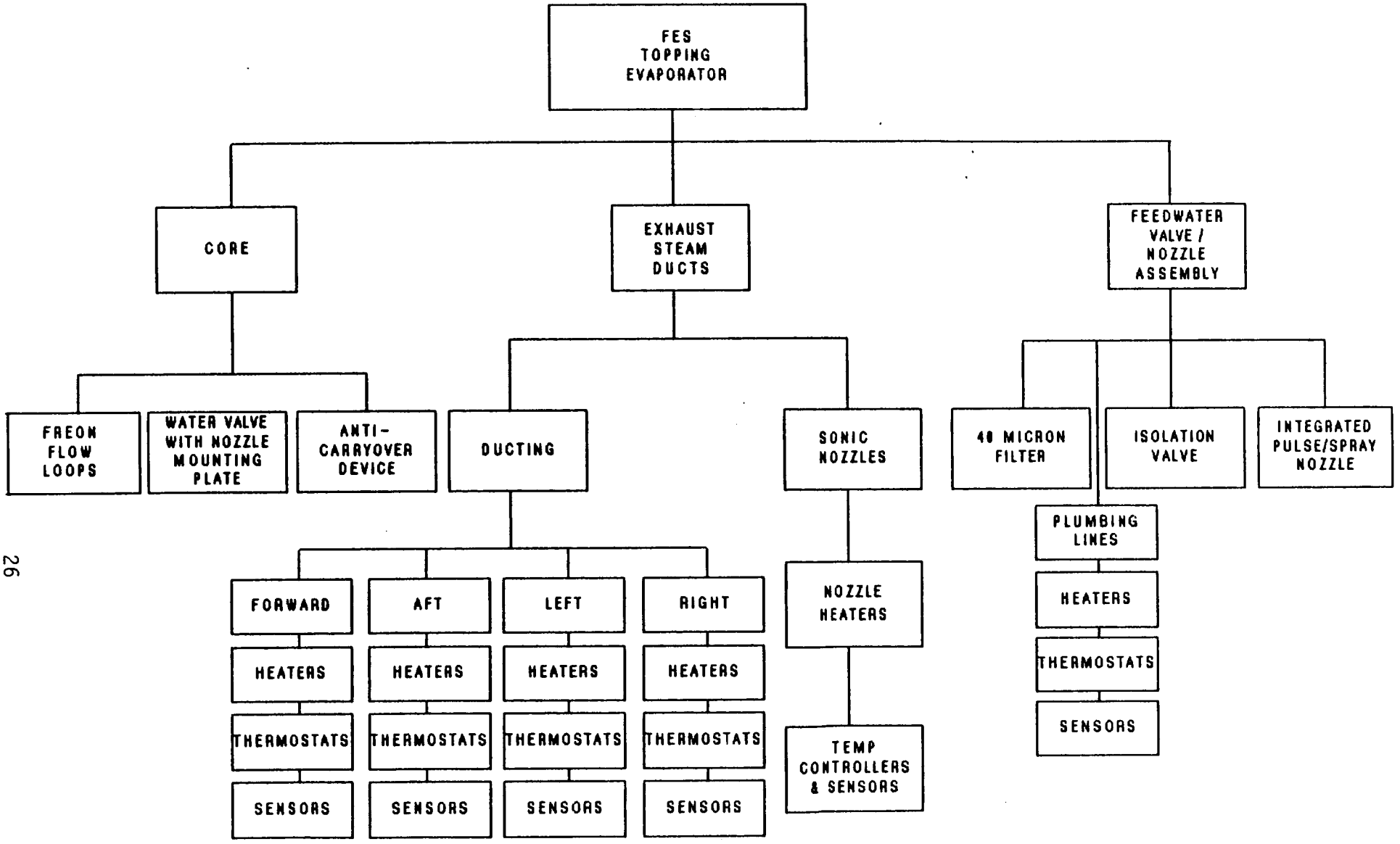


Figure 18 - FES TOPPING EVAPORATOR

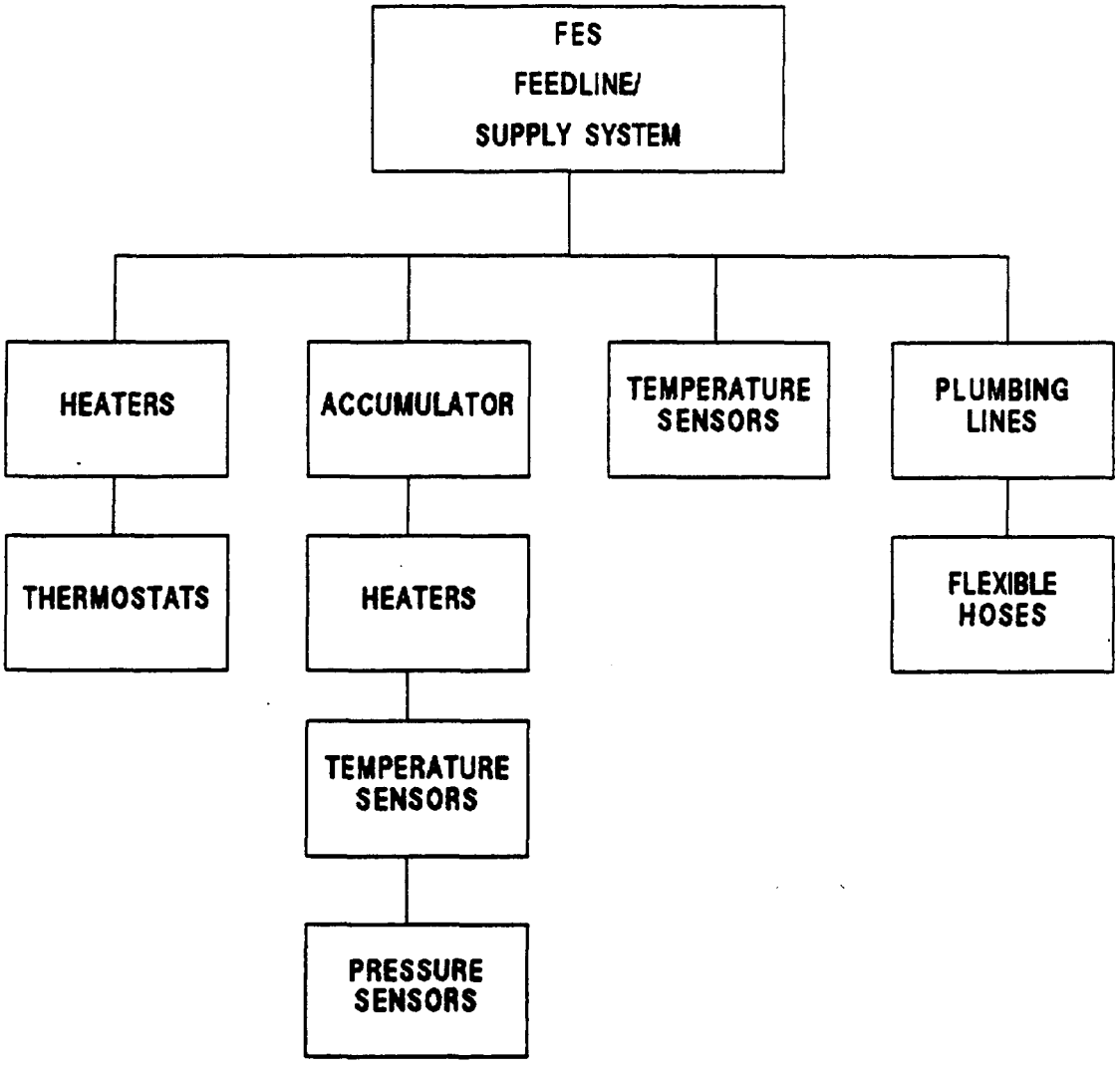


Figure 19 - FES FEEDLINE/SUPPLY SYSTEM

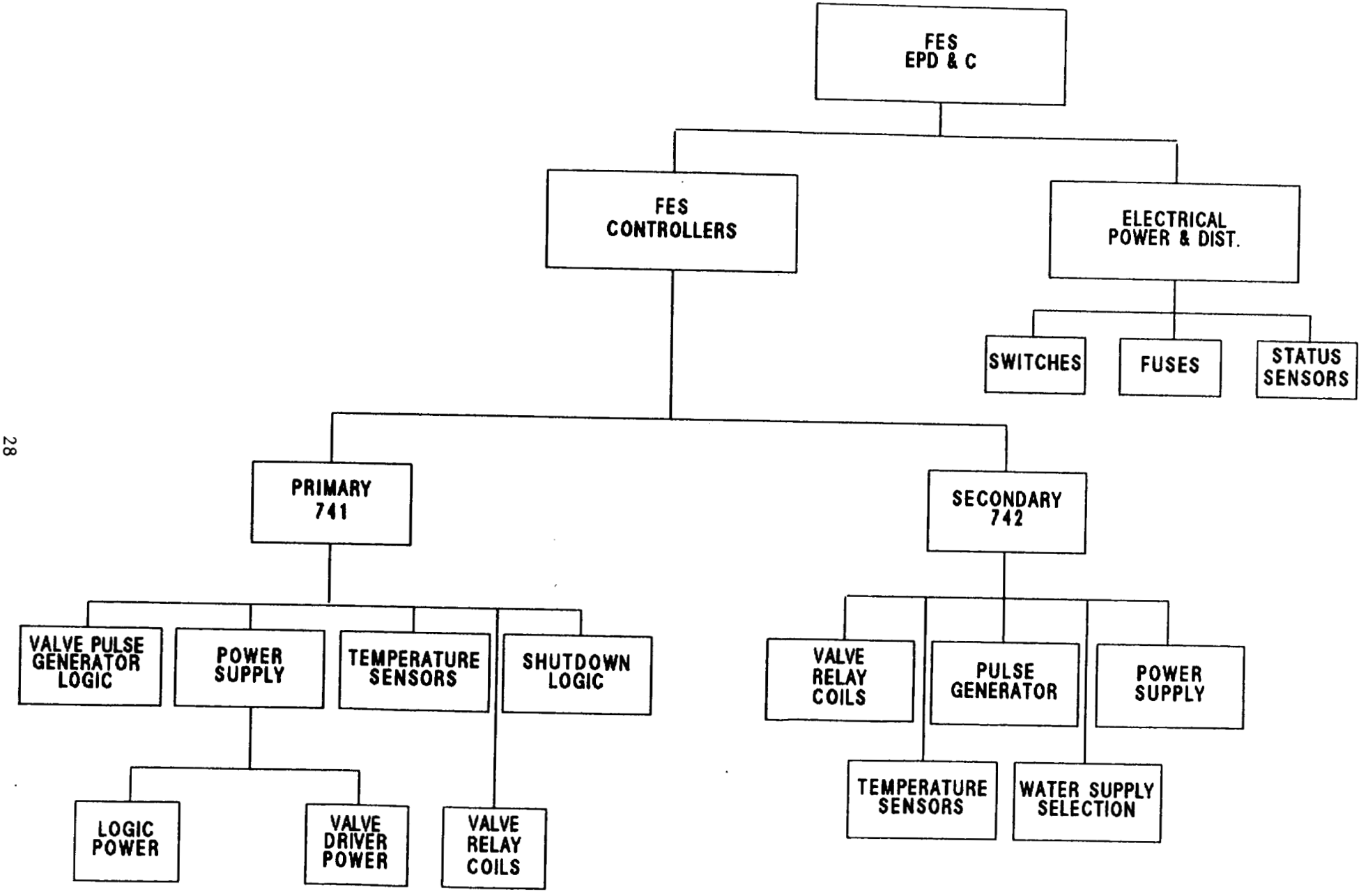


Figure 20 - FES EPD&C

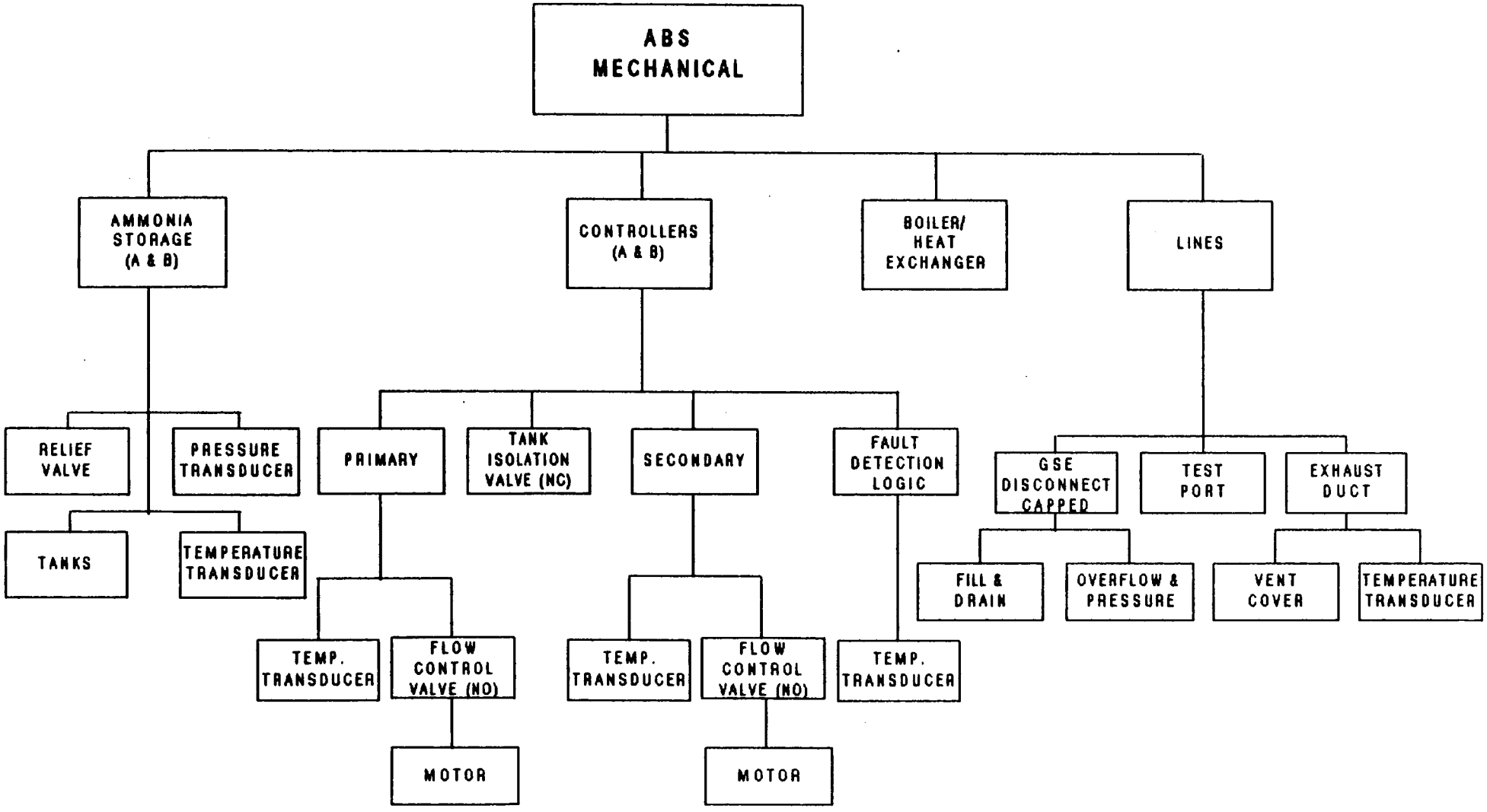


Figure 21 - AMMONIA BOILER SYSTEM MECHANICAL

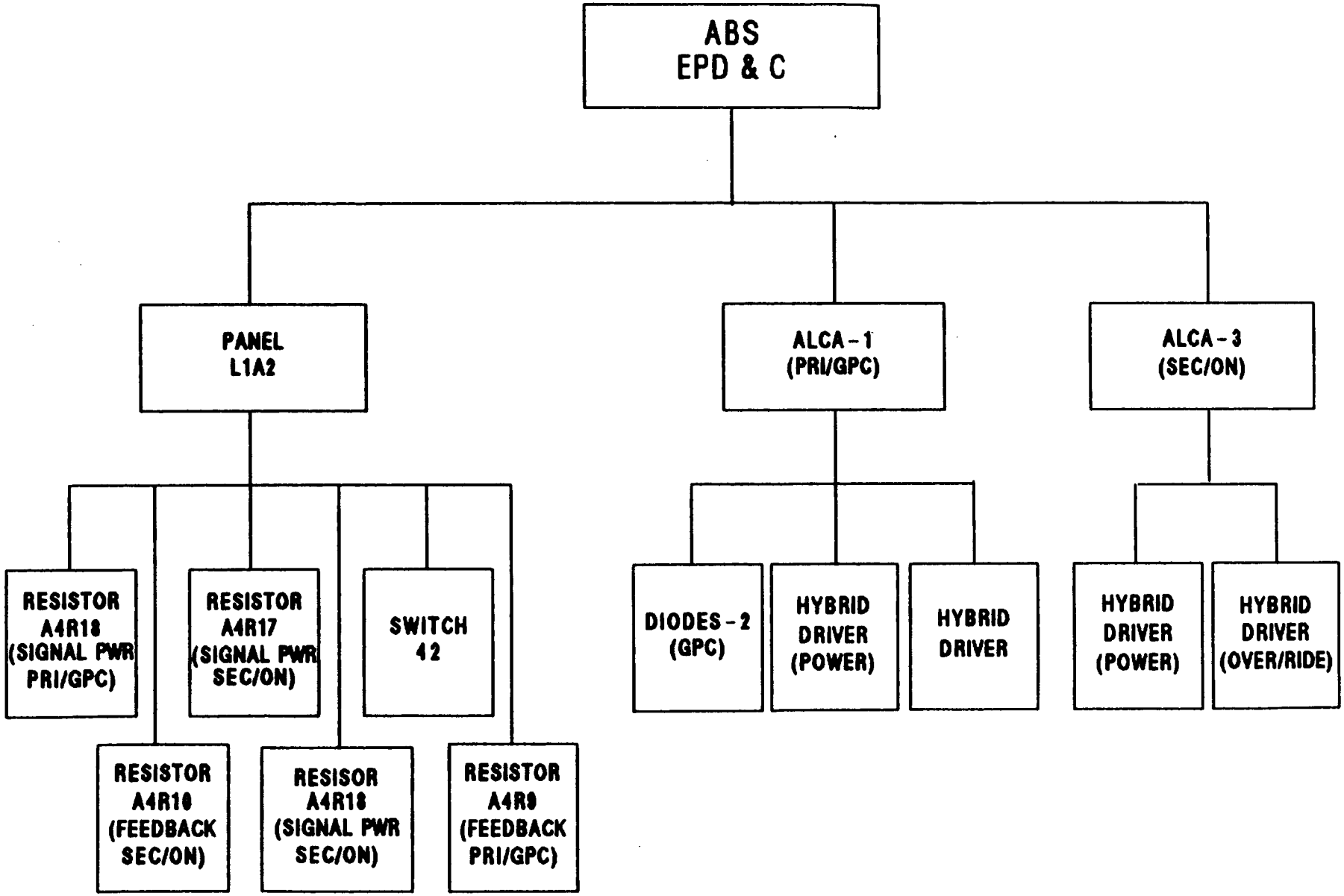


Figure 22 - ABS EPD&C

4.0 ASSESSMENT RESULTS

The IOA analysis of the ATCS hardware initially generated 310 failure mode worksheets and identified 101 Potential Critical Items (PCIs) prior to starting the assessment process. In order to facilitate comparison, seventy-four additional failure mode worksheets were generated. Additionally, upon closer examination, IOA deemed ten of the original failure modes to be non-credible and recommends deleting them. The analysis results were compared to the available NASA FMEA/CIL data consisting of a summary listing of ATCS EPD&C FMEA/CILs dated 1 October 1987, a summary listing of ATCS mechanical FMEA/CILs dated 1 October 1987, and SSV88-12 containing the ATCS waiverable mechanical CILs. The discrepancy between the number of IOA and NASA FMEAs can be explained by the different approaches used by NASA and IOA to group failure modes. This resulted in multiple IOA FMEAs being mapped to a single NASA FMEA. However, every NASA FMEA is mapped to at least one IOA worksheet.

A summary of the quantity of NASA FMEAs assessed, versus the recommended IOA baseline, and any issues identified is presented in Table I.

Table I SUMMARY OF IOA ATCS FMEA ASSESSMENT

Component	NASA	IOA	Issues
FCL	87	119	31
RFCA	43	52	6
FES	85	163	55
ABS	37	40	9
TOTAL	252	374	101

It should be noted that the number of issues corresponds to the number of IOA FMEAs with criticalities different than their NASA counterparts. In the cases where multiple IOA FMEAs were matched to one NASA FMEA, a criticality mismatch would give rise to multiple issues.

A summary of the quantity of NASA CIL items assessed, versus the recommended IOA baseline, and any issues identified is presented in Table II.

Table II SUMMARY OF IOA ATCS CIL ASSESSMENT

Component	NASA	IOA	Issues
FCL	52	66	10
RFCA	19	25	6
FES	17	33	11
ABS	21	23	3
TOTAL	109	147	30

Appendix C presents the detailed assessment worksheets for each failure mode identified and assessed. Appendix D highlights the NASA Critical Items and corresponding IOA worksheet ID. Appendix E contains IOA analysis worksheets supplementing previous analysis results reported in Space Transportation System Engineering and Operations Support (STSEOS) Working Paper No. 1.0-WP-VA87001-005, Analysis of the ATCS, 01 December 1987. Appendix F provides a cross reference between the NASA FMEA and corresponding IOA worksheet(s). IOA recommendations are also summarized.

Table III presents a summary of the IOA failure criticalities for the Post 51-L FMEA baseline. Further discussion of each of these subdivisions and the applicable failure modes is provided in subsequent paragraphs.

Table III SUMMARY OF IOA ATCS FAILURE CRITICALITIES

Criticality:	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
FCL	1	57	3	17	3	37	1	119
RFCA		14	7	17	2	11	1	52
FES	4	17	4	68	27	40	3	163
ABS	8	13		9		10		40
TOTAL	13	101	14	111	32	98	5	374

In some cases, insufficient data was available to resolve a recommended criticality. For this case, no critiality was assigned and the item remained unresolved, indicated in the "?" column.

Of the failure modes analyzed, one-hundred forty-seven (147) were determined to be potential critical items. A summary of the IOA potential critical items is presented in Table IV.

Table IV SUMMARY OF IOA ATCS POTENTIAL CRITICAL ITEMS

Criticality:	1/1	2/1R	2/2	3/1R	3/2R	?	TOTAL
FCL	1	57	3	4	-	1	66
RFCA	-	14	7	4	-	-	25
FES	4	17	4	6	1	1	33
ABS	8	13		2	-	-	23
TOTAL	13	101	14	16	1	2	147

4.1 Freon Coolant Loop Assessment Results

The assessment of the freon coolant loop failure modes resulted in 119 IOA FMEA worksheets being mapped to 87 NASA FMEAs. The 119 IOA worksheets came from the 108 worksheets developed during the original analysis phase, 15 new IOA worksheets generated during the assessment phase, four of the original IOA worksheets deleted after re-examination, and nine original IOA worksheets being left unmapped. The assessment also yielded 31 issues based on the 119 IOA worksheets. Twenty-two of the issues are IOA FMEAs with criticalities different than their NASA counterparts; the remaining nine are the unmapped IOA FMEAs. Of the 31 issues, there were 10 potential CIL issues.

The twenty-two discrepant items can be grouped into two major categories. First, there are a number of failures which result only in the loss of sensor data. IOA recommends these failures be given a 3/3 criticality. NASA criticalities are frequently higher. However, since sensor data is not critical to mission completion or to crew/vehicle safety, IOA recommends the lower criticality.

The second major category for discrepancies involves failures which occur only during ground operations and which may result in launch delays or loss of ground cooling. By NSTS 22206, failures of this type are automatically assigned 3/3 criticalities. IOA recommends following these guidelines and assigning the FMEAs 3/3 criticalities.

In addition to the twenty-two discrepancies, there are nine unmapped IOA FMEAs. Eight of the unmapped FMEAs involve restricted flow or leakage of heat exchanger fluid. It is possible that these failures are covered in other NASA documents such as those corresponding to the appropriate heat exchanger (GSE, payload, hydraulics, etc.). However, this should be investigated and verified, particularly for the five of these FMEAs that have 2/1R criticalities and are thus PCIs.

The final unmapped IOA worksheet is a failed off C&W light which may be covered under the NASA C&W FMEA baseline and which has a 3/3 criticality. This low criticality rating puts the FMEA at a very low priority for re-examination by NASA.

Tables V and VI present summaries of the FCL assessment results. Following Table V is an explanation of the table format which is used in the remainer of this report.

Table V SUMMARY OF FCL FAILURE CRITICALITIES								
	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
NASA (1) Original	2	37	9	14	11	14	-	87
IOA (2) Recommendations for NASA FMEAs	1	41	3	12	1	29	1	88
IOA (3) Original	1	55	-	-	17	35	-	108
IOA (4) Recommended	1	57	3	17	3	37	1	119

(1) This criticality breakdown is based on the NASA data used by IOA for the assessment.

(2) The "IOA Recommendations for NASA FMEAs" is based on the criticality data provided by NASA but modified to reflect the changes being recommended by IOA. In the case where IOA feels that a NASA FMEA should be divided to more accurately reflect individual criticalities, the NASA FMEA will be counted once for each recommended criticality. This will result in a higher total for the "IOA Recommendations for NASA FMEAs" than for the "IOA Original".

(3) This criticality breakdown is as presented in IOA deliverable 2.

(4) "IOA Recommended" represents the final distribution of IOA FMEA criticalities after assessment.

Table VI SUMMARY OF FCL CRITICAL ITEMS								
	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
NASA Original	2	37	9	4	-	-	-	52
IOA Recommendations for NASA FMEAs	1	41	3	3	-	-	-	48
IOA Original	1	55	-	-	3	-	-	59
IOA Recommended	1	57	3	4	-	-	1	66

4.2 Radiator and Flow Control Assembly Assessment Results

The assessment of the Radiator and Flow Control Assembly (RFCA) FMEAs matched 52 IOA FMEAs to 43 NASA FMEAs. The 52 IOA FMEA worksheets came from the 40 original worksheets developed during the analysis phase, fifteen additional FMEA worksheets written during the assessment phase, and three of the original FMEAs deleted after re-examination. There were no IOA RFCA FMEAs which could not be mapped to corresponding NASA FMEAs.

Six of the IOA FMEAs have suggested criticalities different than their NASA counterparts. The differences are due to inconsistencies in evaluation. IOA recommends that failures which are identical to each other (except for the cause) be assigned the same criticality. For example, a valve failing open due to a mechanical jam or an erroneous electrical signal (provided there is no way to remove or replace the signal) should be assigned the same criticality for each failure. All six of the issues are also CIL issues.

Tables VII and VIII present a summary of the results of the RFCA assessment.

Table VII SUMMARY OF RFCA FAILURE CRITICALITIES

	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
NASA Original	-	9	5	16	4	9	-	43
IOA Recommendations for NASA FMEAs	-	10	5	16	2	9	1	43
IOA Original	-	7	-	-	22	11	-	40
IOA Recommended	-	14	7	17	2	11	1	52

Table VIII SUMMARY OF RFCA CRITICAL ITEMS								
	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
NASA Original	-	9	5	5	-	-	-	19
IOA Recommendations for NASA FMEAs	-	10	5	4	-	-	-	19
IOA Original	-	7	-	-	-	-	-	7
IOA Recommended	-	14	7	4	-	-	-	25

4.3 Flash Evaporator System Assessment Results

During the assessment of the Flash Evaporator System (FES), a total of 163 IOA FMEAs were matched to 85 NASA/Rockwell FMEAs. This meant that a number of NASA FMEAs were matched to more than one IOA FMEA. The 163 IOA FMEAs came from the original 134 FMEAs developed during the analysis phase of the project, 30 new FMEAs developed during the assessment phase, ten original IOA FMEAs left unmatched during the assessment, and one original IOA FMEA deleted upon re-examination.

The assessment process yielded 45 IOA FMEAs with recommended criticalities different than their NASA counterparts plus 10 unmatched IOA FMEAs. Of these 55 issues, 11 are CIL issues.

The 45 issues fall into five major categories. First, the NASA FMEA process assigned all failures which resulted in the loss of the topping evaporator a `1R' functional criticality. The loss of the topping evaporator results only in the loss of mission, not in the loss of crew or vehicle. It takes multiple unrelated failures of additional components of the ATCS to reach a `1R' criticality. Therefore, IOA recommends that the failures which result in the loss of the topping evaporator be assigned functional criticalities of `2R'.

Second, IOA is recommending that failures which result in the loss of sensors or sensor data only, be assigned 3/3 criticalities. Sensor failures can be worked, with the data being available from other sources. There is no impact on crew or vehicle safety, or on mission duration.

NASA assigned failures which resulted in the loss of topping sonic nozzle, or high load nozzle heaters, 3/3 criticalities. Flight rules and procedures require that the nozzles reach a minimum temperature prior to activation of the evaporator. Therefore, if the heaters are inoperative it is possible for the nozzle to freeze up and the evaporator be considered lost. IOA, therefore, recommends that failures which result in the loss of the nozzle heaters be assigned the same functional criticalities as failures which result in the loss of the evaporator.

The fourth category concerns the delineation of failures involving restricted flow of freon or freon leaks. NASA groups these failures into one for each type. IOA recommends that the failures be examined more closely for various locations of leaks or restrictions.

The final issue category is the assignment of criticalities for backup and primary equipment. These both perform the same function and by 22206 should be assigned the same criticalities.

The ten unmatched FMEAs can also be divided into major categories. First, there are six IOA FMEAs which deal with external leakage of water/steam from the evaporators or nozzles. These FMEAs all have 2/1R criticalities and should be investigated by NASA to determine credibility and applicability. Two unmapped FMEAs concern the failure of rotary switches to a given position. Although, NASA deemed this to be a non-credible failure mode, IOA feels that the possibility should re-examined and the failures re-instated. Finally, the remaining unmatched FMEAs involve sensor data or ground measurements and should be examined by NASA only in the interests of completeness.

