INDEPENDENT ORBITER ASSESSMENT

ASSESSMENT
OF THE
AUXILIARY POWER
UNIT

19 FEBRUARY 1988

MCDONNELL DOUGLAS ASTRONAUTICS COMPANY
HOUSTON DIVISION

SPACE TRANSPORTATION SYSTEM ENGINEERING AND OPERATIONS SUPPORT

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1.0 EXECUTIVE SUMMARY

The McDonnell Douglas Astronautics Company (MDAC) was selected in June 1986 to perform an Independent Orbiter Assessment (IOA) of the Failure 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, 10 October 1986.

The IOA effort first completed an analysis of the Auxiliary Power Unit (APU) 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 NASA FMEA/CIL baseline with proposed Post 51-L updates included. A resolution of each discrepancy from the comparison is provided through additional analysis as required. This report documents the results of that comparison for the Orbiter APU hardware.

The IOA product for the APU analysis, covering both APU hardware and APU electrical components, consisted of 344 failure mode "worksheets" (301 original worksheets plus 43 supplemental worksheets) that resulted in 178 potential critical items being identified (149 original items plus 29 supplemental items). A comparison was made of the IOA product to the NASA APU hardware FMEA/CIL baseline dated 17 December 1986 which consisted of 184 FMEAs and fifty-seven CIL items. The comparison determined if there were any results which had been found by the IOA analysis of the APU hardware that did not agree with the NASA APU hardware baseline. The comparison identified seventy-two discrepancies. After discussion with the NASA subsystem manager, this list was reduced to nineteen issues which were taken by the subsystem manager to the NASA/Rockwell FMEA/CIL working group meetings for disposition. As a result of that review, four additional APU hardware FMEAS recommended by the IOA were added to the NASA proposed FMEA/CIL baseline, three of which were CIL items.

A comparison was made of the IOA product to the NASA proposed APU Electrical Power Distribution and Control (EPDC) CIL baseline dated 10 July 1987 which consisted of forty-five CIL items. The comparison identified nine discrepancies, which were provided to the NASA/Rockwell FMEA/CIL working group meetings for consideration. As a result of this review, all nine issues were resolved without adding any additional CIL's to the proposed NASA APU EPDC CIL baseline.

A comparison was made of the IOA product to the NASA proposed APU EPDC FMEA baseline dated 2 October 1987, which consisted of 124 FMEAs and forty-eight CIL items. No discrepancies were identified as a result of this comparison.

It should be noted that while this FMEA baseline package fully documented the forty-eight APU EPDC CIL items, allowing a thorough comparison, it provided only hardware item identification, failure mode, and criticality for the seventy-six non-CIL FMEAs. Assessment of these non-CIL FMEAs was done as well as it could be under the circumstances.

Figure 1 presents a comparison of the proposed post 51-L NASA baseline with the IOA recommended baseline and any issues. The number of IOA FMEAs and CIL items shown differ from those of the original analysis because they take into account the IOA/NASA discrepancies which were resolved before the twenty-eight issues (nineteen hardware issues and nine EPDC issues) shown were generated. As the numbers imply, not all issues involve adding or removing FMEAs or CIL items. Some involve changing criticalities or redundancy screens of existing FMEAs. The two remaining IOA issues shown are discussed in Section 4.

APU ASSESSMENT OVERVIEW

APU ASSESSMENT SUMMARY

	ORIGINAL ASSESSMENT *			FINAL RESOLUTION **		
	IOA	NASA	ISSUES	IOA	NASA	ISSUES
FMEA	316	304	28	314	313+	2
CIL	101	102	25	106	106++	0