Tables IX and X present summaries of the FES assessment results.

Table IX SUMMARY OF FES FAILURE CRITICALITIES

	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
NASA Original	1	10	-	46	2	26	-	85
IOA Recommendations for NASA FMEAs	1	10	3	40	45	22	2	93
IOA Original	1	16	4	45	40	28	-	134
IOA Recommended	4	17	4	68	27	40	3	163

Table X SUMMARY OF FES CRITICAL ITEMS

	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
NASA Original	1	10	-	5	1	-	-	17
IOA Recommendations for NASA FMEAs	1	10	3	4	1	-	-	19
IOA Original	1	16	4	-	1	-	-	22
IOA Recommended	4	17	4	6	1	-	1	33

4.4 Ammonia Boiler System Assessment Results

During the assessment of the Ammonia Boiler System (ABS), forty IOA FMEAs were mapped to thirty-seven NASA FMEAs. The forty IOA FMEAs came from the original 28 ABS FMEA worksheets developed during the analysis phase, fourteen additional ABS FMEAs written during the assessment phase, and two of the original worksheets deleted after re-examination. Three of the IOA FMEA worksheets could not be mapped to equivalent NASA FMEAs.

The assessment process yielded six IOA FMEAs with recommended criticalities different from their NASA counterparts. Three of the FMEAs are recommended for criticality changes based on consistency with other ABS/ATCS FMEAs and are recommended for 1/1 criticalities. The remaining three issues involve levels of redundancy with which IOA disagrees. In two of the cases there appear to be one less level of redundancy than NASA counted; the remaining issue appears to have an additional redundancy level not considered during NASAs evaluation. IOA recommends that all six of these FMEAs be re-examined by NASA and IOA, and the issues resolved as time permits.

In addition to the six FMEAs with criticality differences, three of the original FMEAs were left unmatched. These three FMEA worksheets do have 3/3 criticality, but involve external leakage from valves or lines. For this reason, IOA recommends re-examination of the failures and upgrading the criticality if required.

Of the nine identified issues, three are CIL issues. Tables XI and XII present summaries of the IOA assessment results.

Table XI SUMMARY OF ABS FAILURE CRITICALITIES

	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
NASA Original	5	14	-	11	7	-	-	37
IOA Recommendations for NASA FMEAs	8	13	-	9	7	-	-	37
IOA Original	2	11	-	-	15	-	-	28
IOA Recommended	8	13	-	9	10	-	-	40

Table XII SUMMARY OF ABS CRITICAL ITEMS								
	1/1	2/1R	2/2	3/1R	3/2R	3/3	?	TOTAL
NASA Original	5	14	-	2	-	-	-	21
IOA Recommendations for NASA FMEAs	8	13	-	2	-	-	-	23
IOA Original	2	11	-	-	-	-	-	13
IOA Recommended	8	13	-	2	-	-	-	23

5.0 REFERENCES

Reference documentation available from NASA and Rockwell was used in the analysis. The documentation used included the following:

1. RI-VS70-960102, Integrated Systems Schematics
2. Shuttle Flight Operations Manual Volume 3: Environment Control and Life Support Systems (ECLSS)
3. Space Shuttle Systems Handbook, JSC-11174
4. Shuttle Operational Data Book, JSC 08934
5. STS Operational Flight Rules, JSC 12820
6. Environmental Systems Console Handbook, JSC 19935
7. Instructions for Preparation of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL), NSTS 22206
8. Summary Listing of ATCS EPD&C FMEA/CILs dated 1 October 1987
9. Summary Listing of ATCS Mechanical FMEA/CILs dated 1 October 1987
10. ATCS Mechanical Waiverable CILs, SSV88-12

APPENDIX A

ACRONYMS

APPENDIX A
ACRONYMS

ABS	- Ammonia Boiler System
AC	- Alternating Current
ACOD	- Anti-Carryover Device
ALC	- Aft Load Controller
ALCA	- Aft Load Control Assembly
AOA	- Abort-Once-Around
AOS	- Acquisition of Signal
ARS	- Atmospheric Revitalization System
ASSY	- Assembly
ATCS	- Active Thermal Control Subsystem
ATO	- Abort-To-Orbit
BTU	- British Thermal Units
C&W	- Caution and Warning
CB	- Circuit Breaker
CIL	- Critical Items List
CNTLR	- Controller
CRIT	- Criticality
D&C	- Displays and Controls
DIST	- Distribution
DS	- Digital Signal
ECLSS	- Environmental Control and Life Support System (Subsystem)
EMU	- Extravehicular Mobility Unit
EPDC	- Electrical Power, Distribution and Control
EPS	- Electrical Power System
F	- Fahrenheit
F	- Failed
F	- Functional
FCA	- Flow Control Assembly
FCL	- Freon Coolant Loop
FES	- Flash Evaporator System
FMEA	- Failure Modes and Effects Analysis
FRAC	- Fraction
ft	- Feet
GAS	- Get-Away Special
GFE	- Government Furnished Equipment
GPC	- General Purpose Computer
GSE	- Ground Support Equipment
H2O	- Water
HP	- Horsepower
hr	- Hour
HW	- Hardware
HX	- Heat Exchanger
HZ	- Hertz
ID	- Identifier
INTCHGR	- Interchanger
IOA	- Independent Orbiter Assessment

ACRONYMS

JSC	- Johnson Space Center
LCA	- Load Controller Assembly
MC	- Memory Configuration
MDAC	- McDonnell Douglas Astronautics Company
MDM	- Multiplexer/Demultiplexer
MM	- Major Mode
NA	- Not Applicable
NASA	- National Aeronautics and Space Administration
NC	- Normally Closed
NH3	- Ammonia
NO	- Normally Open
NSTS	- National Space Transportation System
O2	- Oxygen
OPS	- Operations Sequence
P	- Pass
P/L	- Payload
PASS	- Primary Avionics Software System
PCA	- Power Control Assembly
PCI	- Potential Critical Item
PCN	- Page Change Notice
PNL	- Panel
R	- Redundancy
RAD	- Radiator
RCS	- Reaction Control System
RFCA	- Radiator and Flow Control Assembly
RGA	- Rate Gyro Assembly
RI	- Rockwell International
RTLS	- Return-to-Launch Site
SM	- Systems Management
SOP	- Secondary Oxygen Pack
SSSH	- Space Shuttle Systems Handbook
STS	- Space Transportation System
TAL	- Transatlantic Abort Landing
TEMP	- Temperature
VAC	- Volts, ac
VRCS	- Vernier Reaction Control System
WP	- Working Paper

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

B.1 Definitions

Definitions contained in NSTS 22206, Instructions For Preparation of FMEA/CIL, PCN-2, 6 April 1987, 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 on-orbit 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)

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

DE-ORBIT 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

B.2 IOA Project Level Ground Rules and Assumptions

The philosophy embodied in NSTS 22206, Instructions for Preparation of FMEA/CIL, PCN-2, 6 April 1987, 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.

B.3 ATCS-Specific Ground Rules and Assumptions

The IOA analysis was performed to the component or assembly level of the ATCS subsystem. The analysis considered the worst case effects of the hardware or functional failure on the subsystem, mission, and crew and vehicle safety.

1. For redundancy definitions; the high load evaporator is not redundant to the topping evaporator during on-orbit operation.

   RATIONALE: During on-orbit operations, the topping evaporator is used: (1) to eliminate the excess heat load which cannot be handled by the radiators alone; and, (2) to provide an alternate means of performing a water dump. The topping evaporator operation also results in "balanced venting" with no propulsive effects. The high load evaporator would operate erratically at the heat levels of the topping. The high load results in propulsive venting and concern for vehicle control if used with the VRCS. Payload contamination concerns also limit the use of the high load evaporator on orbit. Due to these negative effects, the high load evaporator cannot be considered as redundant to the topping evaporator.

2. Orbiter attitudes and payload cooling requirements necessitate the use of the topping evaporator for the entire mission.

   RATIONALE: Worst case. Some attitudes require only the radiators. Requiring the use of the FES for the entire mission results in a worst case scenario.

3. The two exit duct/sonic nozzle systems for the topping evaporator are not redundant to each other.

   RATIONALE: The topping evaporator is sized to reject a given heat load with both nozzles operational. Loss of one duct/nozzle would reduce the operational heat load. Additionally, the configuration is such that the venting is nonpropulsive when both duct/nozzles are used. Using only one duct/nozzle would result in a propulsive venting with subsequent impacts on the attitude hold and RCS jet systems.

4. During ascent and entry, the high load evaporator is redundant to the freon coolant loops.

   RATIONALE: Definition of redundancy. Loss of both the high load evaporator and one freon loop can lead to the loss of crew/vehicle. Defining redundancy as above allows the end result to be reflected in the criticalities.

5. Loss of the topping evaporator on-orbit, is a loss of mission.

   RATIONALE: The loss of the topping evaporator will mean attitude changes and power level reductions. These changes result in changes to the mission profile and mission length. Taken together, this means a loss of mission.

6. During on-orbit operations, the FES and the fuel cell drain vent line provide an unlike redundancy to the water dump capability.

   RATIONALE: Conservative approach. If a leak in one of the feedlines occurs, then the steps to isolate the leak can also isolate the water dump system from the water tanks. When this occurs, the FES must function as an unlike redundancy item to dump excess water from the storage tanks. If leaks occur in both feedlines, they must be isolated leaving no "primary" method of dumping water.

7. In analysis cases where the meaning of hardware item redundancy seems ambiguous, redundancy is understood to mean that there is one or more systems that are redundant to the system in which the hardware item occurs.

   RATIONALE: This is the most conservative assumption for purposes of determining criticality.

8. Loss of redundancy means loss of all capability to perform function.

   RATIONALE: Maintain uniform usage within project.

9. Caps and fittings for quick disconnects are considered one component.

   RATIONALE: This is the most conservative assumption.

10. Leaks (GN2, hydraulic fluid, water) are sufficiently prolonged

in time to allow recognition and response.

RATIONALE: This assumption allows for non-trivial case analysis.

11. Contamination of all freon coolant loops during turnaround servicing is not considered a "single credible event" in evaluating Redundancy Screen C.

RATIONALE: This is considered a ground operations problem although the significant number of inflight system anomalies attributed to contamination suggests that it should be analyzed independently as a potential cause of critical failure modes. Without this assumption, all system failure modes that list contamination as a cause would fail screen C.

APPENDIX C
DETAILED ASSESSMENT

This section contains the IOA assessment worksheets generated during the assessment of the Active Thermal Control System. The information on these worksheets facilitates the comparison of the NASA FMEA/CIL (Pre and Post 51-L) to the IOA detailed analysis worksheets included in Appendix E. Each of these worksheets identifies the NASA FMEA being assessed, corresponding MDAC Analysis Worksheet ID (Appendix E), hardware item, criticality, redundancy screens, and recommendations. For each failure mode, the highest assessed hardware and functional criticality is compared and discrepancies noted as "N" in the compare row under the column where the discrepancy occurred.

LEGEND FOR IOA ASSESSMENT 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 Screens A, B and C:

- P = Passed Screen
- F = Failed Screen
- NA = Not Applicable

NASA Data :

- Baseline = NASA FMEA/CIL
- New = Baseline with Proposed Post 51-L Changes

CIL Item :

- X = Included in CIL

Compare Row :

- N = Non compare for that column (deviation)

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1000
NASA FMEA #: 06-3-0112-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1000
ITEM: INLET SELF-SEALING COUPLING

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1001
NASA FMEA #: 06-3-0112-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1001
ITEM: ORIFICE (INLET COUPLING)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINES PUMP INLET AND OUTLET COUPLINGS AND ORIFICES. THEREFORE, THIS FMEA IS BEING MATCHED TO NASA 06-3-0112-3.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1002
NASA FMEA #: 06-3-0106-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1002
ITEM: PUMP INLET PRESSURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
SINCE CORRECT OPERATION OF THE PUMP CAN BE VERIFIED FROM ALTERNATE SOURCES OF DATA, IOA RECOMMENDS GIVING THIS SENSOR A 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88 NASA DATA:
ASSESSMENT ID: ATCS-1003 BASELINE [ ]
NASA FMEA #: 06-3-0102-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1003
ITEM: INLET FILTER (ACCUMULATOR)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1004
NASA FMEA #: 06-3-0102-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1004
ITEM: INLET FILTER (ACCUMULATOR)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[F]	[F]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /]	[N]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[F]	[F]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THERE IS ONLY ONE PUMP INLET (ACCUMULATOR) FILTER PER LOOP. THIS MEANS THAT THE LOSS OF THIS ONE FILTER WILL CAUSE LOSS OF BOTH PUMPS (SWITCHING TO ALTERNATE PUMP DOES NOT SOLVE THE PROBLEM). THEREFORE, IOA RECOMMENDS THE 2/1R CRITICALITY, BUT AGREES WITH THE NASA SCREEN EVALUATION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1005
NASA FMEA #: 06-3-0103-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1005
ITEM: ACCUMULATOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1006
NASA FMEA #: 06-3-0112-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1006
ITEM: SELF-SEALING DISCONNECT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[F]	[F]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINES ALL DISCONNECTS ASSOCIATED WITH THE PUMP PACKAGE INTO ONE FMEA EVALUATED AT THE WORST CASE CRITICALITY. FOR BETTER CLARITY, EACH DISCONNECT SHOULD BE EVALUATED SEPARATELY. HOWEVER, DUE TO THESE GROUNDRULE DIFFERENCES THERE IS NOT ENOUGH DATA TO EVALUATE DIFFERENCES AND MAKE A CRITICALITY RECOMMENDATION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1007
NASA FMEA #: 06-3-0105-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1007
ITEM: QUANTITY SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
SENSOR DATA CAN BE DEDUCED FROM OTHER SOURCES. SENSOR FAILURE HAS NO EFFECT ON CREW/VEHICLE SAFETY OR MISSION COMPLETION. THEREFORE, IOA RECOMMENDS THE 3/3 CRITICALITY AS BEING MORE REPRESENTATIVE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1008
NASA FMEA #: 06-3-0104-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1008
ITEM: INLET FILTER (FREON PUMP)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINES THE FILTERS AND THE CHECK VALVE INTO ONE FMEA. IOA AGREES WITH NASA CRITICALITIES AND SCREENS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1009
NASA FMEA #: 06-3-0104-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1009
ITEM: INLET FILTER (FREON PUMP)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[F]	[F]	[P]	[X] *
IOA	[3 /2R]	[P]	[F]	[P]	[X]
COMPARE	[/N]	[N]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINES THE FILTERS AND THE CHECK VALVES INTO ONE FMEA.
AGREE WITH NASA CRITICALITIES AND SCREEN RECOMMENDATIONS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1010
NASA FMEA #: 06-3-0101-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1010
ITEM: FREON PUMP

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1011
NASA FMEA #: 06-3-0101-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1011
ITEM: FREON PUMP

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1012
NASA FMEA #: 06-3-0101-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1012
ITEM: 3-PHASE MOTOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINES PUMP AND MOTOR INTO ONE FMEA. AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1013
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1013
ITEM: 3-PHASE MOTOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THIS FMEA IS WRITTEN FOR LOSS OF ONE PHASE OF A THREE-PHASE MOTOR. TAKEN TO THE WORST CASE, THE FAILURE BECOMES THE LOSS OF THE MOTOR WHICH IS ALREADY COVERED IN OTHER FMEAs. THEREFORE IOA IS DELETING THIS FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1014
NASA FMEA #: 06-3-0104-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1014
ITEM: OUTLET FILTER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[F]	[F]	[P]	[X] *
IOA	[2 /1R]	[P]	[F]	[P]	[X]
COMPARE	[N /]	[N]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THERE IS ONE FILTER ASSOCIATED WITH EACH CHECK VALVE/PUMP. STRUCTURAL DAMAGE TO ONE FILTER MIGHT CLOG ONE CHECK VALVE, BUT THE ALTERNATE LEG WOULD STILL BE OPERATIONAL AS WELL AS THE ALTERNATE FREON LOOP. THEREFORE, IOA AGREES WITH NASA CRITICALITIES AND SCREENS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1015
NASA FMEA #: 06-3-0104-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1015
ITEM: OUTLET FILTER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINES THE FILTERS AND CHECK VALVE INTO ONE FMEA. IOA AGREES WITH NASA CRITICALITIES AND SCREENS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1016
NASA FMEA #: 06-3-0108-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1016
ITEM: CHECK VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1017
NASA FMEA #: 06-3-0112-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1017
ITEM: OUTLET SELF-SEALING COUPLING

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1018
NASA FMEA #: 06-3-0112-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1018
ITEM: ORIFICE (OUTLET COUPLING)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINES ALL DISCONNECTS AND ORIFICES ASSOCIATED WITH THE PUMP PACKAGE INTO ONE FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1019
NASA FMEA #: 06-3-0207-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1019
ITEM: FUEL CELL HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1020
NASA FMEA #: 06-3-0207-6

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1020
ITEM: FUEL CELL HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1021
NASA FMEA #: 06-3-0207-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1021
ITEM: FUEL CELL HEAT EXCHANGERS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITY BASED ON WORST CASE EFFECTS OCCURING DURING ASCENT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1022
NASA FMEA #: 06-3-0207-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1022
ITEM: FUEL CELL HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1023
NASA FMEA #: 06-3-0207-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1023
ITEM: FUEL CELL HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1024
NASA FMEA #: 06-3-0207-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1024
ITEM: FUEL CELL HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1025
NASA FMEA #: 06-3-0301-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1025
ITEM: HYDRAULIC HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[P]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE NASA CRITICALITY HAS BEEN CHANGED IN A CCB. IOA DOES NOT HAVE THE APPROPRIATE PAPERWORK AT THIS TIME. THEREFORE, IOA RECOMMENDS RETAINING THE IOA CRITICALITY WHICH WILL BE THE REVISED NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1026
NASA FMEA #: 06-3-0301-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1026
ITEM: HYDRAULIC HEAT EXCHANGERS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1027
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1027
ITEM: HYDRAULIC HEAT EXCHANGERS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1028
NASA FMEA #: 06-3-0301-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1028
ITEM: HYDRAULIC HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1029
NASA FMEA #: 06-3-0301-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1029
ITEM: HYDRAULIC HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /]	[ ]	[ ]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [D] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES FOR ALL FLIGHT PHASES. THE IOA CRITICALITY FOR THE ABORT PHASE IS A 1/1, BUT ADDITIONAL DATA ALLOWS IOA TO AGREE WITH NASA IN RECOMMENDING THE LOWER CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1030
NASA FMEA #: 06-3-0301-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1030
ITEM: HYDRAULIC HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1031
NASA FMEA #: 06-3-0301-6

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1031
ITEM: HYDRAULIC HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[P]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
ALTERNATE METHODS EXIST TO OVERCOME THE PROBLEM OF RESTRICTED HYDRAULIC FLUID FLOW. HOWEVER, LOSS OF ALL ALTERNATE METHODS COULD LEAD TO THE LOSS OF ONE HYDRAULIC SYSTEM AND SUBSEQUENT EARLY MISSION TERMINATION BY FLIGHT RULES. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1032
NASA FMEA #: 06-3-0304-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1032
ITEM: GSE HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1033
NASA FMEA #: 06-3-0304-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1033
ITEM: GSE HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1034
NASA FMEA #: 06-3-0390-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1034
ITEM: GSE HEAT EXCHANGERS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1035
NASA FMEA #: 06-3-0304-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1035
ITEM: GSE HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THIS FAILURE AFFECTS GROUND OPERATIONS ONLY, NOT ON-ORBIT OPS. THEREFORE, IOA RECOMMENDS THE 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1036
NASA FMEA #: 06-3-0304-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1036
ITEM: GSE HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1037
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1037
ITEM: O2 RESTRICTOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA IN THIS PACKAGE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1038
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1038
ITEM: O2 RESTRICTOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA DEEMED THIS TO BE A NON-CREDIBLE FAILURE MODE REQUIRING TWO SEPARATE FAILURES (06-3-0250-1). IOA FEELS THIS FAILURE MODE SHOULD BE RE-EXAMINED TO DETERMINE THE AUTHENTICITY OF THE CONCERN AND RE-INSTATE THE FAILURE IF REQUIRED.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88 NASA DATA:
ASSESSMENT ID: ATCS-1039 BASELINE [ ]
NASA FMEA #: 06-3-0201-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1039
ITEM: ARS INTERCHANGER HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1040
NASA FMEA #: 06-3-0201-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1040
ITEM: ARS INTERCHANGER HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88 NASA DATA:
ASSESSMENT ID: ATCS-1041 BASELINE [ ]
NASA FMEA #: 06-3-0201-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1041
ITEM: ARS INTERCHANGER HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-1042 BASELINE [ ]
NASA FMEA #: 06-3-0390-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1042
ITEM: ARS INTERCHANGER HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1043
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1043
ITEM: ARS INTERCHANGER HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA IN THIS PACKAGE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1044
NASA FMEA #: 06-3-0201-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1044
ITEM: ARS INTERCHANGER HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1045
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1045
ITEM: ARS INTERCHANGER HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[2 /1R]	[F]	[P]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA IN THIS PACKAGE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1046
NASA FMEA #: 06-3-0202-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1046
ITEM: INLET TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-1047 BASELINE [ ]
NASA FMEA #: 06-3-0203-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1047
ITEM: FLOW RATE SENSOR INTERCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THIS SENSOR DRIVES A C&W LIGHT AND A METER DISPLAY. HOWEVER, ALTERNATE DATA SOURCES CAN BE USED TO DETERMINE THE CORRECT OPERATION OF THE FREON LOOP. LOSS OF THIS SENSOR WILL NOT AFFECT CONTINUED OPERATIONS. THEREFORE, IOA RECOMMENDS A 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1048
NASA FMEA #: 06-3-0223-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1048
ITEM: PAYLOAD HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[F]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO ISSUE WITH NASA EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1049
NASA FMEA #: 06-3-0223-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1049
ITEM: PAYLOAD HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1050
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1050
ITEM: PAYLOAD HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[3 /2R]	[P]	[P]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA IN THIS PACKAGE. CRITICALITY IS BEING CHANGED TO REFLECT CORRECT DATA. INCORRECT ENTRY INADVERTENTLY PICKED UP IN DATA BASE ENTRIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1051
NASA FMEA #: 06-3-0390-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1051
ITEM: PAYLOAD HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1052
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1052
ITEM: PAYLOAD HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[P]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA IN THIS PACKAGE. CRITICALITY IS BEING CHANGED TO REFLECT CORRECT DATA. INCORRECT ENTRY INADVERTENTLY PICKED UP IN DATA BASE ENTRIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1053
NASA FMEA #: 06-3-0223-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1053
ITEM: PAYLOAD HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[P]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THIS FAILURE DIRECTLY AFFECTS THE FREON LOOP RATHER THAN THE PAYLOAD COOLANT LOOP. THE RESTRICTION AFFECTS THE ENTIRE LOOP AND NOT JUST AT THE PAYLOAD HEAT EXCHANGER. THE FAILURE CAN RESULT IN THE LOSS OF ONE FREON LOOP WHICH MEANS IOA RECOMMENDS THE 2/1R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1054
NASA FMEA #: 06-3-0224-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1054
ITEM: FLOW RATE SENSOR PAYLOAD HX

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE SENSOR DOES NOT MEAN LOSS OF THE MISSION, CREW, OR VEHICLE. THE DATA CAN BE OBTAINED FROM ALTERNATE SOURCES. THEREFORE, IOA RECOMMENDS RETAINING THE 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1055
NASA FMEA #: 06-3-0212-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1055
ITEM: SERVICING QUICK DISCONNECT CAP