+ HW=189, EPDC=124

++ HW=58, EPDC=48

ELECTRICAL SYSTEM

	IOA	NASA	ISSUES
FMEA	121	120	9
CIL	39	45	9

STRUCTURE

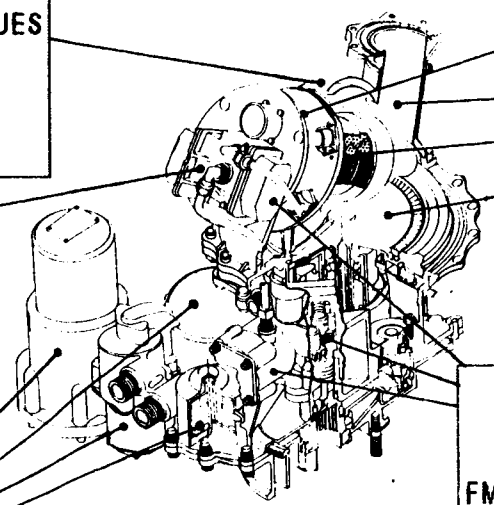
	IOA	NASA	ISSUES
FMEA	1	0	1
CIL	1	0	1

FUEL PUMP/GGVM COOLING SYSTEM

	IOA	NASA	ISSUES
FMEA	21	21	0
CIL	0	0	0

LUBE OIL SYSTEM

	IOA	NASA	ISSUES
FMEA	22	16	10
CIL	8	6	8



INSTRUMENTATION SYSTEM

	IOA	NASA	ISSUES
FMEA	49	48	1
CIL	0	0	0

GG INJECTOR COOLING SYSTEM

	IOA	NASA	ISSUES
FMEA	16	16	0
CIL	8	8	0

POWER SYSTEM

	IOA	NASA	ISSUES
FMEA	12	12	0
CIL	8	8	0

CONTROLLER

	IOA	NASA	ISSUES
FMEA	12	12	0
CIL	6	6	0

FUEL SYSTEM

	IOA	NASA	ISSUES
FMEA	54	51	7
CIL	31	29	7

DISPLAYS

	IOA	NASA	ISSUES
FMEA	8	8	0
CIL	0	0	0

* NASA PROPOSED BASELINE AS OF 17 DECEMBER 1986 (EPDC BASELINE AS OF 10 JULY 1987)

** NASA BASELINE AS OF 2 OCTOBER 1987

FIGURE 1 - APU FMEA/CIL ASSESSMENT

2.0 INTRODUCTION

2.1 Purpose

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

3.0 SUBSYSTEM DESCRIPTION

3.1 Design and Function

The Auxiliary Power Unit (APU) subsystem converts chemical energy stored in liquid hydrazine to mechanical shaft power. The Orbiter has three completely independent APUs, with each APU driving one hydraulic pump.

Each APU subsystem consists of the following:

- A fuel supply and distribution system
- An auxiliary power unit and controller
- An exhaust duct assembly
- A fuel thermal control system
- A fuel pump seal cavity drain line
- A fuel pump/valve module cooling system
- A gas generator injector cooling system

The hydrazine is delivered to the APU gas generator via the fuel pump. The catalyst in the gas generator causes the hydrazine to decompose. The hot gases make two passes through the turbine, which in turn provides mechanical power to the APU gearbox. Through gear reduction, power is provided to drive the APU fuel pump, lube oil pump, and hydraulic oil pump.

Three water tanks and associated lines are provided to cool the fuel pumps and gas generator valve modules after APU shutdown on-orbit and to cool the gas generator injectors should an emergency hot start be required.

The hydrazine fuel supply is stored in the fuel tank and is pressurized with nitrogen during servicing. The pressure provides start capability until the fuel pump is running and acts against the tank diaphragm to positively expel fuel to the APU. The fuel pump provides a constant flow of hydrazine to the valve module after the initial bootstrap start.

Two parallel fuel isolation valves are manually actuated by the crew during APU activation and deactivation. During nonoperating periods, they isolate the fuel supply to prevent further fuel flow. Each valve has a reverse-flow pressure-relief feature to prevent system damage due to expansion of fuel trapped between the valves and the APU.