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[F]	[F]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
A CAP FAILING TO REMAIN CLOSED IS A WORST CASE CONDITION OF EXTERNAL LEAKAGE. IOA AGREES WITH NASA CRITICALITIES AND NASA SCREENS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1056
NASA FMEA #: 06-3-0390-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1056
ITEM: FLOW PROPORTIONING VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88 NASA DATA:
ASSESSMENT ID: ATCS-1057 BASELINE [ ]
NASA FMEA #: 06-3-0220-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1057
ITEM: FLOW PROPORTIONING VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1058
NASA FMEA #: 06-3-0220-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1058
ITEM: FLOW PROPORTIONING VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEA WRITTEN AGAINST FAILURE TO OPERATE IN COOLANT - PAYLOAD. THE CRITICALITITES ALSO ASSUME A WORST CASE CONDITION OF REQUIRING BOTH FREON LOOPS FOR ADEQUATE COOLING OF THE PAYLOAD. LOSS OF COOLANT TO THE PAYLOAD WHEN REQUIRED BY MISSION OBJECTIVES WILL MEAN A LOSS OF MISSION. AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-1058A BASELINE [ ]
NASA FMEA #: 06-3-0220-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1058
ITEM: FLOW PROPORTIONING VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
FAILS TO OPERATE COOLANT - INTERCHANGER. AGREE WITH NASA CRITICALITIES. IF THE VALVE FAILS TO OPERATE IN A MANNER WHICH PREVENTS SUFFICIENT FLOW FROM REACHING THE INTERCHANGER, VEHICLE COOLING MAY BE LOST. LOSS OF FLOW PROPORTIONING VALVES IN BOTH FREON LOOPS CAN LEAD TO THE LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1059
NASA FMEA #: 06-3-0220-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1059
ITEM: ACTUATOR (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs CONSIDER THE ACTUATOR AS A PART OF THE OVERALL VALVE MODULE. WORST CASE OF THE IOA ACTUATOR FAILURE WOULD BE FOR THE VALVE TO REMAIN STUCK IN THE PAYLOAD POSITION. THIS LEADS TO INADEQUATE FLOW TO THE INTERCHANGER. UNDER THESE CONDITIONS, IOA AGREES WITH THE CRITICALITY OF THE CITED NASA FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1060
NASA FMEA #: 06-3-0390-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1060
ITEM: MIDBODY COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1061
NASA FMEA #: 06-3-0215-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1061
ITEM: MIDBODY COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1062
NASA FMEA #: 06-3-0215-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1062
ITEM: MIDBODY COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[F]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO ISSUE WITH SCREEN B - ACCEPT NASA RECOMMENDATION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1063
NASA FMEA #: 06-3-0307-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1063
ITEM: ORIFICE (AFT AVIONICS COLDPLATES)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINED THE FAILURE IN THE ORIFICE WITH A FAILURE OF THE AFT AVIONICS COLDPLATES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-1064 BASELINE [ ]
NASA FMEA #: 06-3-0309-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1064
ITEM: AFT COLDPLATE NETWORK FLOWRATE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE SENSOR WILL NOT MEAN LOSS OF THE MISSION OR LOSS OF CREW/VEHICLE. THE DATA AVAILABLE FROM THE SENSOR CAN BE OBTAINED FROM ALTERNATE SOURCES. THEREFORE, IOA RECOMMENDS THE 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-1065 BASELINE [ ]
NASA FMEA #: 06-3-0390-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1065
ITEM: AFT AVIONICS COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1066
NASA FMEA #: 06-3-0307-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1066
ITEM: AFT AVIONICS COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1067
NASA FMEA #: 06-3-0307-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1067
ITEM: AFT AVIONICS COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1068
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1068
ITEM: ORIFICE (RGA COLDPLATES)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. THE ORIFICES ACT AS BYPASS LOOPS AROUND THE RGA COLDPLATES FOR EXCESS FREON. NASA FMEAs ONLY COVER THE CASE OF RESTRICTED FLOW THROUGH THE RGA COLDPLATES WITH NO MENTION OF THE ORIFICES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1069
NASA FMEA #: 06-3-0230-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1069
ITEM: RGA COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1070
NASA FMEA #: 06-3-0390-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1070
ITEM: RGA COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-1071
NASA FMEA #: 06-3-0230-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1071
ITEM: RGA COLDPLATES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-1072
NASA FMEA #: 06-3-0390-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1072
ITEM: FREON LOOP LINES AND FITTINGS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1073
NASA FMEA #: 05-6W-2004-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1073
ITEM: CIRCUIT BREAKERS (FREON PUMP)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF ALL CIRCUIT BREAKERS TO ONE PUMP WILL RESULT IN THE LOSS OF THE PUMP. LOSS OF BOTH PUMPS ON ONE LOOP MEANS THE LOSS OF THE LOOP. EVEN THOUGH IT REQUIRES A LARGE NUMBER OF FAILURES TO REACH THE 1R CRITICALITY, IT IS A POSSIBLE CHAIN OF EVENTS. UNDER THESE CONDITIONS, IOA AGREES WITH NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1074
NASA FMEA #: 05-6W-2045-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1074
ITEM: SWITCH (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1075
NASA FMEA #: 05-6W-2045-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1075
ITEM: SWITCH (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1076
NASA FMEA #: 05-6W-2045-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1076
ITEM: SWITCH (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /]	[ ]	[ ]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[D] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITIES. FOR EACH LOOP, THE PUMPS CAN BE STARTED WITH THE SWITCH OR PUMP B CAN BE STARTED WITH A GPC COMMAND. THIS ADDS ANOTHER LEVEL OF REDUNDANCY TO THE SWITCH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1077
NASA FMEA #: 05-6W-2085-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1077
ITEM: RESISTOR (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1078
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1078
ITEM: RESISTOR (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DELETE - NOT A CREDIBLE FAILURE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1079 BASELINE [ ]
NASA FMEA #: 05-6W-2256-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1079
ITEM: MDM BLOCKING DIODE (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE GPC COMMAND PATH IS A BACKUP TO THE SWITCH. THEREFORE, THE TWO PATHS SHOULD CARRY THE SAME CRITICALITY. IOA AGREES WITH NASA CRITICALITIES AND WITH THE EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1080 BASELINE [ ]
NASA FMEA #: 05-6W-2256-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1080
ITEM: MDM BLOCKING DIODE (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITIES. THE INPUT TO THE MDM CANNOT BE DAMAGED BY REVERSE CURRENT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1081
NASA FMEA #: 05-6W-2202-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1081
ITEM: HYBRID DRIVER (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1082
NASA FMEA #: 05-6W-2202-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1082
ITEM: HYBRID DRIVER (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITS. WORST CASE IS A CONTINUOUSLY ACTIVATED PUMP.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1083
NASA FMEA #: 05-6W-2126-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1083
ITEM: RELAY SOLENOID (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES AND EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1084
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1084
ITEM: RELAY SOLENOID (FREON PUMPS)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA CONSIDERS THIS A NON-CREDIBLE FAILURE MODE (05-6W-2126-3).
IOA AGREES AND WILL DELETE THIS FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1085
NASA FMEA #: 05-6W-2008-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1085
ITEM: CIRCUIT BREAKER (FREON FLOW PROPORTIONING)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1086 BASELINE [ ]
NASA FMEA #: 05-6W-2043-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1086
ITEM: SWITCH (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1087
NASA FMEA #: 05-6W-2043-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1087
ITEM: SWITCH (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
WORST CASE IS AN INABILITY TO PROVIDE PAYLOAD WITH REQUIRED COOLING. IF THE PRIMARY MISSION OBJECTIVE REQUIRES THE COOLING PROVIDED BY BOTH FREON LOOPS, LOSS OF FLOW THRU THE PAYLOAD HEAT EXCHANGER WILL MEAN A LOSS OF MISSION. IN THIS CASE IT IS ASSUMED THAT THE PAYLOAD REQUIRES FLOW FROM BOTH FREON LOOPS AND LOSS OF ONE WILL CAUSE WORST CASE EFFECTS TO OCCUR. THEREFORE, IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1088 BASELINE [ ]
NASA FMEA #: 05-6W-2043-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1088
ITEM: SWITCH 21 (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IF THE SWITCH IS FAILED IN THE PAYLOAD HEAT EXCHANGER POSITION, THEN INSUFFICIENT FREON WILL FLOW THROUGH THE ARS INTERCHANGER RESULTING IN INADEQUATE VEHICLE COOLING. THEREFORE, IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1089
NASA FMEA #: 06-3-0217-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1089
ITEM: SIGNAL CONDITIONER (ATCS OF1)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[3 /3]	[ ]	[ ]	[ ]	[D] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE SIGNAL CONDITIONER PROVIDES A POWER SOURCE FOR FREON LOOP SENSOR DATA. ERRONEOUS DATA WOULD MEAN INCORRECT FREON LOOP PARAMETERS. WORST CASE COULD RESULT IN LOSS OF ALL SENSOR DATA ON FREON LOOP. HOWEVER, FREON LOOP CAN BE MONITORED USING ALTERNATE DATA SOURCES. THEREFORE, THIS FAILURE SHOULD BE CONSIDERED TO HAVE NO EFFECT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1090 BASELINE [ ]
NASA FMEA #: 05-6W-2081-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1090
ITEM: RESISTOR (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1091
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1091
ITEM: RESISTOR (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DELETE - NOT A CREDIBLE FAILURE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1092
NASA FMEA #: 05-6W-2257-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1092
ITEM: BLOCKING DIODE (INTERCHANGER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1093
NASA FMEA #: 05-6W-2257-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1093
ITEM: BLOCKING DIODE (INTERCHANGER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1094
NASA FMEA #: 05-6W-2257-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1094
ITEM: BLOCKING DIODE (PAYLOAD HX)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1095
NASA FMEA #: 05-6W-2257-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1095
ITEM: BLOCKING DIODE (PAYLOAD HX)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1096 BASELINE [ ]
NASA FMEA #: 05-6W-2151-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1096
ITEM: INDICATOR (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1097
NASA FMEA #: 05-6W-2151-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1097
ITEM: INDICATOR (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1098 BASELINE [ ]
NASA FMEA #: 05-6W-2151-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1098
ITEM: INDICATOR (FLOW PROPORTIONING VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1099 BASELINE [ ]
NASA FMEA #: 05-6W-2001-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1099
ITEM: CIRCUIT BREAKER (FREON SIGNAL CONDITIONER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1100 BASELINE [ ]
NASA FMEA #: 05-6W-2001-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1100
ITEM: CIRCUIT BREAKER (FREON SIGNAL CONDITIONER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
WORST CASE IS A LOSS OF SENSOR DATA. INFORMATION CAN BE OBTAINED AND FREON LOOP PERFORMANCE MONITORED FROM ALTERNATE SOURCES. THEREFORE, IOA RECOMMENDS 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1101 BASELINE [ ]
NASA FMEA #: 05-6W-2041-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1101
ITEM: SWITCH 10 (FREON SIGNAL CONDITIONER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
WORST CASE IS A LOSS OF SENSOR DATA. INFORMATION CAN BE OBTAINED AND FREON LOOP PERFORMANCE MONITORED FROM ALTERNATE SOURCES. THEREFORE, IOA RECOMMENDS A 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-1102 BASELINE [ ]
NASA FMEA #: 05-6W-2041-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1102
ITEM: SWITCH 10 (FREON SIGNAL CONDITIONER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
WORST CASE IS A LOSS OF SENSOR DATA. INFORMATION CAN BE OBTAINED AND FREON LOOP PERFORMANCE MONITORED FROM ALTERNATE SOURCES. THEREFORE, IOA RECOMMENDS A 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1103
NASA FMEA #: 05-6W-2041-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1103
ITEM: SWITCH 10 (FREON SIGNAL CONDITIONER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
WORST CASE RESULT IS A LOSS OF SENSOR DATA. INFORMATION CAN BE OBTAINED AND FREON LOOP PERFORMANCE MONITORED FROM ALTERNATE SOURCES. THEREFORE, IOA RECOMMENDS A 3/3 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1104
NASA FMEA #: 05-6W-2057-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1104
ITEM: SWITCH 4 (FREON)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1105
NASA FMEA #: 05-6W-2356-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1105
ITEM: FREON FLOW VOLTMETER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
WORST CASE IS LOSS OF DISPLAY DATA WITH NO EFFECT ON SAFETY OR OPERATIONS. THEREFORE, IOA RECOMMENDS THE LOWER CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1106
NASA FMEA #: 05-6W-2357-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 1106
ITEM: FREON EVAPORATOR OUTLET TEMPERATURE VOLTMETER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-1107
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 1107
ITEM: FREON C&W LIGHT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA IN THIS PACKAGE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2000
NASA FMEA #: 06-3-0520-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2000
ITEM: INLET SELF-SEALING COUPLING

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-2001 BASELINE [ ]
NASA FMEA #: 06-3-0520-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2001
ITEM: OUTLET SELF-SEALING COUPLING

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2002
NASA FMEA #: 06-3-0580-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2002
ITEM: FLEX HOSES,MANIFOLDS, TUBES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2003
NASA FMEA #: 06-3-0502-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2003
ITEM: FLOW CONTROL VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /2]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
FAILING THE VALVE IN THE BYPASS POSITION WILL ELIMINATE RADIATOR FLOW REGARDLESS OF THE CAUSE (MECHANICAL OR ELECTRICAL). LOSS OF FLOW THROUGH THE RADIATOR IS A LOSS OF MISSION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2003A
NASA FMEA #: 06-3-0502-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2003
ITEM: FLOW CONTROL VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA SEPARATED THE FAILURE ACCORDING TO MECHANICAL AND ELECTRICAL CAUSES. REGARDLESS OF THE CAUSE, THE FAILURE HAS THE SAME EFFECT AND THEREFORE THE CRITICALITIES SHOULD BE CONSISTENT. IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2004
NASA FMEA #: 06-3-0502-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2004
ITEM: FLOW CONTROL VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA CRITICALITY ASSIGNED BASED ON FINAL EFFECT BEING SUPER-COOLED FREON FREEZING AND RUPTURING THE INTERCHANGER. BASED ON THIS SCENARIO, IOA AGREES WITH NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2004A
NASA FMEA #: 06-3-0502-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2004
ITEM: FLOW CONTROL VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATED THE FAILURE BY MECHANICAL AND ELECTRICAL CAUSES. ADDITIONALLY, THE WORST CASE WAS BASED ON SUPER-COOLED FREON FREEZING AND RUPTURING THE INTERCHANGER. IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2005
NASA FMEA #: 06-3-0520-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2005
ITEM: FLOW CONTROL VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2006
NASA FMEA #: 06-3-0502-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2006
ITEM: STEPPING MOTOR (FLOW CONTROL VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs COMBINE THE VALVE AND MOTOR INTO ONE. IOA AGREES WITH THE CRITICALITY BASED ON THE WORST CASE OF THE STEPPING MOTOR BEING STOPPED WHEN THE VALVE IS IN THE NORMAL POSITION WHICH CAN LEAD TO SUPER-COOLED FREON IN LOOP.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2007
NASA FMEA #: 06-3-0504-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2007
ITEM: BYPASS VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
FAILING THE VALVE IN THE BYPASS POSITION WILL ELIMINATE THE COOLING FROM ONE RADIATOR WHICH RESULTS IN A MINIMUM DURATION FLIGHT AND LOSS OF MISSION. THEREFORE, IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2007A
NASA FMEA #: 06-3-0504-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2007
ITEM: BYPASS VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /2]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA SEPARATED THE VALVE FAILURE INTO TWO FMEAs BASED ON CAUSE - ONE FOR ELECTRICAL AND ONE FOR MECHANICAL. REGARDLESS OF THE CAUSE, THE RESULT OF FAILING THE VALVE IN THE BYPASS POSITION IS THE SAME AND THEREFORE THE CRITICALITIES SHOULD BE CONSISTENT. IOA RECOMMENDS A "2/2" CRITICALITY BASED ON LOSS OF MISSION DUE TO LOSS OF FLOW THROUGH RADIATOR.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2008
NASA FMEA #: 06-3-0504-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2008
ITEM: BYPASS VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[ ]	[N]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. WORST CASE RESULT OF STICKING BYPASS VALVE IN THE RAD FLOW POSITION IS EXCESSIVE COOLING OF FREON WITH LOSS OF TEMPERATURE CONTROL. AGREE WITH NASA EVALUATION OF SCREEN B IN ABSENCE OF CONFLICTING DATA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2008A
NASA FMEA #: 06-3-0504-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2008
ITEM: BYPASS VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[F]	[P]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA SEPARATES FAILURE INTO TWO FMEAs BASED ON CAUSE (MECHANICAL AND ELECTRICAL). REGARDLESS OF THE CAUSE, THE RESULT IS THE SAME, AND THE CRITICALITIES SHOULD BE CONSISTENT. THERFORE, IOA RECOMMENDS THE 2/1R CRITICALITY WITH SCREENS AS RECOMMENDED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2009
NASA FMEA #: 06-3-0520-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2009
ITEM: BYPASS VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2010
NASA FMEA #: 06-3-0504-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2010
ITEM: MOTOR (BYPASS VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[N /]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[F]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA COMBINES THE MOTOR AND VALVE INTO A SINGLE FMEA. IOA RECOMMENDS THE HIGHER CRITICALITY BASED ON OTHER FMEAs IN PACKAGE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2011
NASA FMEA #: 06-3-0520-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2011
ITEM: MODE CONTROL VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2012
NASA FMEA #: 06-3-0505-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2012
ITEM: RADIATOR FLOW CONTROLLER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. LOSS OF ALL CONTROLLERS MEANS LOSS OF ALL RAD FLOW WHICH CAN LEAD TO LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2013
NASA FMEA #: 06-3-0510-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2013
ITEM: INLET TEMPERATURE TRANSDUCER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88 **NASA DATA:**
ASSESSMENT ID: ATCS-2014 BASELINE [ ]
NASA FMEA #: 06-3-0510-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2014
ITEM: OUTLET TEMPERATURE TRANSDUCER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2015
NASA FMEA #: 06-3-0507-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2015
ITEM: TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2015A
NASA FMEA #: 06-3-0508-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2015
ITEM: TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2015B
NASA FMEA #: 06-3-0508-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2015
ITEM: TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. FAILING THE SENSOR OFF SCALE HIGH WILL RESULT IN SUPER-COOLED FREON WITH SUBSEQUENT DOWNSTREAM PROBLEMS. AGREE WITH EVALUATION OF SCREEN B IN ABSENCE OF CONFLICTING DATA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2015C
NASA FMEA #: 06-3-0507-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2015
ITEM: TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. FAILING THE SENSOR OFF SCALE HIGH WILL ALLOW FREON TO GET TOO COLD WITH SUBSEQUENT DOWNSTREAM SUPER-COOLING AND POSSIBLE RUPTURE/FREEZING OF INTERCHANGER.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-2016 BASELINE [ ]
NASA FMEA #: 05-6W-2010-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2016
ITEM: CIRCUIT BREAKER 14 (FREON RADIATOR CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES AND EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-2017 BASELINE [ ]
NASA FMEA #: 05-6W-2034-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2017
ITEM: SWITCH 26 (RADIATOR CONTROL LOOP)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /1R] [P] [P] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF ONE CONTROLLER DOES NOT RESULT IN LOSS OF THE RADIATOR. THEREFORE, RECOMMEND A HARDWARE CRIT OF "3" BUT WITH THE "1R" FUNCTIONAL CRIT SINCE LOSS OF ALL CONTROLLERS PLUS LOSS OF ADDITIONAL COOLING CAN CAUSE LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-2017A BASELINE [ ]
NASA FMEA #: 05-6W-2034-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2017
ITEM: SWITCH 26 (RADIATOR CONTROL LOOP)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF BOTH CONTROLLERS ON ONE LOOP WILL RESULT IN LOSS OF THAT RADIATOR. LOSS OF ONE RADIATOR IS A MIN. DURATION FLIGHT AND THEREFORE A LOSS OF MISSION. IOA AGREES WITH NASA CRITICALITIES AND SCREENS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-2018 BASELINE [ ]
NASA FMEA #: 05-6W-2034-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2018
ITEM: SWITCH 26 (RADIATOR CONTROL LOOP)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. LOSS OF ALL CAPABILITY TO CONTROL RADIATOR FLOW CAN RESULT IN LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2019
NASA FMEA #: 05-6W-2252-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2019
ITEM: DIODE (RADIATOR FLOW CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2020
NASA FMEA #: 05-6W-2252-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2020
ITEM: DIODE (RADIATOR FLOW CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/08/88
ASSESSMENT ID: ATCS-2021
NASA FMEA #: 05-6W-2080-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2021
ITEM: RESISTOR (RADIATOR FLOW CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/08/88
ASSESSMENT ID: ATCS-2022
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 2022
ITEM: RESISTOR (RADIATOR FLOW CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DELETE - NOT A CREDIBLE FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: ATCS-2023
NASA FMEA #: 05-6W-2038-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2023
ITEM: SWITCH 25 (RADIATOR CONTROL OUTLET TEMPERATURE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
RADIATOR CONTROL IS STILL FUNCTIONAL AND THE TEMPERATURE IS CONTROLLED TO 38 DEGREES F. THE ONLY ITEMS LOST ARE THE CAPABILITY TO USE FES AS AN ALTERNATE METHOD OF DUMPING WATER (CONTROLLING TO HIGHER TEMPERATURE), OR USING THE HIGH SETTING FOR COLD-SOAKING THE RADIATORS. IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: ATCS-2024
NASA FMEA #: 05-6W-2038-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2024
ITEM: SWITCH 25 (RADIATOR CONTROL OUTLET TEMPERATURE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
FAILING THE SWITCH IN HIGH WILL ESSENTIALLY ELIMINATE COOLING FROM ONE RADIATOR. ADDITIONAL PROBLEMS ARE CAUSED BY THE INCREASED WATER USAGE BY THE FES TO MAINTAIN REQUIRED COOLING LEVELS. THE LOSS OF COOLING PLUS WATER MANAGEMENT PROBLEMS LEADS TO A LOSS OF MISSION. THEREFORE, IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2025
NASA FMEA #: 05-6W-2014-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2025
ITEM: CIRCUIT BREAKER (RADIATOR BYPASS VLV)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. LOSS OF ALL COOLING CAN LEAD TO A LOSS OF CREW/VEHICLE. AGREE WITH EVALUATION OF SCREEN B DUE TO LACK OF CONFLICTING DATA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-2026 BASELINE [ ]
NASA FMEA #: 05-6W-2036-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2026
ITEM: SWITCH 29 (RADIATOR MANUAL SELECT)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. LOSS OF ALL CAPABILITY TO CONTROL BYPASS VALVE MAY LEAD TO LOSS OF COOLING OR TO EXCESSIVE COOLING DUE TO SUPER-COOLED FREON.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: ATCS-2027
NASA FMEA #: 05-6W-2036-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2027
ITEM: SWITCH 29 (RADIATOR MANUAL SELECT)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-2028 BASELINE [ ]
NASA FMEA #: 05-6W-2036-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2028
ITEM: SWITCH 29 (RADIATOR MANUAL SELECT)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[ ]	[N]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NOT ENOUGH DATA TO RESOLVE AT THIS TIME.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: ATCS-2029
NASA FMEA #: 05-6W-2082-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2029
ITEM: RESISTOR (PRECEDES S35)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. WORST CASE RESULTS CAN LEAD TO A LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/08/88
ASSESSMENT ID: ATCS-2030
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 2030
ITEM: RESISTOR (PRECEDES S35)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DELETE - NOT A CREDIBLE FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2031
NASA FMEA #: 05-6W-2032-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2031
ITEM: SWITCH 35 (RADIATOR CONTROLLER BYPASS VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES AND EVALUATION OF SCREEN B. LOSS OF ALL CAPABILITY TO CONTROL THE RADIATORS CAN LEAD TO LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2032
NASA FMEA #: 05-6W-2032-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2032
ITEM: SWITCH 35 (RADIATOR CONTROLLER BYPASS VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES AND EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88
ASSESSMENT ID: ATCS-2033
NASA FMEA #: 05-6W-2203-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2033
ITEM: HYBRID DRIVER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. LOSS OF ALL ABILITY TO CONTROL THE RADIATOR FLOW CAN RESULT IN A LOSS OF CREW/VEHICLE. AGREE WITH SCREEN B DUE TO LACK OF CONFLICTING DATA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2034
NASA FMEA #: 05-6W-2203-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2034
ITEM: HYBRID DRIVER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. PREMATURE ACTIVATION OF THE HYBRID DRIVER CAN LEAD TO INCORRECT COMMANDS BEING SENT TO THE VALVE AND INCORRECT VALVE POSITIONING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2035
NASA FMEA #: 05-6W-2097-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2035
ITEM: RESISTOR (BYPASS VALVE INDICATOR)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2036
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 2036
ITEM: RESISTOR (BYPASS VALVE INDICATOR)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DELETE - NOT A CREDIBLE FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-2037
NASA FMEA #: 05-6W-2254-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2037
ITEM: DIODE (BYPASS VALVE INDICATOR)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-2038 BASELINE [ ]
NASA FMEA #: 05-6W-2254-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2038
ITEM: DIODE (BYPASS VALVE INDICATOR)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/08/88
ASSESSMENT ID: ATCS-2039
NASA FMEA #: 05-6W-2152-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2039
ITEM: BYPASS VALVE INDICATOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/08/88
ASSESSMENT ID: ATCS-2039A
NASA FMEA #: 06-3-0503-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 2039
ITEM: BYPASS VALVE INDICATOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3000
NASA FMEA #: 06-3-0328-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3000
ITEM: FES HI LOAD FEEDLINE TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3001
NASA FMEA #: 06-3-0311-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3001
ITEM: HI LOAD FEEDLINE FROM CUT-OFF TO NOZZLE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO ISSUE WITH SCREEN B - ACCEPT NASA's RECOMMENDATION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3002 BASELINE [ ]
NASA FMEA #: 06-3-0330-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3002
ITEM: HI LOAD FEEDLINE FROM CUT OFF TO NOZZLE
(PLUMBING)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO ISSUE WITH SCREEN B - ACCEPT NASA's RECOMMENDATION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3003
NASA FMEA #: 06-3-0330-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3003
ITEM: FES HI LOAD FEEDLINE HEATER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3004
NASA FMEA #: 06-3-0330-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3004
ITEM: FES HI LOAD FEEDLINE HEATER THERMOSTAT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONSIDERS A FAILED ON HEATER TO BE A NON-CREDIBLE FAILURE. THE SAME EFFECT IS ACHIEVED BY FAILING THE ASSOCIATED THERMOSTAT TO ALWAYS REFLECT A LOW TEMPERATURE - KEEPING THE HEATERS ON. IOA AGREES WITH THE CRITICALITY IF THE FAILURE MODE IS CHANGED FROM A FAILED ON HEATER TO A FAILED OFF THERMOSTAT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3005
NASA FMEA #: 06-3-0330-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3005
ITEM: FES HI LOAD FEEDLINE HEATER THERMOSTAT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
A FAILED OPEN THERMOSTAT IS EQUIVALENT TO A FAILED OFF HEATER. THEREFORE, IOA IS MATCHING THIS FMEA TO THE NASA FMEA FOR A NON-OPERATING HEATER.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3006 BASELINE [ ]
NASA FMEA #: 06-3-0322-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3006
ITEM: 40 MICRON FILTER-HI LOAD WATER VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
ACCEPT NASA's RECOMMENDATION ON SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3007
NASA FMEA #: 06-3-0322-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3007
ITEM: HI LOAD ISOLATION VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH THE SCREEN B FAILURE ON THIS ITEM SINCE AN ISOLATION VALVE FAILING OPEN CAN BE MASKED BY A PROPERLY OPERATING PULSER VALVE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3008
NASA FMEA #: 06-3-0322-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3008
ITEM: HI LOAD ISOLATION VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3009
NASA FMEA #: 06-3-0322-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3009
ITEM: HI LOAD PULSER VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3010
NASA FMEA #: 06-3-0322-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3010
ITEM: HI LOAD PULSER VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH THE SCREEN B FAILURE OF THIS ITEM SINCE A FAILED OPEN PULSER VALVE CAN BE MASKED BY A PROPERLY OPERATING ISOLATION VALVE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3011
NASA FMEA #: 06-3-0322-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3011
ITEM: HI LOAD SPRAY NOZZLES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3012
NASA FMEA #: 06-3-0311-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3012
ITEM: HI LOAD EVAPORATOR CORE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH THE NASA 1/1 CRITICALITY. WORST CASE, THIS FAILURE WILL RESULT IN THE LOSS OF THE HIGH LOAD EVAPORATOR AND ONE FREON LOOP. AT THIS COOLING LEVEL, THE POWERDOWN REQUIREMENTS FOR ENTRY PLACE THE ORBITER AT A QUESTIONABLE SURVIVAL LIMIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3013
NASA FMEA #: 06-3-0311-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3013
ITEM: HI LOAD VALVE MOUNTING PLATE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /]	[ ]	[N]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITY. WORST CASE, THIS FAILURE CAN IMMEDIATELY RESULT IN THE LOSS OF THE HIGH LOAD EVAPORATOR. THIS MEANS ONLY ONE ADDITIONAL FAILURE (THE LOSS OF ONE FREON LOOP) IS REQUIRED BEFORE THE LOSS OF THE CREW/VEHICLE CAN OCCUR.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3014
NASA FMEA #: 06-3-0311-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3014
ITEM: HI LOAD VALVE MOUNTING PLATE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87 NASA DATA:
ASSESSMENT ID: ATCS-3015 BASELINE [ ]
NASA FMEA #: 06-3-0311-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3015
ITEM: HI LOAD VALVE MOUNTING PLATE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
ACCEPT NASA's RECOMMENDATION ON SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3016
NASA FMEA #: 06-3-0311-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3016
ITEM: HI LOAD EVAPORATOR ANTI-CARRYOVER DEVICE (ACOD)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87 NASA DATA:
ASSESSMENT ID: ATCS-3017 BASELINE [ ]
NASA FMEA #: 06-3-0311-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3017
ITEM: HI LOAD EVAPORATOR ANTI-CARRYOVER DEVICE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3018
NASA FMEA #: 06-3-0311-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3018
ITEM: HI LOAD ANTI-CARRYOVER DEVICE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE NASA FMEAs DO NOT DISTINGUISH BETWEEN RESTRICTED FREON FLOW IN THE BODY OF THE EVAPORATOR AND RESTRICTED FREON FLOW IN PLACES SUCH AS THE ACOD. A RESTRICTED FLOW THROUGH THE ACOD WILL HAVE NO SIGNIFICANT EFFECT ON EVAPORATOR OPERATIONS AND THEREFORE SHOULD BE A 3/3 CRITICALITY. NASA SHOULD CONSIDER ADDING THIS FAILURE MODE FOR PURPOSES OF COMPLETION. DUE TO THE DIFFERENCES IN DIVISIONS, NO CRITICALITY IS BEING RECOMMENDED.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3019
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3019
ITEM: HI LOAD EXIT DUCT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

RECOMMENDATIONS: (If different from NASA)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. SHOULD BE ADDED FOR COMPLETENESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3020
NASA FMEA #: 06-3-0326-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3020
ITEM: HI LOAD EXIT DUCT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ACCEPTS NASA RECOMMENDATION ON SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3021
NASA FMEA #: 06-3-0326-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3021
ITEM: HI LOAD INBOARD AND OUTBOARD DUCT HEATERS - ZONE A AND B

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3022
NASA FMEA #: 06-3-0328-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3022
ITEM: HI LOAD INBOARD AND OUTBOARD DUCT TEMPERATURE MONITOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3023 BASELINE [ ]
NASA FMEA #: 06-3-0326-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3023
ITEM: HI LOAD INBOARD AND OUTBOARD DUCT HEATER THERMOSTATS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3024
NASA FMEA #: 06-3-0326-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3024
ITEM: HI LOAD INBOARD AND OUTBOARD DUCT HEATER THERMOSTATS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA DETERMINED FAILED ON HEATERS TO BE A NON-CREDIBLE FAILURE. THE SAME EFFECTS ARE MANIFESTED BY A FAILED THERMOSTAT SUCH THAT THE THERMOSTAT IS REFLECTING A LOW TEMPERATURE AND THE HEATERS REMAIN ON. IOA WILL AGREE WITH NASA CRITICALITIES IF THE FAILURE MODE IS CHANGED FROM A FAILED ON HEATER TO A FAILED OFF THERMOSTAT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3025
NASA FMEA #: 06-3-0314-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3025
ITEM: HI LOAD NOZZLE HEATER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
FLIGHT RULES REQUIRE THAT THE HI LOAD NOZZLE REACH A GIVEN MINIMUM TEMPERATURE BEFORE THE HIGH LOAD EVAPORATOR IS ENABLED. IF ALL HEATERS ARE INOPERATIVE, THIS MINIMUM TEMPERATURE CANNOT BE REACHED AND THE HIGH LOAD EVAPORATOR MAY BE CONSIDERED UNAVAILABLE. LOSS OF THE HIGH LOAD PLUS LOSS OF ONE FREON LOOP CAN RESULT IN THE LOSS OF THE CREW/VEHICLE. THEREFORE, IOA RECOMMENDS THE HIGHER CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3026
NASA FMEA #: 06-3-0314-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3026
ITEM: HI LOAD NOZZLE TEMPERATURE SENSOR/HEATER CONTROLLER ASSEMBLY

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /1R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
FLIGHT RULES REQUIRE THE HI LOAD NOZZLE REACH A GIVEN MINIMUM TEMPERATURE PRIOR TO ENABLING THE HI LOAD EVAPORATOR. IF ALL HEATERS ARE INOPERATIVE, THE MINIMUM TEMPERATURE CANNOT BE REACHED AND THE HIGH LOAD EVAPORATOR MUST BE CONSIDERED LOST. LOSS OF THE HIGH LOAD PLUS LOSS OF ONE FREON LOOP CAN RESULT IN LOSS OF CREW/VEHICLE. THEREFORE IOA RECOMMENDS THE HIGHER CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3027 BASELINE [ ]
NASA FMEA #: 06-3-0314-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3027
ITEM: HI LOAD NOZZLE TEMPERATURE SENSOR/HEATER CONTROLLER ASSEMBLY

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3028
NASA FMEA #: 06-3-0328-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3028
ITEM: HI LOAD DUCT NOZZLE TEMPERATURE MONITOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3029
NASA FMEA #: 06-3-0314-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3029
ITEM: HI LOAD NOZZLE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ACCEPTS NASA's RECOMMENDATION ON SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3030
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3030
ITEM: HI LOAD NOZZLE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

RECOMMENDATIONS: (If different from NASA)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. SHOULD BE ADDED FOR COMPLETENESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3031 BASELINE [ ]
NASA FMEA #: 06-3-0330-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3031
ITEM: FES TOPPING FEEDLINE HEATER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA GROUPED ALL OF THE FEED WATER COMPONENTS INTO ONE FMEA GROUP. NO DISTINCTION WAS MADE BETWEEN "SHARED" COMPONENTS AND THOSE DEDICATED TO ONLY THE TOPPING OR HIGH LOAD EVAPORATOR. UNDER THESE CONDITIONS, IOA AGREES WITH THE NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3032
NASA FMEA #: 06-3-0330-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3032
ITEM: FES TOPPING FEEDLINE HEATER THERMOSTAT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONSIDERED A FAILED ON HEATER TO BE A NON-CREDIBLE FAILURE. THE SAME EFFECT IS ACHIEVED BY FAILING THE ASSOCIATED THERMOSTAT CLOSED - THEREBY FORCING THE HEATER TO REMAIN ON. IOA WILL AGREE IF THE NASA CRITICALITY IS CHANGED FROM A FAILED ON HEATER TO A FAILED OFF THERMOSTAT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3033
NASA FMEA #: 06-3-0330-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3033
ITEM: FES TOPPING FEEDLINE HEATER THERMOSTAT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
A FAILED OPEN THERMOSTAT HAS THE SAME EFFECT AS A FAILED OFF HEATER. ADDITIONALLY, NASA MAKES NO DISTINCTION BETWEEN "SHARED" FEEDWATER COMPONENTS AND THOSE DEDICATED TO EITHER THE TOPPING OR HIGH LOAD EVAPORATORS. UNDER THESE CONDITIONS, IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3034
NASA FMEA #: 06-3-0328-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3034
ITEM: FES TOPPING FEEDLINE HEATER TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3035
NASA FMEA #: 06-3-0323-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3035
ITEM: TOPPING EVAPORATOR WATER VALVE ASSEMBLY-40 MICRON FILTER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR WILL MEAN A PRIORITY MISSION. ONLY BY AN UNREALISTIC SEQUENCE OF FAILURES WILL THE LOSS OF CREW/VEHICLE OCCUR. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3036
NASA FMEA #: 06-3-0323-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3036
ITEM: TOPPING EVAPORATOR ISOLATION VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[F]	[P]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE NORMAL POSITION FOR THE TOPPING EVAPORATOR ISOLATION VALVE IS "OPEN" WHENEVER THE EVAPORATOR IS ENABLED. IT IS REQUIRED TO CLOSE ONLY WHEN THE EVAPORATOR IS TURNED OFF (FOR PAYLOAD PURPOSES OR DURING THE LANDING SEQUENCE). SHOULD THIS BE REQUIRED, THE WORST CASE RESULT WILL BE THE LOSS OF MISSION NOT A LOSS OF CREW OR VEHICLE. A NON WORKING ISOLATION VALVE CAN BE MASKED BY A PROPERLY FUNCTIONING PULSER VALVE. THEREFORE, IOA DOES AGREE WITH THE NASA EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3037
NASA FMEA #: 06-3-0323-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3037
ITEM: TOPPING EVAPORATOR ISOLATION VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR RESULTS ONLY IN A LOSS OF MISSION, NOT IN A LOSS OF CREW/VEHICLE. AN UNREALISTIC CHAIN OF FAILURES IS REQUIRED TO REACH THE 1R CRITICALITY. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3038
NASA FMEA #: 06-3-0323-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3038
ITEM: TOPPING EVAPORATOR INTEGRAL PULSER/SHUTOFF VALVE/NOZZLE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY. LOSS OF THE TOPPING EVAPORATOR RESULTS ONLY IN A LOSS OF MISSION, NOT A LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3039
NASA FMEA #: 06-3-0323-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3039
ITEM: TOPPING EVAPORATOR INTEGRAL PULSER/SHUTOFF VALVE/NOZZLE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA RECOMMENDS RETAINING THE 3/2R RANKING. LOSS OF TOPPING EVAPORATOR ONLY RESULTS IN A LOSS OF MISSION, NOT IN A LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3040
NASA FMEA #: 06-3-0327-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3040
ITEM: TOPPING EVAPORATOR INTEGRAL PULSER/SHUTOFF VALVE/NOZZLE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[P]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY. LOSS OF TOPPING EVAPORATOR ONLY RESULTS IN A LOSS OF MISSION, NOT IN A LOSS OF CREW/VEHICLE. IOA ACCEPTS NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3041
NASA FMEA #: 06-3-0311-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3041
ITEM: TOPPING EVAPORATOR FEEDLINE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA MAKES NO DISTINCTION BETWEEN "SHARED" FEEDWATER COMPONENTS AND THOSE DEDICATED TO EITHER THE TOPPING OR HIGH LOAD EVAPORATORS. UNDER THESE CONDITIONS, IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3042
NASA FMEA #: 06-3-0330-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3042
ITEM: TOPPING EVAPORATOR FEEDLINE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA MAKES NO DISTINCTION BETWEEN SHARED FEEDWATER COMPONENTS AND THOSE DEDICATED TO EITHER THE TOPPING OR HIGH LOAD EVAPORATORS. UNDER THESE CONDITIONS, IOA AGREES WITH NASA CRITICALITIES. IOA ALSO ACCEPTS NASA RECOMMENDATION ON SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3043
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3043
ITEM: TOPPING EVAPORATOR ISOLATION VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. SHOULD BE ADDED FOR COMPLETENESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3044
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3044
ITEM: TOPPING EVAPORATOR INTEGRAL PULSER/SHUTOFF VALVE/NOZZLE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. SHOULD BE ADDED FOR COMPLETENESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3045
NASA FMEA #: 06-3-0311-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3045
ITEM: TOPPING EVAPORATOR WATER VALVE/NOZZLE MOUNTING PLATE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[ ]	[N]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA GROUPS ALL FAILURES CAUSED BY A RESTRICTED FLOW OF FREON INTO ONE FMEA. SINCE THE FAILURE IS EFFECTIVELY EQUIVALENT TO THE LOSS OF ONE FREON LOOP REGARDLESS OF WHERE THE RESTRICTION IS BEING EXAMINED, IOA AGREES WITH THE NASA CRITICALITIES AND WITH NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3046
NASA FMEA #: 06-3-0311-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3046
ITEM: TOPPING EVAPORATOR WATER VALVE/NOZZLE MOUNTING PLATE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /1R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA GROUPS ALL FAILURES WHICH RESULT IN A LEAKAGE OF FREON INTO THE FES CORE INTO ONE FMEA. IN THE CASE OF FREON LEAKING INTO THE TOPPING EVAPORATOR, WORST CASE RESULT (HARDWARE) IS A LOSS OF THE TOPPING EVAPORATOR AND ONE FREON LOOP. THIS IS A DEORBIT AT THE NEXT PRIMARY LANDING SITE CASE, BUT NOT AN IMMEDIATE LOSS OF CREW/VEHICLE. IT TAKES ONE ADDITIONAL FAILURE TO REACH THE 1R POINT. THEREFORE, IOA RECOMMENDS RETAINING THE 2/1R RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3047
NASA FMEA #: 06-3-0311-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3047
ITEM: TOPPING EVAPORATOR WATER VALVE/NOZZLE MOUNTING PLATE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[1 /1]	[ ]	[ ]	[ ]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3048
NASA FMEA #: 06-3-0311-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3048
ITEM: TOPPING EVAPORATOR CORE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA GROUPS ALL FAILURES WHICH RESULT IN A LEAKAGE OF FREON INTO THE FES CORE INTO ONE FMEA. IN THE CASE OF FREON LEAKING INTO THE TOPPING EVAPORATOR, WORST CASE RESULT (HARDWARE) IS A LOSS OF THE TOPPING EVAPORATOR AND ONE FREON LOOP. THIS IS A DEORBIT AT THE NEXT PRIMARY LANDING SITE CASE, BUT NOT A LOSS OF CREW/VEHICLE. IT TAKES ONE ADDITIONAL FAILURE TO REACH THE 1R POINT. THEREFORE, IOA RECOMMENDS RETAINING THE 2/1R RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3049
NASA FMEA #: 06-3-0323-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3049
ITEM: TOPPING EVAPORATOR CORE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[2 /2]	[ ]	[ ]	[ ]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[2 /2]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR MEANS A MINIMUM DURATION FLIGHT - THEREFORE A LOSS OF MISSION AND A HARDWARE CRITICALITY OF "2". HOWEVER, IT REQUIRES AN UNREALISTIC SEQUENCE OF FAILURES TO CAUSE A LOSS OF CREW/VEHICLE FOLLOWING THE LOSS OF THE TOPPING EVAPORATOR. THEREFORE, IOA RECOMMENDS RETAINING THE 2/2 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3050
NASA FMEA #: 06-3-0311-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3050
ITEM: TOPPING EVAPORATOR ANTI CARRYOVER DEVICE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA GROUPS ALL FMEAs INVOLVING A RESTRICTED FLOW OF FREON INTO ONE FAILURE. HOWEVER, WHEN THE RESTRICTION IS IN THE ACOD, THERE IS NO AFFECT ON THE EVAPORATOR OPERATION. ADDITIONALLY, THE FREON FLOW THROUGH THE ACOD IS ONLY A VERY SMALL PERCENTAGE OF THE FULL FREON LOOP FLOW. A RESTRICTION IN THE ACOD DOES NOT EQUATE TO A RESTRICTION IN THE FREON LOOP. IOA RECOMMENDS NASA SEPARATE THE VARIOUS FREON FLOW RESTRICTIONS INTO LOCATIONS AND ASSIGN THE ACOD RESTRICTION A 3/3 CRITICALITY. HOWEVER, DUE TO THIS DIFFERENCE IN DIVISIONS, NO RECOMMENDATIONS ARE BEING MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3051
NASA FMEA #: 06-3-0311-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3051
ITEM: TOPPING EVAPORATOR ANTI CARRYOVER DEVICE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA GROUPS ALL FAILURES CAUSED BY A MIXING OF FREON AND WATER INTO ONE FMEA. WHEN THE MIXING OCCURS IN THE TOPPING EVAPORATOR, THE RESULT IS A LOSS OF ONE FREON LOOP AND THE TOPPING EVAPORATOR. THIS IS STILL A SURVIVABLE ENTRY CONDITION AND ONLY AN IMMEDIATE LOSS OF MISSION. ADDITIONAL FAILURES ARE REQUIRED TO REACH THE 1R CRITICALITY. THEREFORE, IOA RECOMMENDS NASA SEPARATE THE FAILURES AND ASSIGN THE TOPPING EVAPORATOR A 2/1R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3052 BASELINE [ ]
NASA FMEA #: 06-3-0311-5 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3052
ITEM: TOPPING EVAPORATOR ANTI CARRYOVER DEVICE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA GROUPS ALL FAILURES CAUSED BY A MIXING OF FREON AND WATER INTO ONE FMEA. WHEN THE MIXING OCCURS IN THE TOPPING EVAPORATOR, THE RESULT IS A LOSS OF ONE FREON LOOP AND THE TOPPING EVAPORATOR. THIS IS STILL A SURVIVABLE ENTRY CONDITION AND ONLY AN IMMEDIATE LOSS OF MISSION. ADDITIONAL FAILURES ARE REQUIRED TO REACH THE 1R CRITICALITY. THEREFORE, IOA RECOMMENDS NASA SEPARATE THE FAILURES AND ASSIGN THE TOPPING EVAPORATOR A 2/1R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3053
NASA FMEA #: 06-3-0327-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3053
ITEM: TOPPING EVAPORATOR EXIT DUCT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /2]	[ ]	[ ]	[ ]	[X]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[2 /2]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE LOSS OF THE TOPPING EVAPORATOR RESULTS ONLY IN A LOSS OF MISSION. AN UNREALISTIC SEQUENCE OF FAILURES IS REQUIRED BEFORE THE LOSS OF CREW/VEHICLE OCCURS. THEREFORE, IOA RECOMMENDS RETAINING THE 2/2 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3054
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3054
ITEM: TOPPING EVAPORATOR EXIT DUCT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. SHOULD BE ADDED FOR COMPLETENESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3055
NASA FMEA #: 06-3-0327-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3055
ITEM: TOPPING EVAPORATOR - EXIT DUCT - ZONE D, E, F, AND H HEATERS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[P]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA TREATS THE LOSS OF A SINGLE HEATER SYSTEM ON THE TOPPING EXIT DUCT IN THE SAME FMEA AS A BLOCKAGE OF THE EXIT DUCT. THE HEATERS ARE REDUNDANT, THEREFORE LOSS OF ONE DOES NOT RESULT IN A LOSS OF THE EXIT DUCT (AS DOES A SINGLE BLOCKAGE).
LOSS OF ALL HEATER SYSTEMS MAY RESULT IN A LOSS OF THE TOPPING EVAPORATOR AND A MINIMUM DURATION FLIGHT. IT WILL NOT RESULT IN THE LOSS OF THE CREW OR VEHICLE. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY. IOA DOES ACCEPT NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3056
NASA FMEA #: 06-3-0327-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3056
ITEM: TOPPING EVAPORATOR - EXIT DUCT - ZONE D, E, F, AND H THERMOSTATS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONSIDERS A FAILED A HEATER TO BE A NON-CREDIBLE FAILURE. THE SAME EFFECT IS MANIFESTED WHEN A THERMOSTAT FAILS REFLECTING A LOW TEMPERATURE CAUSING THE HEATER TO BE CONTINUOUSLY POWERED. IOA WILL AGREE WITH NASA CRITICALITIES IF THE FAILURE MODE IS CHANGED FROM A FAILED ON HEATER TO A FAILED OFF THERMOSTAT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3057 BASELINE [ ]
NASA FMEA #: 06-3-0327-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3057
ITEM: TOPPING EVAPORATOR - EXIT DUCT - ZONE D, E, F, AND H THERMOSTATS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[N /N]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[P]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA TREATS THE LOSS OF A SINGLE HEATER SYSTEM ON THE TOPPING EXIT DUCT IN THE SAME FMEA AS A BLOCKAGE OF THE EXIT DUCT. THE HEATERS ARE REDUNDANT, THEREFORE LOSS OF ONE DOES NOT RESULT IN A LOSS OF THE EXIT DUCT (AS DOES A SINGLE BLOCKAGE).
LOSS OF ALL HEATER SYSTEMS MAY RESULT IN A LOSS OF THE TOPPING EVAPORATOR AND A MINIMUM DURATION FLIGHT. IT WILL NOT RESULT IN THE LOSS OF THE CREW OR VEHICLE. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY. IOA DOES ACCEPT NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3058
NASA FMEA #: 06-3-0328-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3058
ITEM: TOPPING EVAPORATOR - EXIT DUCT - ZONE D, E, F, AND H TEMPERATURE MONITOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3059
NASA FMEA #: 06-3-0327-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3059
ITEM: TOPPING EVAPORATOR - EXIT DUCT ZONE F AND H OVERTEMP THERMOSTAT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONSIDERS FAILED ON HEATERS TO BE NON-CREDIBLE FAILURE. THE SAME EFFECT IS ACHIEVED WHEN A THERMOSTAT FAILS OFF (REFLECTING A CONSISTENTLY LOW TEMPERATURE) AND FORCING THE HEATER TO BE CONTINUOUSLY POWERED. IOA WILL AGREE WITH NASA CRITICALITIES IF THE FAILURE MODE IS CHANGED FROM A FAILED ON HEATER TO A FAILED OFF THERMOSTAT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3060
NASA FMEA #: 06-3-0313-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3060
ITEM: TOPPING EVAPORATOR - RH AND LH SONIC NOZZLES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[NA]	[ ]
COMPARE	[N /N]	[ ]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[2 /2]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
RESTRICTED FLOW THROUGH ONE OF THE SONIC NOZZLES WILL RESULT IN THE LOSS OF THE TOPPING EVAPORATOR. THE LOSS OF THE TOPPING EVAPORATOR MEANS ONLY A LOSS OF MISSION, NOT A LOSS OF CREW OR VEHICLE. AN UNREALISTIC AND UNRELATED CHAIN OF FAILURES IS REQUIRED TO HAVE A LOSS OF A SONIC NOZZLE PROPAGATE INTO THE LOSS OF THE CREW OR VEHICLE. THEREFORE, IOA RECOMMENDS A 2/2 CRITICALITY RANKING FOR THIS FAILURE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3061
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3061
ITEM: TOPPING EVAPORATOR - RH AND LH SONIC NOZZLE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[NA]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. SHOULD BE ADDED FOR COMPLETENESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3062
NASA FMEA #: 06-3-0313-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3062
ITEM: TOPPING EVAPORATOR - RH AND LH NOZZLE HEATER
ZONE G AND I

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS; (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF ALL NOZZLE HEATERS CAN RESULT IN A FREEZE UP IN THE NOZZLE. LOSS OF THE NOZZLE MEANS A LOSS OF THE TOPPING EVAPORATOR AND A MINIMUM DURATION MISSION. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3063
NASA FMEA #: 06-3-0313-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3063
ITEM: TOPPING EVAPORATOR - RH AND LH NOZZLE ZONE G AND I HEATER CONTROLLERS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE HEATER CONTROLLER MEANS LOSS OF THE ASSOCIATED HEATER. LOSS OF ALL NOZZLE HEATERS CAN LEAD TO A FREEZE UP IN THE NOZZLE, LOSS OF THE NOZZLE, AND SUBSEQUENT LOSS OF THE TOPPING EVAPORATOR. LOSS OF THE TOPPING EVAPORATOR MEANS A MINIMUM DURATION FLIGHT. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY RATING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3064
NASA FMEA #: 06-3-0327-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3064
ITEM: TOPPING EVAPORATOR - RH AND LH NOZZLE ZONE G AND I HEATER CONTROLLERS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONSIDERS A FAILED ON HEATER TO BE A NON-CREDIBLE FAILURE. THE SAME EFFECT IS ACHIEVED BY FAILING A THERMOSTAT REFLECTING A LOW TEMPERATURE. IOA AGREES WITH NASA CRITICALITIES IF THE FAILURE MODE IS CHANGED FROM THE FAILED ON HEATER TO A FAILED OFF THERMOSTAT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3065 BASELINE [ ]
NASA FMEA #: 06-3-0328-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3065
ITEM: TOPPING EVAPORATOR - RH AND LH NOZZLE TEMPERATURE MONITORS - ZONES G AND I

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/16/87
ASSESSMENT ID: ATCS-3066
NASA FMEA #: 06-3-0311-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3066
ITEM: FES FEEDLINE A/B FROM WATER SUPPLY TO VALVE/WATER NOZZLE ASSEMBLIES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ACCEPTS NASA EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3067 BASELINE [ ]
NASA FMEA #: 06-3-0330-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3067
ITEM: FES FEEDLINE A/B FROM WATER SUPPLY TO WATER/VALVE NOZZLE ASSEMBLIES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /]	[ ]	[N]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
INSUFFICIENT DATA TO RESOLVE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3068
NASA FMEA #: 06-3-0330-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3068
ITEM: FES FEEDLINE HEATERS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3069
NASA FMEA #: 06-3-0330-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3069
ITEM: FES FEEDLINE FORWARD HEATER THERMOSTATS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONSIDERS A FAILED ON HEATER TO BE A NON-CREDIBLE FAILURE. THE SAME EFFECT IS ACHIEVED BY FAILING THE THERMOSTAT SUCH THAT A LOW TEMPERATURE IS ALWAYS REFLECTED AND THE HEATER IS CONTINUOUSLY POWERED. IOA AGREES WITH NASA CRITICALITIES IF THE FAILURE MODE IS CHANGED FROM A FAILED ON HEATER TO A FAILED OFF THERMOSTAT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-3069A
NASA FMEA #: 05-6W-2351-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3069
ITEM: FES FEEDLINE FORWARD HEATER THERMOSTATS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3070
NASA FMEA #: 06-3-0330-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3070
ITEM: FES FEEDLINE FORWARD HEATER THERMOSTATS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3071
NASA FMEA #: 06-3-0328-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3071
ITEM: FES FEEDLINE TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3072
NASA FMEA #: 06-3-0330-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3072
ITEM: FES ACCUMULATOR HEATER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3073 BASELINE [ ]
NASA FMEA #: 06-3-0330-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3073
ITEM: FES ACCUMULATOR HEATER THERMOSTAT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3074
NASA FMEA #: 06-3-0330-5

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3074
ITEM: FES ACCUMULATOR HEATER THERMOSTAT

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONSIDERS A FAILED ON HEATER TO BE A NON-CREDIBLE FAILURE. THE SAME EFFECT IS ACHIEVED WHEN A THERMOSTAT FAILS OFF (REFLECTING A LOW TEMPERATURE) AND KEEPS CONTINUOUS POWER ON THE HEATER. IOA WILL AGREE WITH THE NASA CRITICALITIES IF THE FAILURE MODE IF CHANGED FROM A FAILED ON HEATER TO A FAILED OFF THERMOSTAT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3075
NASA FMEA #: 06-3-0328-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3075
ITEM: FES ACCUMULATOR TEMPERATURE MONITOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3076
NASA FMEA #: 05-6W-2095-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3076
ITEM: FES FEEDLINE ACCUMULATOR STATUS MONITOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEA IS ACTUALLY WRITTEN AGAINST THE RESISTOR IN THE STATUS MONITORING CIRCUIT RATHER THAN THE MONITOR ITSELF. HOWEVER, SINCE IT IS ONLY A MONITOR CIRCUIT, IOA FEELS THE 3/3 CRITICALITY IS A MORE REALISTIC RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-3076A
NASA FMEA #: 06-3-0330-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3076
ITEM: FES FEEDLINE ACCUMULATOR STATUS MONITOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[F]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /3] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
ONLY RESULT IS A LOSS OF STATUS - NOT A LOSS OF FUNCTION.
THEREFORE, IOA RECOMMENDS A 3/3 CRITICALITY RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3077
NASA FMEA #: 06-3-0330-6

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3077
ITEM: FES FEEDLINE ACCUMULATOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3078
NASA FMEA #: 06-3-0330-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3078
ITEM: FES FEEDLINE ACCUMULATOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3079
NASA FMEA #: 05-6W-2028-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3079
ITEM: FES CONTROLLER - SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[2 /2]	[ ]	[ ]	[ ]	[X]
COMPARE	[N /N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE PRIMARY AND SECONDARY CONTROLLER SWITCHES INTO TWO FMEAs. IOA GROUPED THEM TOGETHER. THE NASA CRITICALITY OF 3/1R DOES NOT RECOGNIZE THE AUTOMATIC LOSS OF MISSION FOR THE LOSS OF AN EVAPORATOR. THE LOSS OF EITHER EVAPORATOR IS CAUSED BY THE EVAPORATOR COMING ON TOO EARLY DURING ASCENT AND DAMAGING THE CORE. IF THE HIGH LOAD IS THE ONE FAILED, ONLY ONE ADDITIONAL FAILURE IS REQUIRED BEFORE THE LOSS OF CREW/VEHICLE CAN OCCUR.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3079A
NASA FMEA #: 05-6W-2030-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3079
ITEM: FES CONTROLLER - SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[2 /2]	[ ]	[ ]	[ ]	[X]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE PRIMARY AND SECONDARY CONTROLLER SWITCHES INTO TWO FMEAs. IOA GROUPED THEM TOGETHER. THE 3/3 CRITICALITY DOES NOT CONSIDER THE EFFECTS OF THE EVAPORATOR OPERATING TOO SOON AND DAMAGING THE CORE DURING LAUNCH. LOSS OF THE TOPPING EVAPORATOR IS A LOSS OF MISSION; LOSS OF THE HIGH LOAD CAN LEAD TO A LOSS OF CREW/VEHICLE. THEREFORE, TAKING THE WORST CASE EFFECTS OF THE HIGH LOAD EVAPORATOR FAILING ON DURING ASCENT AND FREEZING THE CORE, IOA RECOMMENDS A 2/1R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3080
NASA FMEA #: 05-6W-2028-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3080
ITEM: FES CONTROLLER - SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE PRIMARY AND SECONDARY CONTROLLER SWITCHES. IOA COMBINED THEM.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3080A
NASA FMEA #: 05-6W-2030-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3080
ITEM: FES CONTROLLER - SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE PRIMARY AND SECONDARY CONTROLLER SWITCHES. IOA COMBINED THEM INTO ONE FMEA. IOA AGREES WITH NASA RECOMMENDATION ON SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3081
NASA FMEA #: 05-6W-2028-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3081
ITEM: FES CONTROLLER - SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE PRIMARY AND SECONDARY CONTROLLER SWITCHES. IOA COMBINED THEM INTO ONE FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3081A
NASA FMEA #: 05-6W-2030-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3081
ITEM: FES CONTROLLER - SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE PRIMARY AND SECONDARY CONTROLLER SWITCHES. IOA COMBINED THEM INTO ONE FMEA. IOA RECOMMENDS THAT THE SECONDARY CONTROLLER SWITCH RECEIVE THE SAME CRITICALITY AS THE PRIMARY SWITCH UNDER GROUNDRULES SET FORTH IN 22206.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3082
NASA FMEA #: 05-6W-2090-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3082
ITEM: FES CONTROLLER SWITCH STATUS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEA WRITTEN AGAINST RESISTORS IN STATUS MONITORING CIRCUITS AND GPC CONTROL CIRCUIT. NASA SHOULD CONSIDER DIVIDING THE ONE FMEA INTO 2 SEPARATE FMEAs FOR BETTER DELENIATION AND RESOLUTION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3083 BASELINE [ ]
NASA FMEA #: 05-6W-2251-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3083
ITEM: FES CONTROLLER INPUT DIODES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3083A
NASA FMEA #: 05-6W-2253-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3083
ITEM: FES CONTROLLER INPUT DIODES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3084
NASA FMEA #: 05-6W-2077-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3084
ITEM: FES CONTROLLER INPUT RESISTORS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3085 BASELINE [ ]
NASA FMEA #: 05-6W-2090-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3085
ITEM: FES CONTROL SWITCH INPUT RESISTORS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3085A
NASA FMEA #: 05-6W-2091-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3085
ITEM: FES CONTROL SWITCH INPUT RESISTORS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA SEPARATED FMEAs FOR "ON" AND "GPC" INPUT RESISTORS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3086
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3086
ITEM: FES CONTROL SWITCH INPUT RESISTORS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DELETE - NON-CREDIBLE FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3087 BASELINE [ ]
NASA FMEA #: 05-6W-2207-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3087
ITEM: FES CONTROLLER POWER APPLICATION COMPONENTS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3088
NASA FMEA #: 05-6W-2031-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3088
ITEM: HI-LOAD ENABLE SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[NA]	[P]	[X] *
IOA	[2 /1R]	[P]	[NA]	[F]	[X]
COMPARE	[/]	[ ]	[ ]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA's EVALUATION OF SCREEN C.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3089
NASA FMEA #: 05-6W-2031-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3089
ITEM: HI-LOAD ENABLE SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /2R]	[P]	[NA]	[F]	[ ]
COMPARE	[/N]	[ ]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3090
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3090
ITEM: HI-LOAD ENABLE SWITCH STATUS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. SHOULD BE ADDED FOR COMPLETENESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-3091
NASA FMEA #: 06-3-0315-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3091
ITEM: FES CONTROLLER POWER SUPPLY

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3092
NASA FMEA #: 06-3-0318-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3092
ITEM: FES PRIMARY CONTROLLER MIDPOINT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3093 BASELINE [ ]
NASA FMEA #: 06-3-0318-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3093
ITEM: FES PRIMARY CONTROLLER MIDPOINT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3094
NASA FMEA #: 06-3-0318-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3094
ITEM: FES PRIMARY CONTROLLER MIDPOINT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3095 BASELINE [ ]
NASA FMEA #: 06-3-0318-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3095
ITEM: FES SECONDARY CONTROLLER MIDPOINT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR ONLY RESULTS IN A LOSS OF MISSION - NOT IN A LOSS OF CREW/VEHICLE. THEREFORE, RECOMMEND RETAINING THE 3/2R CRITICALITY RATING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3096
NASA FMEA #: 06-3-0318-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3096
ITEM: FES SECONDARY CONTROLLER MIDPOINT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR RESULTS IN A LOSS OF MISSION - NOT IN A LOSS OF CREW/VEHICLE. IOA RECOMMENDS THE 3/2R CRITICALITY RANKING BE RETAINED.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3097
NASA FMEA #: 06-3-0319-01

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3097
ITEM: FES PRIMARY CONTROLLER EVAPORATOR OUT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE TEMPERATURE SENSORS FOR THE PRIMARY A AND PRIMARY B CONTROLLERS. IOA GROUPED THESE SENSORS INTO ONE FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3097A
NASA FMEA #: 06-3-0319-04

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3097
ITEM: FES PRIMARY CONTROLLER EVAPORATOR OUT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE TEMPERATURE SENSORS FOR THE PRIMARY A AND PRIMARY B CONTROLLERS. IOA GROUPED THESE SENSORS INTO ONE FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3098
NASA FMEA #: 06-3-0319-01

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3098
ITEM: FES PRIMARY CONTROLLER EVAPORATOR OUT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE TEMPERATURE SENSORS FOR THE PRIMARY A AND PRIMARY B CONTROLLERS. IOA GROUPED THESE SENSORS INTO ONE FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3098A
NASA FMEA #: 06-3-0319-04

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3098
ITEM: FES PRIMARY CONTROLLER EVAPORATOR OUT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATE THE TEMPERATURE SENSORS FOR THE PRIMARY A AND PRIMARY B CONTROLLERS. IOA GROUPED THESE SENSORS INTO ONE FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3099
NASA FMEA #: 06-3-0319-07

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3099
ITEM: FES SECONDARY CONTROLLER EVAPORATOR OUT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3100 BASELINE [ ]
NASA FMEA #: 06-3-0319-07 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3100
ITEM: FES SECONDARY CONTROLLER EVAPORATOR OUT TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3101 BASELINE [ ]
NASA FMEA #: 06-3-0319-10 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3101
ITEM: FES PRIMARY CONTROLLER SHUTDOWN LOGIC TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SPLIT THE PRIMARY A AND PRIMARY B SENSORS. IOA GROUPED THESE TOGETHER.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3101A BASELINE [ ]
NASA FMEA #: 06-3-0319-13 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3101
ITEM: FES PRIMARY CONTROLLER SHUTDOWN LOGIC TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SPLIT THE PRIMARY A AND PRIMARY B SENSORS. IOA GROUPED THESE TOGETHER.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87
ASSESSMENT ID: ATCS-3102
NASA FMEA #: 06-3-0319-10

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3102
ITEM: FES PRIMARY CONTROLLER SHUTDOWN LOGIC TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SPLIT THE PRIMARY A AND PRIMARY B SENSOR FMEAs. IOA GROUPED THEM TOGETHER. THE FAILURE RESULTS IN A LOSS OF THE TOPPING EVAPORATOR WHICH IS A LOSS OF MISSION, BUT NOT A LOSS OF CREW/VEHICLE. IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/18/87 NASA DATA:
ASSESSMENT ID: ATCS-3102A BASELINE [ ]
NASA FMEA #: 06-3-0319-13 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3102
ITEM: FES PRIMARY CONTROLLER SHUTDOWN LOGIC TEMPERATURE SENSOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SPLIT THE PRIMARY A AND PRIMARY B SENSOR FMEAs. IOA GROUPED THEM TOGETHER. THE FAILURE RESULTS IN A LOSS OF THE TOPPING EVAPORATOR WHICH IS A LOSS OF MISSION, BUT NOT A LOSS OF CREW/VEHICLE. IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-3103
NASA FMEA #: 06-3-0315-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3103
ITEM: FES CONTROLLER SHUTDOWN LOGIC

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-3104
NASA FMEA #: 06-3-0315-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3104
ITEM: FES CONTROLLER SHUTDOWN LOGIC

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3105
NASA FMEA #: 06-3-0322-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3105
ITEM: HI-LOAD VALVE PULSER ELECTRONICS (PRIMARY A, B, AND SECONDARY)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA INCLUDES THIS FAILURE MODE IN THE MECHANICAL FMEAs RATHER THAN EPD&C.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3106
NASA FMEA #: 06-3-0322-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3106
ITEM: HI-LOAD VALVE PULSER ELECTRONICS (PRIMARY A, B, AND SECONDARY)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA ASSESSMENT OF SCREEN B DUE TO LACK OF CONFLICTING DATA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3107 BASELINE [ ]
NASA FMEA #: 06-3-0322-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3107
ITEM: HI-LOAD ISOLATION VALVE RELAY (PRIMARY A, B, AND SECONDARY)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3108 BASELINE [ ]
NASA FMEA #: 06-3-0322-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3108
ITEM: HI-LOAD SPRAY VALVE RELAY (PRIMARY A, B, AND SECONDARY)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3109
NASA FMEA #: 06-3-0323-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3109
ITEM: TOPPING EVAPORATOR ISOLATION VALVE/HOLDING COIL

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR IS A LOSS OF MISSION, NOT A LOSS OF CREW/VEHICLE. IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3110 BASELINE [ ]
NASA FMEA #: 06-3-0323-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3110
ITEM: TOPPING EVAPORATOR SPRAY VALVE RELAY

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
FAILURE RESULTS IN LOSS OF TOPPING EVAPORATOR WHICH IS ONLY A LOSS OF MISSION, NOT A LOSS OF CREW/VEHICLE. IOA RECOMMENDS THE LOWER CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3111
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3111
ITEM: GROUND OPERATIONS DIAGNOSTIC MEASUREMENTS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA. SHOULD BE ADDED FOR COMPLETENESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3112
NASA FMEA #: 05-6W-2039-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3112
ITEM: FES SECONDARY SUPPLY SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3113
NASA FMEA #: 05-6W-2039-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3113
ITEM: FES SECONDARY SUPPLY SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3114 BASELINE [ ]
NASA FMEA #: 05-6W-2049-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3114
ITEM: FES FEEDLINE HEATER SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3115
NASA FMEA #: 05-6W-2049-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3115
ITEM: FES FEEDLINE HEATER SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-3116
NASA FMEA #: 05-6W-2096-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3116
ITEM: FES FEEDLINE HEATER SWITCH STATUS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEA IS WRITTEN AGAINST THE RESISTOR IN THE STATUS MONITORING CIRCUIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3117
NASA FMEA #: 05-6W-2023-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3117
ITEM: FES FEEDLINE HEATER FUSES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3118 BASELINE [ ]
NASA FMEA #: 05-6W-2052-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3118
ITEM: TOPPING EVAPORATOR HEATER SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[NA]	[P]	[X] *
IOA	[2 /2]	[ ]	[ ]	[ ]	[X]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[2 /2]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR IS A LOSS OF MISSION, NOT A LOSS OF CREW/VEHICLE. THEREFORE, IOA RECOMMENDS RETAINING THE 2/2 CRITS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3119
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3119
ITEM: TOPPING EVAPORATOR HEATER SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA DEEMED THIS TO BE A NON-CREDIBLE FAILURE MODE. (05-6W-2052-2) IOA FEELS THIS FAILURE SHOULD BE RE-EXAMINED.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3120 BASELINE [ ]
NASA FMEA #: 05-6W-2092-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3120
ITEM: TOPPING EVAPORATOR HEATER SELECT SWITCH STATUS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEA WRITTEN AGAINST RESISTOR IN STATUS MONITORING CIRCUIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3121
NASA FMEA #: 05-6W-2022-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3121
ITEM: TOPPING EVAPORATOR HEATER SELECT SWITCH FUSES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR IS A LOSS OF MISSION, NOT A LOSS OF CREW/VEHICLE. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-3122
NASA FMEA #: 05-6W-2176-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3122
ITEM: TOPPING EVAPORATOR HEATER FUSES/RPCS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE RESULT OF THIS FAILURE IS A LOSS OF THE TOPPING EVAPORATOR AND A LOSS OF MISSION, BUT NOT A LOSS OF CREW/VEHICLE. THEREFORE, IOA RECOMMENDS A 3/2R CRITICALITY RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3123 BASELINE [ ]
NASA FMEA #: 05-6W-2128-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3123
ITEM: TOPPING EVAPORATOR HEATER RELAY

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE LOSS OF THE TOPPING EVAPORATOR MAY RESULT IN A LOSS OF MISSION BUT WILL NOT RESULT IN A LOSS OF CREW/VEHICLE. IOA RECOMMENDS THE 3/2R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3124
NASA FMEA #: 05-6W-2047-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3124
ITEM: TOPPING EVAPORATOR NOZZLE HEATER SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NON-OPERATION OF THE NOZZLE HEATER CAN LEAD TO A FREEZE UP AND A LOSS OF THE TOPPING EVAPORATOR. IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3125
NASA FMEA #: 05-6W-2094-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3125
ITEM: TOPPING EVAPORATOR NOZZLE HEATER SELECT SWITCH STATUS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEA IS ACTUALLY WRITTEN AGAINST THE RESISTOR IN THE STATUSING CIRCUIT AS OPPOSED TO THE STATUS MONITOR.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3126
NASA FMEA #: 05-6W-2047-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3126
ITEM: TOPPING EVAPORATOR NOZZLE HEATER SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-3127
NASA FMEA #: 05-6W-2022-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3127
ITEM: TOPPING EVAPORATOR NOZZLE HEATER FUSES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LOSS OF THE TOPPING EVAPORATOR IS A LOSS OF MISSION, NOT A LOSS OF CREW/VEHICLE. THEREFORE, IOA RECOMMENDS RETAINING THE 3/2R CRITICALITY RANKING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3128 BASELINE [ ]
NASA FMEA #: 05-6W-2053-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3128
ITEM: HI-LOAD HEATER SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA AGREES WITH NASA's EVALUATION OF SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87
ASSESSMENT ID: ATCS-3129
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 3129
ITEM: HI-LOAD HEATER SELECT SWITCH

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA DEEMED THIS TO BE A NON-CREDIBLE FAILURE MODE (05-6W-2053-2). IOA FEELS THAT THIS FAILURE SHOULD BE RE-EXAMINED.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3130 BASELINE [ ]
NASA FMEA #: 05-6W-2093-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3130
ITEM: HI-LOAD DUCT HEATER SWITCH STATUS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEA WRITTEN AGAINST RESISTORS IN STATUS CIRCUIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3131 BASELINE [ ]
NASA FMEA #: 05-6W-2020-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3131
ITEM: HI-LOAD DUCT HEATER SWITCH FUSES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3132 BASELINE [ ]
NASA FMEA #: 05-6W-2181-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3132
ITEM: HI-LOAD DUCT HEATER FUSES/RPCS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-3132A
NASA FMEA #: 05-6W-2181-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3132
ITEM: HI-LOAD DUCT HEATER FUSES/RPCS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ORIGINALLY COMBINED THE TWO FAILURE MODES OF FAILING OPEN AND PREMATURE OPERATION. NASA'S SEPARATION ALLOWS BETTER DISTINCTION OF CRITICALITIES FOR EACH FAILURE MODE. IOA AGREES WITH NASA CRITICALITIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/22/87 NASA DATA:
ASSESSMENT ID: ATCS-3133 BASELINE [ ]
NASA FMEA #: 05-6W-2133-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 3133
ITEM: HI-LOAD DUCT HEATER RELAYS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4001
NASA FMEA #: 06-3-0413-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4001
ITEM: RELIEF VALVE (NH3)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R. THEREFORE IOA AND NASA CRITICALITIES ARE IN AGREEMENT WITH NO ISSUES ON SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4002
NASA FMEA #: 06-3-0413-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4002
ITEM: RELIEF VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R. THEREFORE IOA AND NASA CRITICALITIES ARE IN AGREEMENT WITH NO ISSUES ON SCREEN B.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4003
NASA FMEA #: 06-3-0406-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4003
ITEM: PRESSURE TRANSDUCER (NH3 TANK)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4004
NASA FMEA #: 06-3-0407-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4004
ITEM: TEMPERATURE TRANSDUCER (NH3 TANK)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4005
NASA FMEA #: 06-3-0411-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4005
ITEM: AMMONIA CONTROLLER A

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[NA]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R, MAKING IOA AND NASA IN AGREEMENT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4006
NASA FMEA #: 06-3-0411-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4006
ITEM: AMMONIA CONTROLLER A

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[/N]	[ ]	[ ]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[1 /1]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R. HOWEVER, PREMATURE OPERATION OF THE CONTROLLER WILL ALLOW AMMONIA TO REACH THE BOILER AND EXCESSIVELY COOL THE FREON LOOP WHICH MAY CAUSE THE WATER LOOPS TO FREEZE AND RUPTURE. TO BE CONSISTENT WITH OTHER NASA CRITICALITIES, THIS FMEA NEEDS TO BE A "1/1".

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4007
NASA FMEA #: 06-3-0410-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4007
ITEM: FLOW CONTROL VALVE (N.O.)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[/N]	[ ]	[ ]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[2 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R. ADDITIONALLY, EACH VALVE HAS ONE CONTROLLER WHICH CAN CAUSE PREMATURE CLOSING. PREMATURE CLOSING WILL PREVENT OPERATION OF ONE ABS. LOSS OF BOTH ABSs CAN RESULT IN LOSS OF CREW/VEHICLE. THEREFORE, IOA RECOMMENDS RETAINING THE 2/1R CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4008
NASA FMEA #: 06-3-0410-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4008
ITEM: FLOW CONTROL VALVE (N.O.)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[NA]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
BEFORE THIS FAILURE IS MANIFESTED, BOTH CONTROL VALVES MUST FAIL TO CLOSE AND THE ISOLATION VALVE MUST FAIL OPEN. THESE THREE FAILURES COULD INTRODUCE AMMONIA INTO THE BOILER EARLY AND CAUSE EXCESSIVE COOLING OF THE FREON LOOP. A SUPER-COOLED FREON LOOP COULD CAUSE THE WATER LOOP TO FREEZE AND RUPTURE WITH A SUBSEQUENT LOSS OF VEHICLE COOLING. THEREFORE, IOA IS RECOMMENDING A CRITICALITY RANKING OF 3/1R.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-4009
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 4009
ITEM: FLOW CONTROL VALVE (N.O.)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4010
NASA FMEA #: 06-3-0403-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4010
ITEM: TEMERATURE SENSOR (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATED THE TWO FAILURE MODES (FAILED HIGH AND FAILED LOW) AND SEPARATED THE TWO TEMPERATURE SENSORS USED FOR THE CONTROLLER FROM THE ONE USED FOR THE FAULT DETECTION LOGIC RESULTING IN FOUR FMEAs WHERE IOA HAD ONE. THESE TEMPERATURE SENSORS CONTROL ELECTRONICS WHICH DIRECTLY AFFECT THE OPERATION OF THE ABS. FAILURES CAN LEAD TO THE LOSS OF THE ABS AND POSSIBLE LOSS OF THE CREW/VEHICLE. THEREFORE, IOA AGREES WITH NASA CRITICALTIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4010A
NASA FMEA #: 06-3-0403-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4010
ITEM: TEMERATURE SENSOR (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATED THE TWO FAILURE MODES (FAILED HIGH AND FAILED LOW) AND SEPARATED THE TWO TEMPERATURE SENSORS USED FOR THE CONTROLLER FROM THE ONE USED FOR THE FAULT DETECTION LOGIC RESULTING IN FOUR FMEAs WHERE IOA HAD ONE. THESE TEMPERATURE SENSORS CONTROL ELECTRONICS WHICH DIRECTLY AFFECT THE OPERATION OF THE ABS. FAILURES CAN LEAD TO THE LOSS OF THE ABS AND POSSIBLE LOSS OF THE CREW/VEHICLE. THEREFORE, IOA AGREES WITH NASA CRITICALTIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4010B
NASA FMEA #: 06-3-0404-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4010
ITEM: TEMERATURE SENSOR (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATED THE TWO FAILURE MODES (FAILED HIGH AND FAILED LOW) AND SEPARATED THE TWO TEMPERATURE SENSORS USED FOR THE CONTROLLER FROM THE ONE USED FOR THE FAULT DETECTION LOGIC RESULTING IN FOUR FMEAs WHERE IOA HAD ONE. THESE TEMPERATURE SENSORS CONTROL ELECTRONICS WHICH DIRECTLY AFFECT THE OPERATION OF THE ABS. FAILURES CAN LEAD TO THE LOSS OF THE ABS AND POSSIBLE LOSS OF THE CREW/VEHICLE. THEREFORE, IOA AGREES WITH NASA CRITICALTIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4010C
NASA FMEA #: 06-3-0404-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4010
ITEM: TEMERATURE SENSOR (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA FMEAs SEPARATED THE TWO FAILURE MODES (FAILED HIGH AND FAILED LOW) AND SEPARATED THE TWO TEMPERATURE SENSORS USED FOR THE CONTROLLER FROM THE ONE USED FOR THE FAULT DETECTION LOGIC RESULTING IN FOUR FMEAs WHERE IOA HAD ONE. THESE TEMPERATURE SENSORS CONTROL ELECTRONICS WHICH DIRECTLY AFFECT THE OPERATION OF THE ABS. FAILURES CAN LEAD TO THE LOSS OF THE ABS AND POSSIBLE LOSS OF THE CREW/VEHICLE. THEREFORE, IOA AGREES WITH NASA CRITICALTIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88 NASA DATA:
ASSESSMENT ID: ATCS-4011 BASELINE [ ]
NASA FMEA #: 06-3-0408-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4011
ITEM: TANK ISOLATION VALVE (N.C.)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[NA]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R PUTTING NASA AND IOA IN AGREEMENT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4012
NASA FMEA #: 06-3-0408-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4012
ITEM: TANK ISOLATION VALVE (N.C.)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[NA]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[1 /1]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R. HOWEVER, THE VALVE FAILING OPEN IS A WORST CASE CONDITION OF INTERNAL LEAKAGE THROUGH THE VALVE. SINCE NASA HAS DETERMINED THE CASE OF INTERNAL LEAKAGE TO BE A 1/1 CRITICALITY (DUE TO EXCESSIVE COOLING OF THE FREON LOOP, SUBSEQUENT COOLING OF THE WATER LOOP, WITH FREEZING AND RUPTURE); THE CASE OF THE ISOLATION VALVE FAILING OPEN MUST ALSO HAVE A 1/1 CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88 NASA DATA:
ASSESSMENT ID: ATCS-4013 BASELINE [ ]
NASA FMEA #: 06-3-0401-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4013
ITEM: NH3 BOILER/HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-4014
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 4014
ITEM: NH3 BOILER/HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO EQUIVALENT NASA FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4015
NASA FMEA #: 06-3-0416-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4015
ITEM: TANK DISCONNECTS, LINES AND FITTINGS (RELIEF VALVE TO ISOLATION VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R PUTTING IOA AND NASA IN AGREEMENT. (IOA AGREES WITH SCREEN B.)

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-4015A
NASA FMEA #: 06-3-0414-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4015
ITEM: TANK DISCONNECTS, LINES AND FITTINGS (RELIEF VALVE TO ISOLATION VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R PUTTING IOA AND NASA IN AGREEMENT. (IOA AGREES WITH NASA's SCREEN B RECOMMENDATION.)

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4016
NASA FMEA #: 06-3-0416-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4016
ITEM: LINES & FITTINGS (ISOLATION VALVE TO BOILER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[X]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 1/1 PUTTING IOA AND NASA IN AGREEMENT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-4017
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 4017
ITEM: LINES (BOILER TO DISCHARGE VENT)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NO DISCERNIBLY EQUIVALENT NASA FMEA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88 NASA DATA:
ASSESSMENT ID: ATCS-4018 BASELINE [ ]
NASA FMEA #: 06-3-0420-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4018
ITEM: TEMPERATURE TRANSDUCER (NH3 EXHAUST)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4019
NASA FMEA #: 05-6W-2078-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4019
ITEM: RESISTOR (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. FAILURE RESULTS IN LOSS OF ONE ABS CONTROLLER. LOSS OF ALL CONTROL CAPABILITIES MEANS LOSS OF ONE ABS WITH SECOND ABS LOSS MEANING LOSS OF CREW/VEHICLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4020
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 4020
ITEM: RESISTOR (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DELETE - NOT A CREDIBLE FAILURE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-4021
NASA FMEA #: 05-6W-2026-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4021
ITEM: SWITCH 42 (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[N]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R PUTTING IOA AND NASA IN AGREEMENT. (IOA AGREES WITH NASA's EVALUATION OF SCREEN B.)

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-4021A
NASA FMEA #: 05-6W-2026-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4021
ITEM: SWITCH 42 (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[N]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R PUTTING IOA AND NASA IN AGREEMENT. (IOA AGREES WITH NASA's EVALUATION OF SCREEN B.)

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-4022
NASA FMEA #: 05-6W-2026-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4022
ITEM: SWITCH 42 (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[NA]	[P]	[X] *
IOA	[3 /3]	[P]	[NA]	[P]	[X]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DURING THE IOA ANALYSIS, FAILURES WERE CONSIDERED FOR THE NOMINAL MISSION PROFILE AND DURING ABORTS. THE IOA ANALYSIS OF THE AMMONIA BOILER SYSTEM RESULTED IN HIGHER CRITICALITIES DURING THE ABORT REGIONS. HOWEVER, THE ASSESSMENT WORKSHEET ONLY ALLOWS THE ENTRY OF NOMINAL FLIGHT CRITICALITIES. THE HIGHEST CRITICALITY ASSIGNED TO THIS FMEA WAS ACTUALLY 2/1R PUTTING IOA AND NASA IN AGREEMENT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4023
NASA FMEA #: 05-6W-2079-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4023
ITEM: RESISTOR (NH3 FEEDBACK)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4024
NASA FMEA #:

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: ATCS
MDAC ID: 4024
ITEM: RESISTOR (NH3 FEEDBACK)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DELETE - NOT A CREDIBLE FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4025
NASA FMEA #: 05-6W-2255-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4025
ITEM: DIODES (GPC)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITY. LOSS OF DIODE CAN LEAD TO LOSS OF CONTROL CAPABILITY OF THE ABS WITH SUBSEQUENT LOSS OF THE ABS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4026
NASA FMEA #: 05-6W-2255-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4026
ITEM: DIODES (GPC)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4027
NASA FMEA #: 05-6W-2201-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4027
ITEM: HYBRID DRIVER (POWER-PRI/GPC)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[N]	[N]	[N]	[N]

RECOMMENDATIONS: (If different from NASA)

[1 /1]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
PREMATURE OPENING OF ISOLATION VALVE SHOULD BE GIVEN A 1/1 CRITICALITY TO BE CONSISTENT WITH OTHER FAILURES OF THIS TYPE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-4028
NASA FMEA #: 05-6W-2201-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 4028
ITEM: HYBRID DRIVER (NH3 CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AGREE WITH NASA CRITICALITIES. FAILURE OF HYBRID DRIVER CAN EVENTUALLY LEAD TO LOSS OF ABS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-11110X
NASA FMEA #: 06-3-0108-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11110
ITEM: CHECK VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[P]	[P]	[ ] *
IOA	[3 /1R]	[P]	[P]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THIS FAILURE MODE WAS NOT CONSIDERED DURING THE ORIGINAL ANALYSIS PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-11111X
NASA FMEA #: 06-3-0207-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11111
ITEM: FUEL CELL HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THIS FAILURE MODE WAS NOT CONSIDERED DURING THE ORIGINAL ANALYSIS PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-11112X BASELINE [ ]
NASA FMEA #: 06-3-0212-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11112
ITEM: SERVICING QUICK DISCONNECT CAP

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[F]	[F]	[P]	[X] *
IOA	[3 /1R]	[F]	[F]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. IOA GROUNDRULES HAD CONSIDERED ALL COMPONENTS OF THE QUICK DISCONNECTS TO BE ONE ITEM, THUS ELIMINATING THE "INTERNAL LEAKAGE" FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-11113X
NASA FMEA #: 06-3-0223-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11113
ITEM: PAYLAOD HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /2]	[ ]	[ ]	[ ]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THIS FAILURE MODE WAS NOT CONSIDERED ON THIS EQUIPMENT DURING THE ORIGINAL ANALYSIS PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-11114X BASELINE [ ]
NASA FMEA #: 06-3-0303-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11114
ITEM: TEMPERATURE SENSOR, FCL EVAP OUT TEMP

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[P]	[P]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
	[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

RECOMMENDATIONS: (If different from NASA)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. IOA FEELS THE LOSS OF A SENSOR IS MORE ACCURATELY REFLECTED AS A 3/3 RATHER THAN HAVING MISSION IMPACT. THIS ITEM WAS OVERLOOKED BY THE DIVISION BETWEEN FREON COOLANT LOOP FMEAs AND EVAPORATOR FMEAs.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-11115X
NASA FMEA #: 06-3-0304-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11115
ITEM: GSE HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. SINCE FAILURE AFFECTS GROUND OPERATIONS ONLY AND HAS NO AFFECT ON ON-ORBIT OPERATIONS, IOA RECOMMENDS THE 3/3 CRITICALITY RANKING. THE FAILURE OCCURS ONLY DURING GROUND OPERATIONS AND WAS NOT CONSIDERED DURING THE ORIGINAL ANALYSIS PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-11116X BASELINE [ ]
NASA FMEA #: 06-3-0305-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11116
ITEM: GSE HEAT EXCHANGER, FLUID CONNECTOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)					
	[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. WORST CASE EFFECT IS A LAUNCH DELAY WHICH IS A 3/3 CRITICALITY BY 22206. IOA THEREFORE DISAGREES WITH NASA's RECOMMENDATION. ALSO, THE FAILURE MODE WAS NOT CONSIDERED DURING THE ORIGINAL ANALYSIS BECAUSE IT OCCURS ONLY DURING GROUND OPERATIONS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: ATCS-11117X
NASA FMEA #: 06-3-0305-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11117
ITEM: GSE HEAT EXCHANGER, FLUID CONNECTOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /1R]	[P]	[F]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS, IOA TREATED ALL PARTS OF QUICK DISCONNECTS AS A SINGLE ITEM.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: ATCS-11118X BASELINE [ ]
NASA FMEA #: 06-3-0305-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11118
ITEM: GSE HEAT EXCHANGER, FLUID CONNECTOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]	[N]
RECOMMENDATIONS: (If different from NASA)	[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. SINCE WORST CASE EFFECT IS A LAUNCH DELAY, IOA RECOMMENDS A 3/3 CRITICALITY. THE FAILURE MODE WAS NOT CONSIDERED DURING THE ORIGINAL ANALYSIS SINCE IT AFFECTS ONLY GROUND OPERATIONS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-11119X
NASA FMEA #: 05-6W-2004-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11119
ITEM: CIRCUIT BREAKERS (FREON PUMP)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. IOA CONSIDERED THE CASE OF ATTEMPTING TO OPEN A CIRCUIT BREAKER MANUALLY AS AN OFF-NOMINAL OPERATION. THEREFORE, THE FAILURE OF THIS ACTION WAS NOT ADDRESSED DURING THE ORIGINAL ANALYSIS PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88 NASA DATA:
ASSESSMENT ID: ATCS-11120X BASELINE [ ]
NASA FMEA #: 05-6W-2008-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11120
ITEM: CIRCUIT BREAKER (FREON FLOW PROPORTIONING)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. IOA CONSIDERED THE CASE OF ATTEMPTING TO OPEN A CIRCUIT BREAKER MANUALLY AS AN OFF-NOMINAL OPERATION. THEREFORE, THE FAILURE OF THIS ACTION WAS NOT ADDRESSED DURING THE ORIGINAL ANALYSIS PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-11121X
NASA FMEA #: 05-6W-2041-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11121
ITEM: SW10, 11 (FREON SIGNAL CONDITIONER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C		CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]		[X] *
IOA	[3 /3]	[ ]	[ ]	[ ]		[ ]
COMPARE	[N /N]	[ ]	[ ]	[ ]		[N]
RECOMMENDATIONS: (If different from NASA)						
	[3 /3]	[ ]	[ ]	[ ]		[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. SINCE ONLY SENSOR DATA IS LOST, IOA FEELS A LOWER CRITICALITY IS MORE REALISTIC.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/07/88
ASSESSMENT ID: ATCS-11122X
NASA FMEA #: 05-6W-2131-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11122
ITEM: FREON PUMP RELAY

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. DURING THE ANALYSIS PHASE, RESTRICTED FREON FLOW WITHIN VARIOUS COMPONENTS WAS CONSIDERED, BUT NOT A GENERIC, OVERALL CASE OF RESTRICTED FLOW THROUGH THE FREON LOOP LINES AND FITTINGS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/13/88 NASA DATA:
ASSESSMENT ID: ATCS-11123X BASELINE [ ]
NASA FMEA #: 06-3-0390-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 11123
ITEM: FREON LOOP LINES AND FITTINGS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. DURING THE ANALYSIS PHASE, RESTRICTED FREON FLOW WITHIN VARIOUS COMPONENTS WAS CONSIDERED, BUT NOT A GENERIC, OVERALL CASE OF RESTRICTED FLOW THROUGH THE FREON LOOP LINES AND FITTINGS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/08/88
ASSESSMENT ID: ATCS-12040X
NASA FMEA #: 05-6W-2010-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 12040
ITEM: CIRCUIT BREAKER 14 (FREON RADIATOR CONTROLLER)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. IOA CONSIDERED THE MANUAL OPENING OF A CIRCUIT BREAKER AS AN OFF-NOMINAL OPERATION AND THEREFORE DID NOT ANALYZE THE POSSIBILITY OF IT FAILING TO OPEN.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/08/88
ASSESSMENT ID: ATCS-12041X
NASA FMEA #: 05-6W-2014-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 12041
ITEM: CIRCUIT BREAKER (RADIATOR BYPASS VALVE)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. IOA CONSIDERED THE MANUAL OPENING OF A CIRCUIT BREAKER AS AN OFF-NOMINAL OPERATION AND THEREFORE DID NOT ANALYZE THE POSSIBILITY OF IT FAILING TO OPEN.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-12042X BASELINE [ ]
NASA FMEA #: 05-6W-2036-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 12042
ITEM: SWITCH 29 (RADIATOR MANUAL SELECT)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /1R]	[P]	[F]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-12043X
NASA FMEA #: 06-3-0501-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 12043
ITEM: RADIATOR - PANEL ASSEMBLY

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /2]	[ ]	[ ]	[ ]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-12044X BASELINE [ ]
NASA FMEA #: 06-3-0580-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 12044
ITEM: FLEX HOSES, MANIFOLDS, AND TUBES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88
ASSESSMENT ID: ATCS-12045X
NASA FMEA #: 06-3-0580-4

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 12045
ITEM: FLEX HOSES, MANIFOLDS, AND TUBES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /2]	[ ]	[ ]	[ ]	[X] *
IOA	[2 /2]	[ ]	[ ]	[ ]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-13200X
NASA FMEA #: 06-3-0330-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13200
ITEM: FES FEEDLINE ACCUMULATOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[F]	[P]	[X] *
IOA	[3 /1R]	[P]	[F]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THE ACCUMULATOR WAS CONSIDERED ONE ITEM DURING THE ORIGINAL IOA ANALYSIS AND INDIVIDUAL COMPONENTS WERE NOT ANALYZED.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/20/88
ASSESSMENT ID: ATCS-13201X
NASA FMEA #: 06-3-0311-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13201
ITEM: FLASH EVAPORATOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THE FAILURE IS A FAILURE OF THE FREON LOOPS AND WAS NOT CONSIDERED AS PART OF THE FLASH EVAPORATOR ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-13202X
NASA FMEA #: 05-6W-2176-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13202
ITEM: FES TOPPING HEATER RPC

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-13203X
NASA FMEA #: 05-6W-2177-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13203
ITEM: FES FEEDLINE HEATER HDC

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-13204X
NASA FMEA #: 05-6W-2177-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13204
ITEM: FES FEEDLINE HEATER HDC

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87
ASSESSMENT ID: ATCS-13205X
NASA FMEA #: 05-6W-2204-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13205
ITEM: FES NOZZLE HEATER TYPE III HDCs

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /1R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. SINCE FAILURE CAN RESULT IN A LOSS OF THE HIGH LOAD EVAPORATOR, IOA RECOMMENDS THE 3/1R CRITICALITY AS BEING MORE REPRESENTATIVE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/30/87 NASA DATA:
ASSESSMENT ID: ATCS-13206X BASELINE [ ]
NASA FMEA #: 05-6W-2204-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13206
ITEM: FES NOZZLE HEATER TYPE III HDCs

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87 NASA DATA:
ASSESSMENT ID: ATCS-13207X BASELINE [ ]
NASA FMEA #: 05-6W-2205-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13207
ITEM: FES HEATER CONTROL TYPE III HYBRID DRIVER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /1R] [P] [NA] [P] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THIS FAILURE CAN CAUSE THE LOSS OF THE HIGH LOAD EVAPORATOR WHICH MEANS A 1R CRITICALITY. IOA RECOMMENDS THIS HIGHER CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87 NASA DATA:
ASSESSMENT ID: ATCS-13208X BASELINE [ ]
NASA FMEA #: 05-6W-2205-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13208
ITEM: FES HEATER CONTROL TYPE III HYBRID DRIVER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-13209X
NASA FMEA #: 05-6W-2207-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13209
ITEM: FES CONTROLLER POWER TYPE III HDCs

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[F]	[F]	[P]	[X] *
IOA	[3 /1R]	[F]	[F]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-13210X
NASA FMEA #: 05-6W-2251-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13210
ITEM: FES INPUT DIODE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/31/87
ASSESSMENT ID: ATCS-13211X
NASA FMEA #: 05-6W-2258-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13211
ITEM: FES TOPPING DUCT HEATER DIODE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[NA]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R]	[P]	[NA]	[P]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. IOA FEELS THE HIGHER CRITICALITY IS MORE REPRESENTATIVE, HOWEVER, SINCE THE LOSS CAN LEAD TO A LOSS OF THE TOPPING EVAPORATOR AND A LOSS OF MISSION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-13212X BASELINE [ ]
NASA FMEA #: 05-6W-2083-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13212
ITEM: FES SONIC NOZZLE RESISTORS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[P]	[P]	[P]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]

RECOMMENDATIONS: (If different from NASA)

[3 /2R] [P] [P] [P] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. SINCE FAILURE COULD LEAD TO LOSS OF NOZZLE HEATERS, IOA RECOMMENDS THE HIGHER FUNCTIONAL CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-13213X BASELINE [ ]
NASA FMEA #: 05-6W-2087-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13213
ITEM: FES GPC CONTROL CURRENT LIMITING RESISTOR

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-13214X BASELINE [ ]
NASA FMEA #: 05-6W-2092-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13214
ITEM: RESISTOR - FES TOPPING DUCT HEATER STATUS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/12/88 NASA DATA:
ASSESSMENT ID: ATCS-13215X BASELINE [ ]
NASA FMEA #: 05-6W-2093-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13215
ITEM: RESISTOR - HIGH LOAD DUCT HEATER STATUS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/20/88 NASA DATA:
ASSESSMENT ID: ATCS-13216X BASELINE [ ]
NASA FMEA #: 05-6W-2351-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13216
ITEM: FES HEATERS AND THERMOSTATS - FEEDWATER LINE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[NA]	[P]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THE INDIVIDUAL HEATERS AND THERMAL SWITCHES WERE COVERED IN THE MECHANICAL SECTION, BUT THERE WAS NO OVERALL FMEA, SUCH AS THIS ONE, IN THE EPD&C SECTION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/20/88
ASSESSMENT ID: ATCS-13217X
NASA FMEA #: 05-6W-2253-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 13217
ITEM: FES CONTROLLER DIODES

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/N]	[N]	[N]	[N]	[ ]
RECOMMENDATIONS: (If different from NASA)					
	[3 /3]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE INTERNAL SHORT OF THE DIODE WILL HAVE NO EFFECT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-14030X
NASA FMEA #: 06-3-0401-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14030
ITEM: NH3 BOILER/HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[2 /1R]	[P]	[P]	[P]	[X] *
IOA	[2 /1R]	[P]	[P]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88 NASA DATA:
ASSESSMENT ID: ATCS-14031X BASELINE [ ]
NASA FMEA #: 06-3-0401-2 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14031
ITEM: NH3 BOILER/HEAT EXCHANGER

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[1 /1]	[ ]	[ ]	[ ]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/04/88
ASSESSMENT ID: ATCS-14032X
NASA FMEA #: 06-3-0408-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14032
ITEM: TANK ISOLATION VALVE (NC)

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[2 /1R]	[P]	[NA]	[P]	[X]
COMPARE	[N /]	[ ]	[ ]	[ ]	[N]

RECOMMENDATIONS: (If different from NASA)

[2 /1R] [P] [NA] [P] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. SINCE FIRST FAILURE LEADS TO THE LOSS OF ONE ABS, IOA RECOMMENDS THE HIGHER CRITICALITY AS BEING MORE REALISTIC AND REPRESENTATIVE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-14033X
NASA FMEA #: 06-3-0408-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14033
ITEM: NH3 TANK ISOLATION VALVE

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[1 /1]	[ ]	[ ]	[ ]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88 NASA DATA:
ASSESSMENT ID: ATCS-14034X BASELINE [ ]
NASA FMEA #: 06-3-0414-1 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14034
ITEM: NH3 FILL AND DRAIN QUICK DISCONNECTS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.
FAILURE OCCURS DURING A PHASE NOT CONSIDERED DURING THE ORIGINAL IOA ANALYSIS (GROUND SERVICING).

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88
ASSESSMENT ID: ATCS-14035X
NASA FMEA #: 06-3-0414-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14035
ITEM: NH3 FILL AND DRAIN QUICK DISCONNECTS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /3]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS: (If different from NASA)	[/]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THIS FAILURE OCCURS DURING A PHASE NOT CONSIDERED DURING THE ORIGINAL IOA ANALYSIS (GROUND SERVICING).

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88 NASA DATA:
ASSESSMENT ID: ATCS-14036X BASELINE [ ]
NASA FMEA #: 06-3-0414-4 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14036
ITEM: NH3 FILL AND DRAIN QUICK DISCONNECTS

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[F]	[F]	[P]	[X] *
IOA	[3 /1R]	[F]	[F]	[P]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/]	[ ]	[ ]	[ ]	[A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. IOA CONSIDERED THE QUICK DISCONNECTS AS SINGLE ITEMS WITHOUT REGARD FOR INTERNAL FAILURES. THUS, THIS FAILURE MODE WAS NOT EXAMINED DURING THE ORIGINAL ANALYSIS PHASE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/05/88 NASA DATA:
ASSESSMENT ID: ATCS-14037X BASELINE [ ]
NASA FMEA #: 06-3-0416-3 NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14037
ITEM: LINES AND FITTINGS - AMMONIA BOILER SYSTEM

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[X] *
IOA	[1 /1]	[ ]	[ ]	[ ]	[X]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/15/88
ASSESSMENT ID: ATCS-14038X
NASA FMEA #: 06-3-0405-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: ATCS
MDAC ID: 14038
ITEM: AMMONIA SUPPLY TANK

LEAD ANALYST: S.K. SINCLAIR

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[ ]	[ ]	[ ]	[ ] *
IOA	[1 /1]	[ ]	[ ]	[ ]	[ ]
COMPARE	[/]	[ ]	[ ]	[ ]	[ ]

RECOMMENDATIONS: (If different from NASA)

[/] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. THIS FAILURE IS A FAILURE OF A PRESSURE VESSEL.

APPENDIX D

POTENTIAL CRITICAL ITEMS

ATCS POTENTIAL CRITICAL ITEMS

NASA-FMEA	MDAC	FLIGHT	ITEM NAME	FAILURE MODE
06-3-0112-2	1000	2/1R	INLET SELF-SEALING COUPLING	EXTERNAL LEAKAGE
06-3-0112-3	1001	2/1R	ORIFICE INLET COUPLING	RESTRICTED FLOW
06-3-0102-1	1003	2/1R	INLET FILTER - ACCUMULATOR	RESTRICTED FLOW
06-3-0102-2	1004	2/1R	INLET FILTER - ACCUMULATOR	STRUCTURAL FAILURE (RUPTURE)
06-3-0103-1	1005	2/1R	ACCUMULATOR	INTERNAL LEAKAGE
06-3-0112-2	1006	2/1R	SELF-SEALING DISCONNECT	EXTERNAL LEAKAGE
06-3-0104-2	1009	3/1R	INLET FILTER FREON PUMP	STRUCTURAL FAILURE (RUPTURE)
06-3-0101-3	1011	2/1R	FREON PUMP	EXTERNAL LEAKAGE
06-3-0104-2	1014	3/1R	OUTLET FILTER	STRUCTURAL FAILURE (RUPTURE)
06-3-0108-2	1016	2/1R	CHECK VALVE	FAILS TO CLOSE
06-3-0112-2	1017	2/1R	OUTLET SELF-SEALING COUPLING	EXTERNAL LEAKAGE
06-3-0112-3	1018	2/1R	ORIFICE (OUTLET COUPLING)	RESTRICTED FLOW
06-3-0207-1	1019	2/1R	FUEL CELL HEAT EXCHANGER	INTERNAL LEAKAGE (F21 TO FC40)
06-3-0207-6	1020	2/1R	FUEL CELL HEAT EXCHANGER	INTERNAL LEAKAGE (F21 TO F21)
06-3-0207-5	1021	1/1	FUEL CELL HEAT EXCHANGERS	INTERNAL LEAKAGE (FC40 TO FC40)
06-3-0207-2	1022	2/1R	FUEL CELL HEAT EXCHANGER	EXTERNAL LEAKAGE (FREON)
06-3-0207-2	1023	2/1R	FUEL CELL HEAT EXCHANGER	EXTERNAL LEAKAGE (FC40)
06-3-0207-4	1024	2/1R	FUEL CELL HEAT EXCHANGER	RESTRICTED FLOW (F21)
06-3-0301-3	1025	2/1R	HYDRAULIC HEAT EXCHANGER	INT LEAKAGE (F21 TO HYD FLUID)
06-3-0301-2	1026	2/1R	HYDRAULIC HEAT EXCHANGERS	INTERNAL LEAKAGE (FREON TO FREON)
	1027	2/1R	HYDRAULIC HEAT EXCHANGERS	INTERNAL LEAKAGE (HYDRAULIC TO HYD)
06-3-0301-4	1028	2/1R	HYDRAULIC HEAT EXCHANGERS	EXTERNAL LEAKAGE (FREON 21)
06-3-0301-1	1030	2/1R	HYDRAULIC HEAT EXCHANGER	RESTRICTED FLOW (FREON 21)
06-3-0304-3	1032	2/1R	GSE HEAT EXCHANGER	INTERNAL LEAKAGE (F21 TO GSE LINES)
06-3-0304-1	1033	2/1R	GSE HEAT EXCHANGER	INTERNAL LEAKAGE (F21 TO F21)
06-3-0390-1	1034	2/1R	GSE HEAT EXCHANGERS	EXTERNAL LEAKAGE (FREON 21)

ATCS POTENTIAL CRITICAL ITEMS - CONT'D.

NASA-FMEA	MDAC	FLIGHT	ITEM NAME	FAILURE MODE
06-3-0304-2	1036	2/1R	GSE HEAT EXCHANGER	RESTRICTED FLOW (FREON 21)
	1037	2/1R	O2 RESTRICTOR	EXT LEAKAGE (02)
	1038	2/1R	O2 RESTRICTOR	EXTERNAL LEAKAGE (FREON 21)
06-3-0201-2	1039	2/1R	ARS INTERCHANGER HEAT EXCHANGER	INTERNAL LEAKAGE (FREON TO WATER)
06-3-0201-3	1040	2/1R	ARS INTERCHANGER HEAT EXCHANGER	INTERNAL LEAKAGE (FREON TO FREON)
06-3-0201-4	1041	2/1R	ARS INTERCHANGER HEAT EXCHANGER	INTERNAL LEAKAGE (WATER TO WATER)
06-3-0390-1	1042	2/1R	ARS INTERCHANGER HEAT EXCHANGER	EXTERNAL LEAKAGE (FREON 21)
	1043	2/1R	ARS INTERCHANGER HEAT EXCHANGER	EXTERNAL LEAKAGE (WATER)
06-3-0201-1	1044	2/1R	ARS INTERCHANGER HEAT EXCHANGER	RESTRICTED FLOW (FREON 21)
	1045	2/1R	ARS INTERCHANGER HEAT EXCHANGER	RESTRICTED FLOW (WATER)
06-3-0223-4	1048	2/1R	PAYLOAD HEAT EXCHANGER	INT LEAK (F21 TO TO PL XCHNG FLUID)
06-3-0223-3	1049	2/1R	PAYLOAD HEAT EXCHANGER	INTERNAL LEAKAGE (FREON TO FREON)
06-3-0390-1	1051	2/1R	PAYLOAD HEAT EXCHANGER	EXTERNAL LEAKAGE (FREON 21)
06-3-0223-2	1053	2/1R	PAYLOAD HEAT EXCHANGER	RESTRICTED FLOW (F21)
06-3-0212-2	1055	2/1R	SERVICING QUICK DISCONNECT CAP	FAILS TO REMAIN CLOSED
06-3-0390-1	1056	2/1R	FLOW PROPORTIONING VLV	EXTERNAL LEAKAGE
06-3-0220-2	1057	2/1R	FLOW PROPORTIONING VLV	FAILS IN INTER POSIT, RTRCTD FLW
06-3-0220-3	1058	2/2	FLOW PROPORTIONING VLV	FAILS IN PL OR EXCHNGR POSIT
06-3-0220-4	1058A	2/1R	FLOW PROPORTIONING VLV	FAILS IN PL OR EXCHNGR POSIT
06-3-0220-4	1059	2/1R	ACTUATOR (FLOW PROP VALVE)	FAILS TO START
06-3-0390-1	1060	2/1R	MIDBODY COLDPLATES	EXTERNAL LEAKAGE
06-3-0215-2	1061	2/1R	MIDBODY COLDPLATES	INTERNAL LEAKAGE
06-3-0215-1	1062	2/1R	MIDBODY COLDPLATES	RESTRICTED FLOW
06-3-0307-1	1063	2/1R	ORIFICE (AFT AVIONICS COLDPLATES)	RESTRICTED FLOW
06-3-0390-1	1065	2/1R	AFT AVIONICS COLDPLATES	EXTERNAL LEAKAGE
06-3-0307-2	1066	2/1R	AFT AVIONICS COLDPLATES	INTERNAL LEAKAGE

ATCS POTENTIAL CRITICAL ITEM - CONT'D.

NASA-FMEA	MDAC	FLIGHT	ITEM NAME	FAILURE MODE
06-3-0307-1	1067	2/1R	AFT AVIONICS COLDPLATES	RESTRICTED FLOW
06-3-0230-2	1069	2/1R	RGA COLDPLATES	INTERNAL LEAKAGE
06-3-0390-1	1070	2/1R	RGA COLDPLATES	EXTERNAL LEAKAGE
06-3-0230-1	1071	2/1R	RGA COLDPLATES	RESTRICTED FLOW
06-3-0390-1	1072	2/1R	FREON LOOP LINES AND FITTINGS	EXTERNAL LEAKAGE
05-6W-2008-1	1085	2/1R	CB (FREON FLOW PROPORTIONING VALVE)	OPEN (ELECTRICAL)
05-6W-2043-1	1086	2/1R	SWITCH (FLOW PROPORTIONING VALVE)	FAILS WITH VLV IN MID-TRAVEL POSIT
05-6W-2043-3	1087	2/2	SWITCH (FLOW PROPORTIONING VALVE)	FAILS IN INTRCHNGR POSITION
05-6W-2043-2	1088	2/1R	SWITCH 21 (FLOW PROPORTIONING VALVE)	FAILS IN PL HX POSITION
06-3-0520-1	2000	2/1R	INLET SELF-SEALING COUPLING	EXTERNAL LEAKAGE
06-3-0520-1	2001	2/1R	OUTLET SELF-SEALING COUPLING	EXTERNAL LEAKAGE
06-3-0580-1	2002	2/1R	FLEX HOSES, MANIFOLDS, TUBES	EXTERNAL LEAKAGE
06-3-0502-3	2003	2/2	FLOW CONTROL VALVE	FAILS TO OPEN
06-3-0502-4	2003A	2/2	FLOW CONTROL VALVE	FAILS TO OPEN
06-3-0502-2	2004	2/1R	FLOW CONTROL VALVE	FAILS TO CLOSE, INTERNAL LEAKAGE
06-3-0502-1	2004A	2/1R	FLOW CONTROL VALVE	FAILS TO CLOSE, INTERNAL LEAKAGE
06-3-0520-1	2005	2/1R	FLOW CONTROL VALVE	EXTERNAL LEAKAGE
06-3-0502-2	2006	2/1R	STEPPING MOTOR (FLOW CONTROL VALVE)	FAILS TO START
06-3-0504-3	2007	2/2	BYPASS VALVE	FAILS IN BYPASS
06-3-0504-4	2007A	2/2	BYPASS VALVE	FAILS IN BYPASS
06-3-0504-1	2008	2/1R	BYPASS VALVE	FAILS IN RAD FLOW
06-3-0504-2	2008A	2/1R	BYPASS VALVE	FAILS IN RAD FLOW
06-3-0520-1	2009	2/1R	BYPASS VALVE	EXTERNAL LEAKAGE
06-3-0504-2	2010	2/1R	MOTOR (BYPASS VALVE)	FAILS TO START
06-3-0520-1	2011	2/1R	MODE CONTROL VALVE	EXTERNAL LEAKAGE
06-3-0508-1	2015B	3/1R	TEMP SENSOR	FAILS OFF-SCALE
05-6W-2034-3	2017A	2/1R	SWITCH 26 (RAD CONTROL LOOP)	FAILS IN OFF
05-6W-2038-2	2024	2/2	SWITCH 25 (RAD CNTRL OUTLET TEMP)	FAILS IN HI POSITION
05-6W-2014-1	2025	3/1R	CB (RAD BYPASS VLV)	OPEN
05-6W-2203-1	2033	3/1R	HYBRID DRIVER	OPEN
06-3-0322-3	3007	3/1R	HI LOAD ISOL VALVE	FAILS OPEN
06-3-0322-3	3010	3/1R	HI LOAD PLSR VALVE	FAILS OPEN

ATCS POTENTIAL CRITICAL ITEMS - CONT'D.

NASA-FMEA	MDAC	FLIGHT	ITEM NAME	FAILURE MODE
06-3-0311-5	3012	1/1	HI LOAD EVAP CORE	INT LEAK (FREON)
06-3-0311-1	3013	2/1R	HI LOAD VLV MTG PLATE	INT RESTRICTED FLOW OF FREON
06-3-0311-5	3014	1/1	HI LOAD/VALVE MOUNTING PLATE	INTERNAL/EXTERNAL LEAKAGE (FREON)
06-3-0311-4	3015	2/1R	HI LOAD VALVE MOUNTING PLATE	EXTERNAL LEAKAGE, STRUCTURAL FAILURE
06-3-0311-5	3016	1/1	HI LOAD EVAPORATOR ACOD	INTERNAL LEAKAGE (FREON TO WATER)
06-3-0311-4	3017	2/1R	HI LOAD EVAPORATOR ACOD	EXTERNAL LEAKAGE (FREON)
	3019	2/1R	HI LOAD EXIT DUCT	EXTERNAL LEAKAGE
06-3-0326-1	3020	2/1R	HI LOAD EXIT DUCT	NO FLOW
06-3-0314-1	3029	2/1R	HI LOAD NOZZLE	RESTRICTED FLOW
	3030	2/1R	HI LOAD NOZZLE	EXTERNAL LEAKAGE
06-3-0323-4	3036	3/2R	TOPPING EVAP ISOL VLV	FAILS OPEN
06-3-0311-1	3045	2/1R	TOPPING EVAP H20 VLV/NZL MTG PLATE	NO FREON FLOW
06-3-0311-5	3046	2/1R	TOPPING EVAPORATOR WATER VLV/NOZZLE	LEAK BETWEEN WATER AND FREON
06-3-0311-5	3047	1/1	TOPPING EVAPORATOR WATER VLV NOZZLE	STRUCTURAL FAILURE (RUPTURE)
06-3-0311-5	3048	2/1R	TOPPING EVAPORATOR CORE	INTERNAL LEAKAGE - FREON
06-3-0323-5	3049	2/2	TOPPING EVAPORATOR CORE	RESTRICTED FLOW - WATER
06-3-0311-5	3051	2/1R	TOPPING EVAPORATOR ACOD	INTERNAL LEAKAGE - FREON
06-3-0311-5	3052	2/1R	TOPPING EVAPORATOR ACOD	STRUCTURAL FAILURE (RUPTURE)
06-3-0327-1	3053	2/2	TOPPING EVAPORATOR EXIT DUCT	RESTRICTED FLOW - WATER
06-3-0313-1	3060	2/2	TOPPING EVAPORATOR SONIC NOZZLES	RESTRICTED FLOW
06-3-0330-1	3067	2/1R	FES FEEDLINE A/B	LEAKAGE
05-6W-2028-3	3079	2/1R	FES CONTROLLER-SWITCH	FAILS IN "ON"
05-6W-2030-3	3079A	2/1R	FES CONTROLLER-SWITCH	FAILS IN "ON"
05-6W-2031-2	3088	2/1R	HI-LOAD ENABLE SWITCH	CONTACT(S) STUCK IN OFF POSITION
05-6W-2031-1	3089	3/1R	HI-LOAD ENABLE SWITCH	CONTACT(S) NOT MAKING IN OFF
06-3-0322-3	3106	3/1R	HI LOAD PLSR ELECTRNC	GEN FAST FREQ
05-6W-2052-1	3118	2/2	TOPPING EVAPORATOR HEATER SELECT SWITCH	FAILS IN OFF
05-6W-2053-1	3128	2/1R	HI-LOAD HEATER SWITCH	FAILED TO "OFF"

ATCS POTENTIAL CRITICAL ITEMS - CONCLD.

NASA-FMEA	MDAC	FLIGHT	ITEM NAME	FAILURE MODE
06-3-0413-4	4001	2/1R	NH3 RELIEF VALVE	FAILS TO OPEN
06-3-0413-2	4002	2/1R	RELIEF VALVE	FAILS TO CLOSE
06-3-0411-1	4005	2/1R	AMMONIA CONTROLLER A	LOSS OF OUTPUT
06-3-0411-2	4006	1/1	AMMONIA CONTROLLER A	PREMATURE OP
06-3-0410-1	4007	2/1R	FLOW CONTROL VALVE	FAILS TO OPEN
06-3-0403-1	4010	3/1R	NH3 CNTRL TEMP SNSR	FAILS OFF SCALE
06-3-0408-3	4011	2/1R	TANK ISOLATION VALVE	FAILS TO OPEN
06-3-0408-4	4012	1/1	TANK ISOLATION VALVE	FAILS TO REMAIN CLOSED, EXT LEAK
06-3-0401-3	4013	2/1R	NH3 BOILER/HEAT EXCHANGER	INT/EXT LEAKAGE (FREON 21 TO NH3)
06-3-0416-1	4015	2/1R	TANKS, LINES, & FITTINGS	EXTERNAL LEAKAGE
06-3-0414-3	4015A	2/1R	TANKS, LINES, & FITTINGS	EXTERNAL LEAKAGE
06-3-0416-2	4016	1/1	LINES & FITTINGS	EXTERNAL LEAKAGE
05-6W-2026-2	4021	2/1R	SW 42 (NH3 CONTROLLER)	FAILS TO SW FROM PRI/GPC OR SEC/ON
05-6W-2026-3	4021A	2/1R	SW 42 (NH3 CONTROLLER)	FAILS TO SW FROM PRI/GPC OR SEC/ON
05-6W-2026-1	4022	2/1R	SW 42 (NH3 CONTROLLER)	FAILS TO SWITCH FROM OFF
05-6W-2201-4	4027	1/1	HYBRID DRIVER	FAILS ON
06-3-0207-3	11111	2/1R	FUEL CELL HX	RESTRICTED FLOW (FC40)
06-3-0212-3	11112	3/1R	SERVICING QD CAP	INTERNAL LEAKAGE
06-3-0223-1	11113	2/2	PAYLOAD HX	RESTRICTED FLOW PAYLOAD COOLANT
06-3-0305-2	11117	3/1R	GSE HX, FLUID CONN.	FAILS CLOSED
06-3-0390-2	11123	2/1R	FREON LOOP LINES & FITTINGS	RESTRICTED FLOW
05-6W-2036-3	12042	3/1R	SW 29 (RAD MAN SEL)	SHORTS POLE-POLE
06-3-0501-3	12043	2/2	RAD - PANEL ASSEMBLY	RESTRICTED FLOW
06-3-0580-2	12044	2/1R	FLEX HOSES, MANIFOLDS & TUBES	PHYSICAL BINDING/ JAMMING
06-3-0580-4	12045	2/2	FLEX HOSES, MANIFOLDS, & TUBES	RESTRICTED FLOW
06-3-0330-2	13200	3/1R	FES FEEDLINE ACCUM	JAMMED BELLOWS
06-3-0311-3	13201	2/1R	FLASH EVAPORATOR	INT LEAKAGE-FREON
05-6W-2207-3	13209	3/1R	FES CNTRL HDC	FAILS CLOSED
06-3-0401-1	14030	2/1R	NH3 BOILER/HX	RESTRICTED FLOW FREON
06-3-0401-2	14031	1/1	NH3 BOILER/HX	RESTRICTED FLOW NH3 LOOP
06-3-0408-1	14032	2/1R	TANK ISOL VALVE (NC)	FAILS TO OPEN
06-3-0408-2	14033	1/1	NH3 TANK ISOL VALVE	LEAKAGE
06-3-0414-4	14036	3/1R	NH3 FILL & DRAIN QD	INTERNAL LEAKAGE
06-3-0416-3	14037	1/1	NH3 LINES & FITTINGS	RESTRICTED FLOW
06-3-0405-1	14038	1/1	AMMONIA SUPPLY TANK	BURSTS

APPENDIX E
DETAILED ANALYSIS

This appendix contains the IOA analysis worksheets supplementing previous results reported in STSEOS Working Paper 1.0-WP-VA87001-005, Analysis of the Active Thermal Control System, (01 December 1987). Prior results were obtained independently and documented before starting the FMEA/CIL assessment activity. Supplemental analysis was performed to address failure modes not previously considered by the IOA. Each sheet identifies the hardware item being analyzed, parent assembly and function performed. For each failure mode possible causes are identified, and hardware and functional criticality for each mission phase are determined as described in NSTS 22206, Instructions for Preparation of FMEA and CIL, PCN-2, 6 April 1987. Failure mode effects are described at the bottom of each sheet and worst case criticality is identified 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: 1/07/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 11110 ABORT: 3/1R

ITEM: CHECK VALVE
FAILURE MODE: FAILS CLOSED - ACTIVE PUMP

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) FREON PUMP ASSEMBLY
4) CHECK VALVE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: MIDBODY AREA 40
PART NUMBER: 40V63PP1

CAUSES: CONTAMINATION, MECHANICAL SHOCK, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
FAILING THE CHECKVALVE CLOSED ON THE ACTIVE PUMP WILL CAUSE LOSS OF THAT PUMP. THE ALTERNATE PUMP IN THE SAME FREON LOOP IS STILL AVAILABLE AS IS THE SECOND FREON LOOP. LOSS OF ALL REDUNDANCY WILL CAUSE LOSS OF CREW/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 2/1R
MDAC ID: 11111 ABORT: 2/1R

ITEM: FUEL CELL HEAT EXCHANGER
FAILURE MODE: RESTRICTED FLOW - FC40

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) FUEL CELL HEAT EXCHANGER
4) FC40 LOOP
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: MIDBODY AREA 40
PART NUMBER: 40V63HX11

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
REDUCED FLOW OF THE FC40 COOLANT WILL RESULT IN INADEQUATE COOLING OF THE FUEL CELLS. REDUCED COOLING CAN LEAD TO FUEL CELL OVERHEATING WITH ACCOMPANYING LOSS OF MISSION AND POSSIBLE LOSS OF CREW/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 11112 ABORT: 3/1R

ITEM: SERVICING QUICK DISCONNECT CAP
FAILURE MODE: INTERNAL LEAKAGE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) PLUMBING
4) SERVICING QUICK DISCONNECT
5)
6)
7)
8)
9)

CRITICALITIES

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

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: GSE/ECLSS SERVICING PANEL
PART NUMBER: 40V63MD142

CAUSES: CONTAMINATION, PIECE-PART FAILURE, CORROSION

EFFECTS/RATIONALE:
INTERNAL LEAKAGE WITHIN THE QUICK DISCONNECT IS CAUSED BY THE FAILURE OF ONE OF THE SEALS. SUBSEQUENT FAILURES OF REDUNDANT SEALS AND CAP WILL CAUSE LOSS OF ONE FREON LOOP. THE SEAL CANNOT BE CHECKED ON THE GROUND AFTER INSTALLATION AND THE FAILURE IS NOT DETECTABLE IN FLIGHT - THUS FAILING SCREENS B AND A.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 2/2
MDAC ID: 11113 ABORT: 2/2

ITEM: PAYLAOD HEAT EXCHANGER
FAILURE MODE: RESTRICTED FLOW - PAYLOAD COOLANT

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) PAYLOAD HEAT EXCHANGER
4) PAYLOAD COOLANT LOOP
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: MIDBODY - AREA 40
PART NUMBER: 40V63HX1

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
A REDUCTION IN FLOW IN THE PAYLOAD COOLANT LOOP WILL RESULT IN INADEQUATE PAYLOAD COOLING. IF THE PRIMARY PAYLOAD REQUIRES THE COOLING, THEN LOSS OF THE LOOP WILL RESULT IN THE LOSS OF THE PRIMARY MISSION. SAFETY OF THE CREW/VEHICLE IS NOT AFFECTED.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 11114 ABORT: 3/3

ITEM: TEMPERATURE SENSOR, FCL EVAP OUT TEMP
FAILURE MODE:

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) TEMPERATURE SENSOR
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER: V63T1207A, V63T1407A

CAUSES:

EFFECTS/RATIONALE:
THIS TEMPERATURE SENSOR IS USED TO DETERMINE THE TEMPERATURE OF THE FREON COOLANT LOOP AS IT EXITS THE FLASH EVAPORATOR. THE RESULT IS ALSO USED TO ILLUMINATE A C&W LIGHT AND PROVIDES INPUT TO A METER. LOSS OF THE SENSOR CAN BE IDENTIFIED AS SUCH WITH NO IMPACT ON CREW OR MISSION. ERROENOUS OUTPUT CAN BE IDENTIFIED BY USING OTHER SENSORS AND DATA SOURCES.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 11115 ABORT: /NA

ITEM: GSE HEAT EXCHANGER
FAILURE MODE: RESTRICTED FLOW - GSE FREON

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) GSE HEAT EXCHANGER
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:	3/3		

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

LOCATION: AFT FUSELAGE
PART NUMBER: 50V63HX1

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
RESTRICTED FLOW OF THE FREON IN THE GSE HEAT EXCHANGER WILL REDUCE THE EFFICIENCY OF THE PRE-LAUNCH COOLING. WORST CASE MAY CAUSE A DELAY IN THE LAUNCH BUT THE FAILURE DOES NOT AFFECT ON-ORBIT OPERATIONS. 22206 GROUNDRULES CALL FOR A 3/3 CRITICALITY IN THIS CASE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 11116 ABORT: /NA

ITEM: GSE HEAT EXCHANGER, FLUID CONNECTOR
FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) GSE HEAT EXCHANGER
4) FLUID CONNECTOR
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: AFT FUSELAGE
PART NUMBER: 50V63HX1, MC276-0035-1205

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:
EXTERNAL LEAKAGE FROM THE GSE FLUID CONNECTION DURING GROUND OPRATIONS HAS NO EFFECT ON ON-ORBIT OPERATIONS. WORST CASE EFFECT IS A LAUNCH DELAY WHICH BY 22206 IS A 3/3 CRITICALITY.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 11117 ABORT: 3/1R

ITEM: GSE HEAT EXCHANGER, FLUID CONNECTOR
FAILURE MODE: FAILS CLOSED - RELIEF VALVE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) GSE HEAT EXCHANGER
4) FLUID CONNECTOR
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 [2] B [F] C [P]

LOCATION: AFT FUSELAGE
PART NUMBER: 50V63HX1, MC276-0035-1205

CAUSES: CONTAMINATION, MECHANICAL SHOCK, VIBRATION, CORROSION

EFFECTS/RATIONALE:
DURING ON-ORBIT OPERATIONS, THE RELIEF VALVE PREVENTS OVERPRESSURIZATION OF THE GSE FREON LOOP. FAILURE OF THE REDUNDANT RELIEF VALVE COULD ALLOW PRESSURE TO BUILD IN THE GSE LOOP (DUE TO THERMAL EXPANSION), WITH RESULTING DAMAGE TO THE FREON LOOP(S). SINCE THE FAILURE OF THE RELIEF VALVE CANNOT BE DETECTED, SCREEN B IS FAILED.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 11118 ABORT: /NA

ITEM: GSE HEAT EXCHANGER, FLUID CONNECTOR
FAILURE MODE: RESTRICTED FLOW- GROUND SYSTEM

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) GSE HEAT EXCHANGER
4) FLUID CONNECTOR
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: AFT FUSELAGE
PART NUMBER: 50V63HX1, MC276-0035-1205

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
RESTRICTED FLOW THROUGH THE GSE HEAT EXCHANGER GROUND SYSTEM WILL RESULT IN INADEQUATE COOLING DURING GROUND OPERATIONS. WORST CASE RESULT WILL BE A LAUNCH DELAY WHICH IS A 3/3 CRITICALITY BY 22206.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/07/88	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ATCS	FLIGHT:	3/3
MDAC ID:	11119	ABORT:	3/3

ITEM: CIRCUIT BREAKERS (FREON PUMP)
FAILURE MODE: FAILS TO OPEN - MANUALLY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP EPD&C
3) FREON PUMPS A (B)
4) PANEL L4
5) CIRCUIT BREAKERS
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FLIGHT DECK - AREA 30
PART NUMBER: 31V73A4-CB19-27, CB39-41

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:
FAILURE OF THE CIRCUIT BREAKER TO OPEN WHEN MANUALLY PULLED WILL HAVE NO EFFECT ON ITS INTENDED OPERATION. THERE WILL STILL BE PROTECTION AGAINST CURRENT SURGES. THEREFORE, THIS FAILURE WILL HAVE NO EFFECT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/07/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 11120 ABORT: 3/3

ITEM: CIRCUIT BREAKER (FREON FLOW PROPORTIONING)
FAILURE MODE: FAILS TO OPEN - MANUALLY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP EPD&C
3) FLOW PROPORTIONING MODULE
4) PANEL L4
5) CIRCUIT BREAKERS
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FLIGHT DECK - AREA 30
PART NUMBER: 31V73A4CB42, CB45

CAUSES: CONTAMINATION, MECHANICAL SHOCK, MISHANDLING/ABUSE

EFFECTS/RATIONALE:
FAILURE OF THE CIRCUIT BREAKER TO OPEN MANUALLY WILL HAVE NO EFFECT ON ITS INTENDED OPERATION. THERE WILL STILL BE PROTECTION AGAINST CURRENT SURGES. THEREFORE, THIS FAILURE WILL HAVE NO EFFECT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/07/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 11121 ABORT: 3/3

ITEM: SW10, 11 (FREON SIGNAL CONDITIONER)
FAILURE MODE: SHORTS TO GROUND BOTH SIDES

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP EPD&C
3) INSTRUMENTATION
4) PANEL 017
5) SWITCHES 10, 11
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FLIGHT DECK - AREA 30
PART NUMBER: 33V73A17-S10, S11

CAUSES: CONTAMINATION, MECHANICAL SHOCK, OVERLOAD, PIECE-PART FAILURE

EFFECTS/RATIONALE:
FAILURE ELIMINATES ONE SOURCE OF POWER FOR THE FREON SIGNAL CONDITIONER. ALTERNATE SOURCE/PATH STILL AVAILABLE AS ARE ALTERNATE DATA SOURCES. THEREFORE, THIS FAILURE RECEIVES A 3/3 CRITICALITY.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/07/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 11122 ABORT: /NA

ITEM: FREON PUMP RELAY
FAILURE MODE: FAILS OPEN, SHORT TO GROUND

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP EPD&C
3) FREON PUMP A
4) RELAY
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: MIDBODY
PART NUMBER:

CAUSES: CONTAMINATION, MECHANICAL SHOCK

EFFECTS/RATIONALE:
THIS RELAY PROVIDES A POWER PATH FOR GSE CHECKOUT. THE ONLY TIME IT IS USED/REQUIRED IS DURING GROUND OPERATIONS AND THE RELAY IS DESIGNED TO REMAIN OPEN DURING ON-ORBIT OPERATIONS. IF IT FAILS TO CLOSE DURING PRE-FLIGHT TESTS, THE WORST CASE RESULT WILL BE A LAUNCH DELAY WHICH BY 22206 IS A 3/3 CRITICALITY.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 2/1R
MDAC ID: 11123 ABORT: 2/1R

ITEM: FREON LOOP LINES AND FITTINGS
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FREON COOLANT LOOP
3) LINES AND FITTINGS
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: MIDBODY
PART NUMBER:

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:
RESTRICTED FLOW ANYWHERE IN THE FREON LOOP WILL RESULT IN REDUCED COOLING CAPABILITY AND A SUBSEQUENT LOSS OF MISSION. LOSS OF ALL COOLING MAY RESULT IN LOSS OF CREW/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/08/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 12040 ABORT: 3/3

ITEM: CIRCUIT BREAKER 14 (FREON RADIATOR CONTROLLER)
FAILURE MODE: FAILS TO OPEN - MANUALLY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) RADIATOR AND FLOW CONTROL ASSEMBLY - EPD&C
3) RADIATOR FLOW CONTROL VALVE
4) PANEL 015 (014)
5) CB14, 15
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FLIGHT DECK - AREA 30
PART NUMBER: 33V73A15-CB14, CB15; 33V73A14-CB14, C15

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:
FAILURE OF THE CIRCUIT BREAKER TO OPEN WHEN MANUALLY PULLED WILL NOT AFFECT ITS ELECTRICAL OPERATION. THE CB WILL STILL PROTECT AGAINST CURRENT SURGES WHICH IS ITS PRIMARY PURPOSE. THEREFORE THIS FAILURE HAS NO AFFECT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/08/88	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ATCS	FLIGHT:	3/3
MDAC ID:	12041	ABORT:	3/3

ITEM: CIRCUIT BREAKER (RADIATOR BYPASS VALVE)
FAILURE MODE: FAILS TO OPEN - MANUALLY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) RADIATOR AND FLOW CONTROL ASSEMBLY - EPD&C
3) RADIATOR BYPASS VALVE
4) PANEL 014
5) CIRCUIT BREAKER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FLIGHT DECK - AREA 30
PART NUMBER: 31V73A4-CB128, 129, 44, 47

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:
FAILURE OF THE CIRCUIT BREAKER TO OPEN WHEN MANUALLY PULLED WILL NOT AFFECT ITS PRIMARY PURPOSE OF CURRENT SURGE PROTECTION. THEREFORE, THIS FAILURE HAS NO EFFECT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/12/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 12042 ABORT: 3/1R

ITEM: SWITCH 29 (RADIATOR MANUAL SELECT)
FAILURE MODE: SHORTS POLE TO POLE IN EITHER POSITION

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) RADIATOR AND FLOW CONTROL ASSEMBLY - EPD&C
3) RADIATOR BYPASS VALVE
4) PANEL L1A2
5) SWITCH 29, 30
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FLIGHT DECK - AREA 30
PART NUMBER: 31V73A1A2-S29, S30

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:
A POLE TO POLE SHORT IS AN EXTENDED CASE OF FAILING TO TRANSFER FROM A POSITION. SINCE THIS FMEA COVERS BOTH RAD FLOW AND BYPASS POSITIONS, IT IS BEING ASSIGNED THE WORST CASE CRITICALITY AS DEFINED IN IOA FMEA 2027. SCREEN B FAILS SINCE ONE FAILURE ELIMINATES BOTH REDUNDANT CONTACT SETS ON A SINGLE SWITCH.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/12/88	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ATCS	FLIGHT:	2/2
MDAC ID:	12043	ABORT:	2/2

ITEM: RADIATOR - PANEL ASSEMBLY
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) RADIATOR AND FLOW CONTROL ASSEMBLY
3) PANELS
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION:
PART NUMBER:

CAUSES: CONTAMINATION, MECHANICAL SHOCK, PIECE-PART FAILURE

EFFECTS/RATIONALE:
RESTRICTED FLOW THROUGH THE RADIATORS WILL RESULT IN INADEQUATE COOLING OF ORBITER SYSTEMS. LOSS OF ONE RADIATOR IS A MINIMUM DURATION FLIGHT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/12/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 2/1R
MDAC ID: 12044 ABORT: 2/1R

ITEM: FLEX HOSES, MANIFOLDS, AND TUBES
FAILURE MODE: PHYSICAL BINDING/JAMMING

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) RADIATOR AND FLOW CONTROL ASSEMBLY
3) FLEX HOSES, MANIFOLDS, AND TUBES
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PAYLOAD BAY
PART NUMBER:

CAUSES: MECHANICAL SHOCK, MISHANDLING/ABUSE, STRUCTURAL FAILURE

EFFECTS/RATIONALE:
A JAMMING OF THE FLEX HOSE CONTAINER ASSEMBLY DURING RADIATOR DEPLOYMENT OR RETRACTION COULD RESULT IN INCOMPLETE DEPLOYMENT OR RETRACTION. WORST CASE WOULD RESULT IN EITHER LOSS OF COOLING FROM THE AFFECTED RADIATOR OR POSSIBLE INABILITY TO CLOSE THE PAYLOAD BAY DOORS DUE TO DEPLOYED RADIATOR.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/12/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 2/2
MDAC ID: 12045 ABORT: 2/2

ITEM: FLEX HOSES, MANIFOLDS, AND TUBES
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) RADIATOR AND FLOW CONTROL ASSEMBLY
3) FLEX HOSES, MANIFOLDS, AND TUBES
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: MIDBODY
PART NUMBER:

CAUSES: CONTAMINATION, MECHANICAL SHOCK, PIECE-PART FAILURE

EFFECTS/RATIONALE:
RESTRICTED FLOW OF FREON THROUGH THE FLEX HOSES WILL RESULT IN RESTRICTED FLOW THROUGH THE RADIATORS AND INADEQUATE VEHICLE COOLING. LOSS OF ONE RADIATOR IS A MINIMUM DURATION FLIGHT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/30/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 13200 ABORT: 3/1R

ITEM: FES FEEDLINE ACCUMULATOR
FAILURE MODE: JAMMED BELLOWS

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) ACCUMULATOR
4) BELLOWS
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER: TBD

CAUSES: CONTAMINATION, MECHANICAL SHOCK

EFFECTS/RATIONALE:
A JAMMED BELLOWS IN THE ACCUMULATOR MEANS AN INCORRECT LINE PRESSURE MAY BE MAINTAINED RESULTING IN INCORRECT FES OPERATION.

REFERENCES: VS70-960102 (60FH, 60FJ), SSSH 7.3 SHEET 1 OF 2, JSC FLIGHT RULES

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/20/88	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ATCS	FLIGHT:	2/1R
MDAC ID:	13201	ABORT:	2/1R

ITEM: FLASH EVAPORATOR
FAILURE MODE: INTERNAL LEAKAGE - FREON

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) FREON LOOPS
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION:
PART NUMBER:

CAUSES: MECHANICAL SHOCK, PIECE-PART FAILURE, STRUCTURAL FAILURE

EFFECTS/RATIONALE:
LEAKAGE BETWEEN THE TWO FREON LOOPS MEANS DEORBIT AT NEXT PRIMARY LANDING SITE. ADDITIONAL FAILURES CAN LEAD TO LOSS OF CREW/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/30/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 13202 ABORT: 3/3

ITEM: FES TOPPING HEATER RPC
FAILURE MODE: FAILS CLOSED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) TOPPING EVAPORATOR
4) HEATERS
5) REMOTE POWER CONTROLLER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER: TBD

CAUSES: CONTAMINATION, OVERLOAD

EFFECTS/RATIONALE:
THE HEATER RPCs FAILED CLOSED AND CONDUCT POWER TO THE HEATERS PREMATURELY. ACTUAL OPERATION OF THE HEATERS IS CONTROLLED BY THERMOSTAT. THIS FAILURE HAS NO EFFECT ON OPERATIONS.

REFERENCES: VS70-960102 (60FN), SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/30/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 13203 ABORT: 3/1R

ITEM: FES FEEDLINE HEATER HDC
FAILURE MODE: OPEN (ELECTRICAL)

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM EPD&C
3) FEEDLINE HEATER SYSTEM
4) TYPE III HDC
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER: TBD

CAUSES: MECHANICAL SHOCK, MISHANDLING/ABUSE, OVERLOAD

EFFECTS/RATIONALE:
A LOSS OF OUTPUT FROM THE HDCs WILL MEAN A LOSS OF THE ASSOCIATED SET OF FEEDLINE HEATERS. LOSS OF ALL HEATERS ON THE FES FEEDLINES WILL MEAN A LOSS OF ALL FES COOLING AND A POSSIBLE LOSS OF CREW/VEHICLE.

REFERENCES: VS70-960102 (60FL), SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/30/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 13204 ABORT: 3/3

ITEM: FES FEEDLINE HEATER HDC
FAILURE MODE: FAILS CLOSED, CONDUCTS PREMATURELY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM EPD&C
3) FEEDLINE HEATER SYSTEM
4) TYPE III HDC
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:
A PREMATURE CLOSING OF THE HDC WILL MEAN POWER IS APPLIED TO THE FES FEEDLINE HEATER CIRCUIT AT OTHER THAN EXPECTED TIMES. ACTUAL OPERATION OF THE HEATERS IS CONTROLLED BY THE THERMOSTAT AND THIS FAILURE HAS NO EFFECT ON OPERATIONS.

REFERENCES: VS70-960102 (60FL), SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	12/30/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ATCS	FLIGHT:	3/1R
MDAC ID:	13205	ABORT:	3/1R

ITEM: FES NOZZLE HEATER TYPE III HDCs
FAILURE MODE: FAILS OPEN, LOSS OF OUTPUT, SHORTED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM EPD&C
3) NOZZLE HEATER SYSTEMS
4) TYPE III HDCs
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF OUTPUT FROM THE NOZZLE HEATER HDCs MEANS A LOSS OF POWER TO THE ASSOCIATED HEATER CIRCUITS. THIS MAY ALLOW THE NOZZLES TO FREEZE UP AND CAUSE AN EFFECTIVE LOSS OF THE EVAPORATOR. IF THE HIGH LOAD EVAPORATOR IS LOST, AN ADDITIONAL FAILURE CAN CAUSE THE LOSS OF CREW/VEHICLE.

REFERENCES: SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/30/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 13206 ABORT: 3/3

ITEM: FES NOZZLE HEATER TYPE III HDCs
FAILURE MODE: FAILS CLOSED, CONDUCTS PREMATURELY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM EPD&C
3) NOZZLE HEATER SYSTEMS
4) TYPE III HDCs
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, OVERLOAD

EFFECTS/RATIONALE:
FAILING THE HDCs CLOSED WILL MEAN THAT POWER WILL BE APPLIED TO THE HEATER CIRCUIT AT OTHER THAN NOMINAL TIMES. ACTUAL OPERATION OF THE HEATERS IS CONTROLLED BY THERMOSTATS AND THIS FAILURE HAS NO EFFECT.

REFERENCES: SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	12/31/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ATCS	FLIGHT:	3/1R
MDAC ID:	13207	ABORT:	3/1R

ITEM: FES HEATER CONTROL TYPE III HYBRID DRIVER
FAILURE MODE: LOSS OF OUTPUT, SHORT TO GROUND

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) HEATERS
4) TYPE III HYBRID DRIVER
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF THE HYBRID DRIVER MEANS THAT POWER WILL NOT BE AVAIALBE TO THE ASSOCIATED HEATER. LOSS OF ALL FES HEATING CAN LEAD TO FREEZING AND A LOSS OF THE EVAPORATOR.

REFERENCES: SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/31/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 13208 ABORT: 3/3

ITEM: FES HEATER CONTROL TYPE III HYBRID DRIVER
FAILURE MODE: FAILS CLOSED, CONDUCTS PREMATURELY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) HEATERS
4) TYPE III HYBRID DRIVER
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, OVERLOAD, PIECE-PART FAILURE

EFFECTS/RATIONALE:
IF THE HYBRID DRIVER FAILS CLOSED, POWER WILL BE APPLIED TO THE FES HEATER CIRCUIT AT A TIME OTHER THAN NOMINAL. ACTUAL OPERATION OF THE HEATERS IS CONTROLLED BY THE THERMOSTATS AND THIS FAILURE HAS NO EFFECT.

REFERENCES: SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/31/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 13209 ABORT: 3/1R

ITEM: FES CONTROLLER POWER TYPE III HDCs
FAILURE MODE: FAILS CLOSED, CONDUCTS PREMATURELY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) CONTROLLER POWER
4) TYPE III HDC
5)
6)
7)
8)
9)

CRITICALITIES

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

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, OVERLOAD

EFFECTS/RATIONALE:
IF THE DRIVER CLOSES PREMATURELY, POWER WILL BE TRANSMITTED TO THE CONTROLLER AT OTHER THAN NOMINAL TIMES. THIS ALLOWS THE EVAPORATORS TO OPERATE AT LOWER THAN RATED ALTITUDES AND POSSIBLY LOSE THE EVAPORATOR. LOSS OF THE HIGH LOAD CAN LEAD TO LOSS OF THE CREW/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/31/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 13210 ABORT: 3/3

ITEM: FES INPUT DIODE
FAILURE MODE: SHORTS - INTERNALLY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) INPUT POWER
4) DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, OVERLOAD, ELECTROMAGNETIC FIELDS

EFFECTS/RATIONALE:
INTERNAL SHORT OF THE DIODE WILL HAVE NO EFFECT.

REFERENCES: SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/31/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/2R
MDAC ID: 13211 ABORT: 3/2R

ITEM: FES TOPPING DUCT HEATER DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) TOPPING EVAPORATOR
4) DUCT HEATERS
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, OVERLOAD, PIECE-PART FAILURE

EFFECTS/RATIONALE:
FAILURE OF THE DIODE WILL RESULT IN A LOSS OF POWER GETTING TO THE DUCT HEATERS, POSSIBLE FREEZE UP OF THE DUCT, AND LOSS OF THE TOPPING EVAPORATOR. LOSS OF THE TOPPING EVAPORATOR WILL MEAN LOSS OF MISSION.

REFERENCES: SSSH 7.3 SHEET 1 OF 2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/12/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/2R
MDAC ID: 13212 ABORT: 3/2R

ITEM: FES SONIC NOZZLE RESISTORS
FAILURE MODE: OPEN (ELECTRICAL)

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) TOPPING EVAPORATOR
4) SONIC NOZZLE - HEATERS
5) CURRENT LIMITING RESISTORS
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL L1A2
PART NUMBER: RLR42C120GM

CAUSES: CONTAMINATION, THERMAL SHOCK, VIBRATION

EFFECTS/RATIONALE:
LOSS OF THE CURRENT LIMITING RESISTOR WILL RESULT IN A LOSS OF THE ASSOCIATED SONIC NOZZLE HEATERS. LOSS OF ALL NOZZLE HEATERS COULD RESULT IN A FREEZE UP OF THE NOZZLE, LOSS OF THE TOPPING EVAPORATOR, AND SUBSEQUENT LOSS OF MISSION.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/12/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 13213 ABORT: 3/1R

ITEM: FES GPC CONTROL CURRENT LIMITING RESISTOR
FAILURE MODE: OPEN (ELECTRICAL)

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM - EPD&C
3) CONTROLLER POWER
4) GPC CONTROL
5) RESISTOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL L1A2
PART NUMBER: RLR80S1211FR

CAUSES: CONTAMINATION, THERMAL SHOCK

EFFECTS/RATIONALE:
THE RESISTOR IS PART OF THE INPUT POWER/GPC COMMAND PATH. IF IT OPENS, THEN ONE PATH FOR COMMANDING THE FESs ON AND OFF IS LOST. LOSS OF ALL REDUNDANCY IN COMMANDING THE FES CAN RESULT IN LOSS OF CREW/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/12/88	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ATCS	FLIGHT:	3/3
MDAC ID:	13214	ABORT:	3/3

ITEM: RESISTOR - FES TOPPING DUCT HEATER STATUS
FAILURE MODE: OPEN (ELECTRICAL)

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM - EPD&C
3) TOPPING EVAPORATOR
4) DUCT HEATERS
5) STATUS MONITORING RESISTOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL L1A2
PART NUMBER: RLR07C5101GR

CAUSES: CONTAMINATION, OVERLOAD, THERMAL SHOCK

EFFECTS/RATIONALE:
THIS RESISTOR PROVIDES CURRENT LIMITING TO THE MDM STATUS MONITORING CIRCUIT. LOSS OF THIS RESISTOR WILL RESULT IN A LOSS OF STATUS AND WILL HAVE NO EFFECT ON SYSTEM OPERATION.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/12/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 13215 ABORT: 3/3

ITEM: RESISTOR - HIGH LOAD DUCT HEATER STATUS
FAILURE MODE: OPEN (ELECTRICAL)

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM
3) HIGH LOAD EVAPORATOR
4) DUCT HEATERS
5) STATUS MONITORING CIRCUIT
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL L1A2
PART NUMBER: RLR07C5101GR

CAUSES: CONTAMINATION, OVERLOAD, THERMAL SHOCK

EFFECTS/RATIONALE:
THIS RESISTOR FAILING OPEN WILL RESULT ONLY IN A LOSS OF HEATER STATUS TO THE MDM WITH NO AFFECT ON OPERATIONS.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 13216 ABORT: 3/1R

ITEM: FES HEATERS AND THERMOSTATS - FEEDWATER LINE
FAILURE MODE: OPEN (ELECTRICAL), LOSS OF OUTPUT, SHORTS TO GROUND

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM EPD&C
3) FEEDWATER LINES
4) HEATERS AND THERMOSTATS
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION:
PART NUMBER:

CAUSES: CONTAMINATION, OVERLOAD, PIECE-PART FAILURE

EFFECTS/RATIONALE:
LOSS OF HEATERS CAN LEAD TO LOSS OF THE FEEDLINES. LOSS OF FEEDLINES CAN LEAD TO LOSS OF BOTH EVAPORATORS.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 13217 ABORT: 3/3

ITEM: FES CONTROLLER DIODES
FAILURE MODE: SHORTED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) FLASH EVAPORATOR SYSTEM EPD&C
3) CONTROLLER
4) DIODES
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION:
PART NUMBER:

CAUSES: CONTAMINATION, OVERLOAD

EFFECTS/RATIONALE:
NONE

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/04/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 2/1R
MDAC ID: 14030 ABORT: 2/1R

ITEM: NH3 BOILER/HEAT EXCHANGER
FAILURE MODE: RESTRICTED FLOW - FREON

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) NH3 BOILER/HEAT EXCHANGER
4) NH3/FREON INTERFACE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
RESTRICTED FLOW OF FREON THROUGH THE AMMONIA BOILER HEAT EXCHANGER WILL MEAN INADEQUATE COOLING OF CRITICAL ORBITER COMPONENTS. WORST CASE WILL MEAN A LOSS OF THE ASSOCIATED FREON LOOP. LOSS OF BOTH FREON LOOPS MEANS LOSS OF CREW/VEHICLE. (THIS FAILURE ALSO COVERED IN FREON LOOP FMEAs).

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/04/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 1/1
MDAC ID: 14031 ABORT: 1/1

ITEM: NH3 BOILER/HEAT EXCHANGER
FAILURE MODE: RESTRICTED FLOW - NH3 LOOP

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) NH3 BOILER/HEAT EXCHANGER
4) NH3 LOOP
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES:

EFFECTS/RATIONALE:
A RESTRICTION WITHIN THE NH3 PORTION OF THE BOILER/HEAT EXCHANGER WILL RESULT IN INADEQUATE COOLING OF ORBITER SYSTEMS. LOSS OF COOLING WILL RESULT IN LOSS OF CREW/VEHICLE DURING THOSE PHASES THAT THE NH3 BOILER IS REQUIRED.

REFERENCES: SSSH 7.1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/04/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 2/1R
MDAC ID: 14032 ABORT: 2/1R

ITEM: TANK ISOLATION VALVE (NC)
FAILURE MODE: FAILS TO OPEN - ELECTRICALLY

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) CONTROLLERS (A & B)
4) TANK ISOLATION VALVE (NC)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT BODY - AREA 50
PART NUMBER: 50V63A1-LV1, LV2

CAUSES: LOSS OF INPUT

EFFECTS/RATIONALE:
LOSS OF INPUT TO THE TANK ISOLATION VALVE WILL RESULT IN THE LOSS OF ONE AMMONIA BOILER SYSTEM. LOSS OF BOTH AMMONIA BOILER SYSTEMS CAN RESULT IN THE LOSS OF CREW/VEHICLE DURING LAUNCH ABORTS, ETC.

REFERENCES: SSSH 7.1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 1/1
MDAC ID: 14033 ABORT: 1/1

ITEM: NH3 TANK ISOLATION VALVE
FAILURE MODE: LEAKAGE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) TANK ISOLATION VALVE
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT BODY - AREA 50
PART NUMBER: 50V63A1-LV1, LV2

CAUSES: CONTAMINATION, PIECE-PART FAILURE, VIBRATION

EFFECTS/RATIONALE:
LEAKAGE OF AMMONIA INTO THE BOILER COULD RESULT IN EXCESSIVE COOLING OF THE FREON LOOPS, LOWERING THEIR TEMPERATURE WHICH IN TURN LOWERS THE TEMPERATURE OF THE INTERCHANGER, POSSIBLY RUPTURING THE WATER LOOPS AND ELIMINATING ALL VEHICLE COOLING.

REFERENCES: SSSH 7.2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 14034 ABORT: /NA

ITEM: NH3 FILL AND DRAIN QUICK DISCONNECTS
FAILURE MODE: FAILS TO CLOSE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) FILL AND DRAIN SYSTEM
4) QUICK DISCONNECTS
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: AFT FUSELAGE
PART NUMBER: ME276-0030-0011

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:
FAILURE TO CLOSE THE FILL AND DRAIN QUICK DISCONNECTS OCCURS DURING GROUND OPERATIONS ONLY. IT HAS NO AFFECT DURING FLIGHT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/3
MDAC ID: 14035 ABORT: /NA

ITEM: NH3 FILL AND DRAIN QUICK DISCONNECTS
FAILURE MODE: FAILS TO OPEN

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) FILL AND DRAIN SYSTEM
4) QUICK DISCONNECTS
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: AFT FUSELAGE
PART NUMBER: ME276-0030-0011

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:
OPENING OF THE QUICK DISCONNECT OCCURS ONLY DURING GROUND OPERATIONS. THE FAILURE TO OPEN WILL HAVE NO AFFECT DURING FLIGHT.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 3/1R
MDAC ID: 14036 ABORT: 3/1R

ITEM: NH3 FILL AND DRAIN QUICK DISCONNECTS
FAILURE MODE: INTERNAL LEAKAGE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) FILL AND DRAIN SYSTEM
4) QUICK DISCONNECTS
5)
6)
7)
8)
9)

CRITICALITIES

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

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: AFT FUSELAGE
PART NUMBER: ME276-0030-0011

CAUSES: CONTAMINATION, MECHANICAL SHOCK, VIBRATION

EFFECTS/RATIONALE:
INTERNAL LEAKAGE WITHIN A QUICK DISCONNECT IS CAUSED BY LOSS OF ONE SEAL WITHIN THE QD. THIS FIRST LOSS HAS NO AFFECT AND IS NOT DETECTABLE (FAILS SCREEN B). LOSS OF SECOND SEAL WILL RESULT IN LOSS OF ONE ABS. LOSS OF SECOND ABS CAN RESULT IN LOSS OF VEHICLE COOLING AND POSSIBLE LOSS OF CREW/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 1/1
MDAC ID: 14037 ABORT: 1/1

ITEM: LINES AND FITTINGS - AMMONIA BOILER SYSTEM
FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) LINES AND FITTINGS
4) BOILER MANIFOLD INLET AND OVERLOAD VENT
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT FUSELAGE
PART NUMBER:

CAUSES: CONTAMINATION, STRUCTURAL FAILURE

EFFECTS/RATIONALE:
RESTRICTED FLOW IN THIS AREA WILL RESULT IN LOSS OF THE ABS. LOSS OF THE ABS DURING CRITICAL PHASES CAN MEAN LOSS OF CREW/VEHICLE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/15/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ATCS FLIGHT: 1/1
MDAC ID: 14038 ABORT: 1/1

ITEM: AMMONIA SUPPLY TANK
FAILURE MODE: BURSTS

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: W.E. PARKMAN

BREAKDOWN HIERARCHY:
1) ACTIVE THERMAL CONTROL SYSTEM
2) AMMONIA BOILER SYSTEM
3) TANK
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT BODY - AREA 50
PART NUMBER:

CAUSES: STRUCTURAL FAILURE, OVERPRESSURIZATION, CORROSION

EFFECTS/RATIONALE:
AMMONIA TANK EXPLODES ELIMINATING ABS COOLING SYSTEM AND POSSIBLY DAMAGING SURROUNDING ORBITER HARDWARE.

REFERENCES:

APPENDIX F

NASA FMEA TO IOA WORKSHEET

CROSS REFERENCE/RECOMMENDATIONS

APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE/RECOMMENDATIONS

This section provides a cross reference between the NASA FMEA and corresponding IOA analysis worksheet(s) included in Appendix E. The Appendix F identifies: NASA FMEA Number, IOA Assessment Number, NASA criticality and redundancy screen data, and IOA recommendations.

Appendix F Legend

Code Definition

(1) This FMEA reflects loss of sensor data only. Criticality should be 3/3.

(2) Raise criticality from NASA's recommended value to indicated value.

(3) Insufficient data is available to resolve the issue at this time.

(4) Lower criticality from NASAs recommended value to indicated level.

(5) No equivalent NASA FMEA to this IOA FMEA. Failure mode should be re-examined by NASA and added to the data base.

(6) This FMEA reflects a loss of topping evaporator only. Loss of the topping evaporator will result in a loss of mission, but with no impact on crew or vehicle safety. Criticalities should be re-examined with this criteria in mind and adjusted accordingly.

(7) This FMEA affects the nozzle heaters. Loss of the heater can result in a nozzle freeze up and possible loss of the associated evaporator. Criticalities should be adjusted to account for this possible consequence.

(8) Upon re-examination, IOA has determined this to be a non-credible failure mode. IOA recommends that this failure be deleted.

(9) The different criticality is being recommended to maintain consistency throughout the FMEA package.

(10) This failure affects ground operations only. In accordance with NSTS 22206, IOA recommends assigning this FMEA a 3/3 criticality.

APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS

IDENTIFIERS		NASA				IOA RECOMMENDATIONS *					
NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT HW/F	SCREENS A	B	C	CRIT HW/F	SCREENS A	B	C	OTHER (SEE LEGEND CODE)	ISSUE
	ATCS-1013	/				/				9	
	ATCS-1027	/				/				5	X
	ATCS-1037	/				/				5	X
	ATCS-1038	/				/				5	X
	ATCS-1043	/				/				5	X
	ATCS-1045	/				/				5	X
	ATCS-1050	/				3/2R	P	P	P	5	X
	ATCS-1052	/				3/2R	P	P	P	5	X
	ATCS-1068	/				/				5	X
	ATCS-1078	/				/				8	
	ATCS-1084	/				/				8	
	ATCS-1091	/				/				8	
	ATCS-1107	/				/				5	X
	ATCS-2022	/				/				8	
	ATCS-2030	/				/				8	
	ATCS-2036	/				/				8	
	ATCS-3019	/				/				5	X
	ATCS-3030	/				/				5	X
	ATCS-3043	/				/				5	X
	ATCS-3044	/				/				5	X
	ATCS-3054	/				/				5	X
	ATCS-3061	/				/				5	X
	ATCS-3086	/				/				3	
	ATCS-3090	/				/				5	X
	ATCS-3111	/				/				5	X
	ATCS-3119	/				/				5	X
	ATCS-3129	/				/				5	X
	ATCS-4009	/				/				5	X
	ATCS-4014	/				/				5	X
	ATCS-4017	/				/				5	X
	ATCS-4020	/				/				8	
	ATCS-4024	/				/				8	
05-6W-2001-1	ATCS-1100	3/2R	P	P	P	3/3				1	X
05-6W-2001-4	ATCS-1099	3/3				/					
05-6W-2004-1	ATCS-1073	3/1R	P	NA	P	/					
05-6W-2004-4	ATCS-11119X	3/3				/					
05-6W-2008-1	ATCS-1085	2/1R	P	P	P	/					
05-6W-2008-4	ATCS-11120X	3/3				/					
05-6W-2010-1	ATCS-2016	3/1R	P	P	P	/					
05-6W-2010-4	ATCS-12040X	3/3				/					
05-6W-2014-1	ATCS-2025	3/1R	P	F	P	/					
05-6W-2014-4	ATCS-12041X	3/3				/					
05-6W-2020-1	ATCS-3131	3/1R	P	NA	P	/					
05-6W-2022-1	ATCS-3121	3/1R	P	NA	P	3/2R	P	NA	P	6	X
	ATCS-3127	3/1R	P	NA	P	3/2R	P	NA	P	6, 7	X

IDENTIFIERS		NASA				IDA RECOMMENDATIONS *					
NASA FMEA NUMBER	IDA ASSESSMENT NUMBER	CRIT HW/F	SCREENS A	B	C	CRIT HW/F	SCREENS A	B	C	OTHER (SEE LEGEND CODE)	ISSUE
05-6W-2023-1	ATCS-3117	3/1R	P	NA	P	/					
05-6W-2026-1	ATCS-4022	2/1R	P	NA	P	/					
05-6W-2026-2	ATCS-4021	2/1R	P	P	P	/					
05-6W-2026-3	ATCS-4021A	2/1R	P	P	P	/					
05-6W-2028-1	ATCS-3080	3/1R	P	NA	P	/					
05-6W-2028-2	ATCS-3081	3/1R	P	NA	P	/					
05-6W-2028-3	ATCS-3079	3/1R	P	NA	P	2/1R	P	NA	P	2	X
05-6W-2030-1	ATCS-3080A	3/1R	P	P	P	/					
05-6W-2030-2	ATCS-3081A	3/3				3/1R	P	NA	P	2	X
05-6W-2030-3	ATCS-3079A	3/3				2/1R	P	NA	P	2	X
05-6W-2031-1	ATCS-3089	3/1R	P	F	P	/					
05-6W-2031-2	ATCS-3088	2/1R	P	NA	P	/					
05-6W-2032-1	ATCS-2031	3/1R	P	P	P	/					
05-6W-2032-3	ATCS-2032	3/1R	P	P	P	/					
05-6W-2034-1	ATCS-2017	2/1R	P	P	P	3/1R	P	P	P	4	X
05-6W-2034-2	ATCS-2018	3/1R	P	NA	P	/					
05-6W-2034-3	ATCS-2017A	2/1R	P	F	P	/					
05-6W-2036-1	ATCS-2026	3/1R	P	NA	P	/					
	ATCS-2027	3/1R	P	NA	P	/					
05-6W-2036-2	ATCS-2028	2/1R	P	P	P	/				3	X
05-6W-2036-3	ATCS-12042X	3/1R	P	F	P	/					
05-6W-2038-1	ATCS-2023	3/1R	P	NA	P	/					
05-6W-2038-2	ATCS-2024	2/2				/					
05-6W-2039-1	ATCS-3112	3/1R	P	NA	P	/					
	ATCS-3113	3/1R	P	NA	P	/					
05-6W-2041-1	ATCS-1101	3/2R	P	P	P	3/3				1	X
05-6W-2041-2	ATCS-11121X	2/2				3/3				1	X
05-6W-2041-3	ATCS-1102	3/2R	P	P	P	3/3					
	ATCS-1103	3/2R	P	P	P	3/3					
05-6W-2043-1	ATCS-1086	2/1R	P	P	P	/					
05-6W-2043-2	ATCS-1088	2/1R	P	P	P	/					
05-6W-2043-3	ATCS-1087	2/2				/					
05-6W-2045-1	ATCS-1076	3/1R	P	P	P	/					
05-6W-2045-2	ATCS-1074	3/1R	P	P	P	/					
	ATCS-1075	3/1R	P	P	P	/					
05-6W-2047-1	ATCS-3124	3/3				3/2R	P	NA	P	6, 7	X
05-6W-2047-2	ATCS-3126	3/3				/					
05-6W-2049-1	ATCS-3114	3/1R	P	NA	P	/					
05-6W-2049-2	ATCS-3115	3/1R	P	NA	P	/					
05-6W-2052-1	ATCS-3118	2/1R	P	NA	P	2/2				6	X
05-6W-2053-1	ATCS-3128	2/1R	P	P	P	/					
05-6W-2057-1	ATCS-1104	3/3				/					
05-6W-2077-1	ATCS-3084	3/3				/					
05-6W-2078-1	ATCS-4019	3/1R	P	NA	P	/					
05-6W-2079-1	ATCS-4023	3/3				/					
05-6W-2080-1	ATCS-2021	3/3				/					
05-6W-2081-1	ATCS-1090	3/3				/					
05-6W-2082-1	ATCS-2029	3/1R	P	NA	P	/					
05-6W-2083-1	ATCS-13212X	3/3				3/2R	P	P	P	7	X
05-6W-2085-2	ATCS-1077	3/3				/					

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05-6W-2087-1	ATCS-13213X	3/1R	P	NA	P	/					
05-6W-2090-1	ATCS-3082	3/1R	P	NA	P	3/3				1	X
	ATCS-3085	3/1R	P	NA	P	/					
05-6W-2091-1	ATCS-3085A	3/1R	P	NA	P	/					
05-6W-2092-1	ATCS-13214X	3/3				/					
	ATCS-3120	3/3				/					
05-6W-2093-1	ATCS-13215X	3/3				/					
	ATCS-3130	3/3				/					
05-6W-2094-1	ATCS-3125	3/3				/					
05-6W-2095-1	ATCS-3076	3/2R	P	P	P	3/3				1	X
05-6W-2096-1	ATCS-3116	3/3				/					
05-6W-2097-1	ATCS-2035	3/3				/					
05-6W-2126-1	ATCS-1083	3/1R	P	NA	P	/					
05-6W-2128-1	ATCS-3123	3/1R	P	NA	P	3/2R	P	NA	P	6	X
05-6W-2131-1	ATCS-11122X	3/3				/					
05-6W-2133-1	ATCS-3133	3/1R	P	NA	P	/					
05-6W-2151-1	ATCS-1096	3/3				/					
	ATCS-1097	3/3				/					
	ATCS-1098	3/3				/					
05-6W-2152-1	ATCS-2039	3/3				/					
05-6W-2176-1	ATCS-3122	3/1R	P	NA	P	3/2R	P	NA	P	6	X
05-6W-2176-2	ATCS-13202X	3/3				/					
05-6W-2177-1	ATCS-13203X	3/1R	P	NA	P	/					
05-6W-2177-2	ATCS-13204X	3/3				/					
05-6W-2181-1	ATCS-3132	3/1R	P	NA	P	/					
05-6W-2181-2	ATCS-3132A	3/3				/					
05-6W-2201-1	ATCS-4028	3/1R	P	NA	P	/					
05-6W-2201-4	ATCS-4027	2/1R	P	F	P	1/1					
05-6W-2202-1	ATCS-1081	3/1R	P	NA	P	/					
05-6W-2202-3	ATCS-1082	3/3				/					
05-6W-2203-1	ATCS-2033	3/1R	P	F	P	/					
05-6W-2203-2	ATCS-2034	3/1R	P	NA	P	/					
05-6W-2204-1	ATCS-13205X	3/3				3/1R	P	NA	P	7	X
05-6W-2204-2	ATCS-13206X	3/3				/					
05-6W-2205-1	ATCS-13207X	3/3				3/1R	P	NA	P	6	X
05-6W-2205-2	ATCS-13208X	3/3				/					
05-6W-2207-1	ATCS-3087	3/1R	P	NA	P	/					
05-6W-2207-2	ATCS-13209X	3/1R	F	F	P	/					
05-6W-2251-1	ATCS-3083	3/1R	P	NA	P	/					
05-6W-2251-2	ATCS-13210X	3/3				/					
05-6W-2252-1	ATCS-2020	3/3				/					
05-6W-2252-2	ATCS-2019	3/1R	P	NA	P	/					
05-6W-2253-1	ATCS-3083A	3/1R	P	NA	P	/					
05-6W-2253-2	ATCS-13217X	3/1R	P	NA	P	3/3				4	X
05-6W-2254-1	ATCS-2037	3/3				/					
	ATCS-2038	3/3				/					
05-6W-2255-1	ATCS-4025	3/1R	P	NA	P	/					
05-6W-2255-2	ATCS-4026	3/3				/					
05-6W-2256-1	ATCS-1079	3/1R	P	NA	P	/					
05-6W-2256-2	ATCS-1080	3/3				/					

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05-6W-2257-1	ATCS-1092	3/3				/					
	ATCS-1093	3/3				/					
	ATCS-1094	3/3				/					
	ATCS-1095	3/3				/					
05-6W-2258-1	ATCS-13211X	3/3				3/2R	P	NA	P	6, 7	X
05-6W-2351-1	ATCS-3069A	3/3				/					
05-6W-2351-2	ATCS-13216X	3/1R	P	NA	P	/					
05-6W-2356-1	ATCS-1105	3/2R	P	P	P	3/3				1	X
05-6W-2357-1	ATCS-1106	3/3				/					
06-3-0101-1	ATCS-1010	3/1R	P	NA	P	/					
	ATCS-1012	3/1R	P	NA	P	/					
06-3-0101-3	ATCS-1011	2/1R	P	P	P	/					
06-3-0102-1	ATCS-1003	2/1R	P	P	P	/					
06-3-0102-2	ATCS-1004	3/1R	F	F	P	2/1R	F	F	P	2	X
06-3-0103-1	ATCS-1005	2/1R	P	P	P	/					
06-3-0104-1	ATCS-1008	3/1R	P	P	P	/					
	ATCS-1015	3/1R	P	P	P	/					
06-3-0104-2	ATCS-1009	3/1R	F	F	P	/					
	ATCS-1014	3/1R	F	F	P	/					
06-3-0105-1	ATCS-1007	3/2R	P	P	P	3/3				1	X
06-3-0106-1	ATCS-1002	3/2R	P	P	P	3/3				1	X
06-3-0108-1	ATCS-11110X	3/1R	P	P	P	/					
06-3-0108-2	ATCS-1016	2/1R	P	P	P	/					
06-3-0112-2	ATCS-1000	2/1R	P	P	P	/					
	ATCS-1006	2/1R	P	P	P	/				3	X
	ATCS-1017	2/1R	P	P	P	/					
06-3-0112-3	ATCS-1001	2/1R	P	P	P	/					
	ATCS-1018	2/1R	P	P	P	/					
06-3-0201-1	ATCS-1044	2/1R	P	P	P	/					
06-3-0201-2	ATCS-1039	2/1R	P	P	P	/					
06-3-0201-3	ATCS-1040	2/1R	P	P	P	/					
06-3-0201-4	ATCS-1041	2/1R	P	P	P	/					
06-3-0202-1	ATCS-1046	3/3				/					
06-3-0203-1	ATCS-1047	3/2R	P	P	P	3/3				1	X
06-3-0207-1	ATCS-1019	2/1R	P	P	P	/					
06-3-0207-2	ATCS-1022	2/1R	P	P	P	/					
	ATCS-1023	2/1R	P	P	P	/					
06-3-0207-3	ATCS-11111X	2/1R	P	P	P	/					
06-3-0207-4	ATCS-1024	2/1R	P	P	P	/					
06-3-0207-5	ATCS-1021	1/1				/					
06-3-0207-6	ATCS-1020	2/1R	P	P	P	/					
06-3-0212-2	ATCS-1055	2/1R	P	P	P	/					
06-3-0212-3	ATCS-11112X	3/1R	F	F	P	/					
06-3-0215-1	ATCS-1062	2/1R	P	F	P	/					
06-3-0215-2	ATCS-1061	2/1R	P	P	P	/					
06-3-0217-1	ATCS-1089	3/2R	P	P	P	3/3					
06-3-0220-2	ATCS-1057	2/1R	P	P	P	/					
06-3-0220-3	ATCS-1058	2/2				/					
06-3-0220-4	ATCS-1058A	2/1R	P	P	P	/					
	ATCS-1059	2/1R	P	P	P	/					

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06-3-0223-1	ATCS-11113X	2/2				/					
06-3-0223-2	ATCS-1053	2/2				2/1R	P	P	P	2	X
06-3-0223-3	ATCS-1049	2/1R	P	P	P	/					
06-3-0223-4	ATCS-1048	2/1R	P	P	P	/					
06-3-0224-1	ATCS-1054	3/2R	P	P	P	3/3				1	X
06-3-0230-1	ATCS-1071	2/1R	P	P	P	/					
06-3-0230-2	ATCS-1069	2/1R	P	P	P	/					
06-3-0301-1	ATCS-1030	2/1R	P	P	P	/					
06-3-0301-2	ATCS-1026	2/1R	P	P	P	/					
06-3-0301-3	ATCS-1025	1/1				2/1R	P	P	P	4	X
06-3-0301-4	ATCS-1028	2/1R	P	P	P	/					
06-3-0301-5	ATCS-1029	3/1R	P	P	P	/					
06-3-0301-6	ATCS-1031	3/3				3/2R	P	P	P	2	X
06-3-0303-1	ATCS-11114X	3/2R	P	P	P	3/3				1	X
06-3-0304-1	ATCS-1033	2/1R	P	P	P	/					
06-3-0304-2	ATCS-1036	2/1R	P	P	P	/					
06-3-0304-3	ATCS-1032	2/1R	P	P	P	/					
06-3-0304-4	ATCS-11115X	2/2				3/3				10	X
06-3-0304-5	ATCS-1035	2/2				3/3				10	X
06-3-0305-1	ATCS-11116X	2/2				3/3				10	X
06-3-0305-2	ATCS-11117X	3/1R	P	P	P	/					
06-3-0305-3	ATCS-11118X	2/2				3/3				10	X
06-3-0307-1	ATCS-1063	2/1R	P	P	P	/					
	ATCS-1067	2/1R	P	P	P	/					
06-3-0307-2	ATCS-1066	2/1R	P	P	P	/					
06-3-0309-1	ATCS-1064	3/2R	P	P	P	3/3				1	X
06-3-0311-1	ATCS-3013	2/1R	P	P	P	/					
	ATCS-3018	2/1R	P	P	P	/				3, 5	X
	ATCS-3045	2/1R	P	P	P	/					
	ATCS-3050	2/1R	P	P	P	/				3	X
06-3-0311-2	ATCS-3001	3/1R	P	P	P	/					
	ATCS-3041	3/1R	P	P	P	/					
	ATCS-3066	3/1R	P	P	P	/					
06-3-0311-3	ATCS-13201X	2/1R	P	P	P	/					
06-3-0311-4	ATCS-3015	2/1R	P	P	P	/					
	ATCS-3017	2/1R	P	P	P	/					
06-3-0311-5	ATCS-3012	1/1				/					
	ATCS-3014	1/1				/					
	ATCS-3016	1/1				/					
	ATCS-3046	1/1				2/1R	P	NA	P	4	X
	ATCS-3047	1/1				/					
	ATCS-3048	1/1				2/1R	P	NA	P	4	X
	ATCS-3051	1/1				2/1R	P	NA	P	4	X
	ATCS-3052	1/1				2/1R	P	NA	P	4	X
06-3-0313-1	ATCS-3060	2/1R	P	P	P	2/2				6	X
06-3-0313-2	ATCS-3062	3/3				3/2R	P	NA	P	7	X
	ATCS-3063	3/3				3/2R	P	NA	P	7	X
06-3-0314-1	ATCS-3029	2/1R	P	P	P	/					
06-3-0314-2	ATCS-3025	3/3				3/1R	P	NA	P	7	X
	ATCS-3026	3/3				3/1R	P	NA	P	7	X

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06-3-0314-2	ATCS-3027	3/3				/					
06-3-0315-1	ATCS-3091	3/1R	P	P	P	/					
	ATCS-3103	3/1R	P	P	P	/					
	ATCS-3104	3/1R	P	P	P	/					
06-3-0318-1	ATCS-3092	3/1R	P	NA	P	/					
	ATCS-3093	3/1R	P	NA	P	/					
	ATCS-3094	3/1R	P	NA	P	/					
06-3-0318-3	ATCS-3095	3/1R	P	NA	P	3/2R	P	NA	P	6	X
	ATCS-3096	3/1R	P	NA	P	3/2R	P	NA	P	6	X
06-3-0319-01	ATCS-3097	3/1R	P	NA	P	/					
	ATCS-3098	3/1R	P	NA	P	/					
06-3-0319-04	ATCS-3097A	3/1R	P	NA	P	/					
	ATCS-3098A	3/1R	P	NA	P	/					
06-3-0319-07	ATCS-3099	3/1R	P	NA	P	/					
	ATCS-3100	3/1R	P	NA	P	/					
06-3-0319-10	ATCS-3101	3/1R	P	NA	P	/					
	ATCS-3102	3/1R	P	NA	P	3/2R	P	NA	P	6	X
06-3-0319-13	ATCS-3101A	3/1R	P	NA	P	/					
	ATCS-3102A	3/1R	P	NA	P	3/2R	P	NA	P	6	X
06-3-0322-1	ATCS-3008	3/1R	P	NA	P	/					
	ATCS-3009	3/1R	P	NA	P	/					
	ATCS-3105	3/1R	P	NA	P	/					
	ATCS-3107	3/1R	P	NA	P	/					
	ATCS-3108	3/1R	P	NA	P	/					
06-3-0322-3	ATCS-3007	3/1R	P	F	P	/					
	ATCS-3010	3/1R	P	F	P	/					
	ATCS-3106	3/1R	P	F	P	/					
06-3-0322-4	ATCS-3006	3/1R	P	P	P	/					
	ATCS-3011	3/1R	P	P	P	/					
06-3-0323-1	ATCS-3037	3/1R	P	NA	P	3/2R	P	NA	P	6	X
	ATCS-3038	3/1R	P	NA	P	3/2R	P	NA	P	6	X
	ATCS-3109	3/1R	P	NA	P	3/2R	P	NA	P	6	X
	ATCS-3110	3/1R	P	NA	P	3/2R	P	NA	P	6	X
06-3-0323-3	ATCS-3039	3/1R	P	NA	P	3/2R	P	NA	P	6	X
06-3-0323-4	ATCS-3036	3/1R	P	F	P	3/2R	P	F	P	6	X
06-3-0323-5	ATCS-3035	3/1R	P	NA	P	3/2R	P	NA	P	6	X
	ATCS-3049	3/1R	P	NA	P	2/2				6	X
06-3-0326-1	ATCS-3020	2/1R	P	P	P	/					
06-3-0326-3	ATCS-3021	3/1R	P	NA	P	/					
	ATCS-3023	3/1R	P	NA	P	/					
06-3-0326-4	ATCS-3024	3/3				/					
06-3-0327-1	ATCS-3040	2/1R	P	P	P	3/2R	P	P	P	6	X
	ATCS-3053	2/1R	P	P	P	2/2				6	X
	ATCS-3055	2/1R	P	P	P	3/2R	P	P	P	6	X
	ATCS-3057	2/1R	P	P	P	3/2R	P	P	P	6	X
06-3-0327-4	ATCS-3056	3/3				/					
	ATCS-3059	3/3				/					
	ATCS-3064	3/3				/					
06-3-0328-1	ATCS-3000	3/3				/					
	ATCS-3022	3/3				/					

IDENTIFIERS		NASA				IOA RECOMMENDATIONS *					
NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT HW/F	SCREENS A	B	C	CRIT HW/F	SCREENS A	B	C	OTHER (SEE LEGEND CODE)	ISSUE
06-3-0328-1	ATCS-3028	3/3				/					
	ATCS-3034	3/3				/					
	ATCS-3058	3/3				/					
	ATCS-3065	3/3				/					
	ATCS-3071	3/3				/					
	ATCS-3075	3/3				/					
06-3-0330-1	ATCS-3002	3/1R	P	P	P	/					
	ATCS-3042	3/1R	P	P	P	/					
	ATCS-3067	3/1R	P	P	P	/				3	X
	ATCS-3078	3/1R	P	P	P	/					
06-3-0330-2	ATCS-13200X	3/1R	P	F	P	/					
06-3-0330-3	ATCS-3076A	3/2R	P	F	P	3/3				1	X
06-3-0330-4	ATCS-3003	3/1R	P	NA	P	/					
	ATCS-3005	3/1R	P	NA	P	/					
	ATCS-3031	3/1R	P	NA	P	/					
	ATCS-3033	3/1R	P	NA	P	/					
	ATCS-3068	3/1R	P	NA	P	/					
	ATCS-3070	3/1R	P	NA	P	/					
	ATCS-3072	3/1R	P	NA	P	/					
	ATCS-3073	3/1R	P	NA	P	/					
06-3-0330-5	ATCS-3004	3/3				/					
	ATCS-3032	3/3				/					
	ATCS-3069	3/3				/					
	ATCS-3074	3/3				/					
06-3-0330-6	ATCS-3077	3/1R	P	P	P	/					
06-3-0390-1	ATCS-1034	2/1R	P	P	P	/					
	ATCS-1042	2/1R	P	P	P	/					
	ATCS-1051	2/1R	P	P	P	/					
	ATCS-1056	2/1R	P	P	P	/					
	ATCS-1060	2/1R	P	P	P	/					
	ATCS-1065	2/1R	P	P	P	/					
	ATCS-1070	2/1R	P	P	P	/					
	ATCS-1072	2/1R	P	P	P	/					
06-3-0390-2	ATCS-11123X	2/1R	P	P	P	/					
06-3-0401-1	ATCS-14030X	2/1R	P	P	P	/					
06-3-0401-2	ATCS-14031X	1/1				/					
06-3-0401-3	ATCS-4013	2/1R	P	P	P	/					
06-3-0403-1	ATCS-4010	3/1R	P	F	P	/					
06-3-0403-2	ATCS-4010A	3/1R	P	P	P	/					
06-3-0404-1	ATCS-4010B	3/1R	P	NA	P	/					
06-3-0404-2	ATCS-4010C	3/1R	P	NA	P	/					
06-3-0405-1	ATCS-14038X	1/1				/					
06-3-0406-1	ATCS-4003	3/3				/					
06-3-0407-1	ATCS-4004	3/3				/					
06-3-0408-1	ATCS-14032X	3/1R	P	NA	P	2/1R	P	NA	P	2	X
06-3-0408-2	ATCS-14033X	1/1				/					
06-3-0408-3	ATCS-4011	2/1R	P	NA	P	/					
06-3-0408-4	ATCS-4012	2/1R	P	NA	P	1/1				2	X
06-3-0410-1	ATCS-4007	3/1R	P	NA	P	2/1R	P	NA	P	2	X
06-3-0410-2	ATCS-4008	2/1R	P	NA	P	3/1R	P	NA	P	4	X

IDENTIFIERS		NASA				IDA RECOMMENDATIONS *					
NASA FMEA NUMBER	IDA ASSESSMENT NUMBER	CRIT HW/F	SCREENS A	B	C	CRIT HW/F	SCREENS A	B	C	OTHER (SEE LEGEND CODE)	ISSUE
06-3-0411-1	ATCS-4005	2/1R	P	NA	P	/					X
06-3-0411-2	ATCS-4006	3/1R	P	NA	P	1/1				2	
06-3-0413-2	ATCS-4002	2/1R	P	P	P	/					
06-3-0413-4	ATCS-4001	2/1R	P	P	P	/					
06-3-0414-1	ATCS-14034X	3/3				/					
06-3-0414-2	ATCS-14035X	3/3				/					
06-3-0414-3	ATCS-4015A	2/1R	P	P	P	/					
06-3-0414-4	ATCS-14036X	3/1R	F	F	P	/					
06-3-0416-1	ATCS-4015	2/1R	P	P	P	/					
06-3-0416-2	ATCS-4016	1/1				/					
06-3-0416-3	ATCS-14037X	1/1				/					
06-3-0420-1	ATCS-4018	3/3				/					
06-3-0501-3	ATCS-12043X	2/2				/					
06-3-0502-1	ATCS-2004A	2/1R	P	P	P	/					
06-3-0502-2	ATCS-2004	2/1R	P	P	P	/					
	ATCS-2006	2/1R	P	P	P	/					
06-3-0502-3	ATCS-2003	3/2R	P	P	P	2/2				2, 9	X
06-3-0502-4	ATCS-2003A	2/2				/					
06-3-0503-1	ATCS-2039A	3/3				/					
06-3-0504-1	ATCS-2008	2/1R	P	F	P	/					
06-3-0504-2	ATCS-2008A	3/1R	P	F	P	2/1R	P	F	P	2, 9	X
	ATCS-2010	3/1R	P	F	P	2/1R	P	F	P	2, 9	X
06-3-0504-3	ATCS-2007	2/2				/					
06-3-0504-4	ATCS-2007A	3/2R	P	NA	P	2/2				2, 9	X
06-3-0505-1	ATCS-2012	3/1R	P	NA	P	/					
06-3-0507-1	ATCS-2015	3/2R	P	NA	P	/					
06-3-0507-2	ATCS-2015C	3/1R	P	NA	P	/					
06-3-0508-1	ATCS-2015B	3/1R	P	F	P	/					
06-3-0508-2	ATCS-2015A	3/2R	P	P	P	/					
06-3-0510-1	ATCS-2013	3/3				/					
	ATCS-2014	3/3				/					
06-3-0520-1	ATCS-2000	2/1R	P	P	P	/					
	ATCS-2001	2/1R	P	P	P	/					
	ATCS-2005	2/1R	P	P	P	/					
	ATCS-2009	2/1R	P	P	P	/					
	ATCS-2011	2/1R	P	P	P	/					
	ATCS-2002	2/1R	P	P	P	/					
06-3-0580-1	ATCS-12044X	2/1R	P	P	P	/					
06-3-0580-2	ATCS-12045X	2/2				/					
06-3-0580-4											