The APU turbine speed is controlled by the Gas Generator Valve Module (GGVM). The valve module consists of two flapper-type valves in series. The primary or modulating valve downstream of the pump is normally open and allows flow to the secondary or shutoff valve. The secondary valve is normally in by-pass, which directs hydrazine flow back to the pump inlet. In the powered state, it allows hydrazine flow to the gas generator. The APU controller cycles these

valves to maintain proper turbine speed. The gas generator is a container for a granular catalyst. When hydrazine comes in contact with the catalyst, decomposition occurs, and the hot gases produced are directed to the turbine.

The dual-pass turbine assembly converts hot gas kinetic energy into mechanical shaft power at the desired speeds to operate the hydraulic pump, lube oil pump, and fuel pump.

The speed-reducing gearbox contains gears, bearings, seals, and a scavenger lubrication system. The gearbox is pressurized with nitrogen to prevent vaporization of the lubricant. A lube oil pump circulates the lube oil to the hydraulic water boiler for cooling. The gearbox has a pressurization system consisting of a small GN2 bottle and solenoid shutoff valve actuated by the controller.

The APU controller provides speed control, logic for APU startup and shutdown, signal conditioning, heater control, gearbox pressure control, and malfunction detection capability.

The exhaust duct assembly directs the APU exhaust products overboard through an exit at the upper aft fuselage skin. Exhaust duct assemblies 1 and 2 are located on the port side and duct 3 is on the starboard side of the aft fuselage at the base of the vertical stabilizer.

The fuel tank, fuel line, fuel pump, and lube oil line heaters are sized to maintain the fuel and lube oil above minimum temperature during any Orbiter mission. The gas generator heaters provide a means of preheating the catalyst to > 190 degrees F for controlled decomposition. Insulation for the APU prevents excessive temperatures in the fuel system as a result of entry heating.

The fuel pump and gas generator valve modules are maintained below 200 degrees F after APU shutdown by a water spray system consisting of two water tanks and associated lines, switches, thermostats, and timers. This system is only required on-orbit when convective cooling is insufficient to cool these components.

A single water tank with lines to all three APUs is provided to cool the gas generator injector should an APU restart be required before the gas generator can cool naturally. Control is via the APU controller.

3.2 Interfaces and Locations

Figure 2 depicts the APU interfaces. The APU and APU Controller receive electric power from various Orbiter Aft Load Controllers, Aft Power Controllers, Control Buses, and Essential Buses. APU gauges are powered by Panel Bus Main B 015.

All three APUs are mounted on the 1307 bulkhead, in the Orbiter aft compartment. APUs 1 and 2 are located in close proximity toward the port side of the bulkhead. APU 3 is slightly further away, toward the starboard side.

The APU fuel tanks are mounted on the sides of the aft compartment, about 7 feet aft of the 1307 bulkhead. Tanks 1 and 2 are on the port side, in close proximity. Tank 3 is on the starboard side. Figure 3 shows the locations of the three APUs and associated fuel tanks, fuel lines, and the lube oil lines.

APU lube oil cooling is provided by the Orbiter Water Spray Boilers, one for each APU.

The Controllers for APU 1, 2 and 3 are mounted on freon coldplates in Aft Avionics Bays 4, 5 and 6, respectively.

The APUs are controlled during flight by flight crew switches only - no uplink commands are possible. Many APU functions can be controlled from the ground prelaunch by way of the Launch Aft MDM, however.

3.3 Functional Breakdown

For analysis purposes, the APU was broken down into the following functional subsystems:

1. Power System
2. Fuel System
3. Lube Oil System
4. Gas Generator Injector Cooling System
5. Fuel Pump/GGVM Cooling System
6. Structure
7. Electrical System
8. Displays
9. Instrumentation
10. Controller

These subsystems are described below.

1. The Power System consists of the components involved in generating shaft power from the exothermic reaction - the gas generator, turbine wheel, exhaust duct, gearbox, gas generator bed heaters, and the turbine speed sensors.

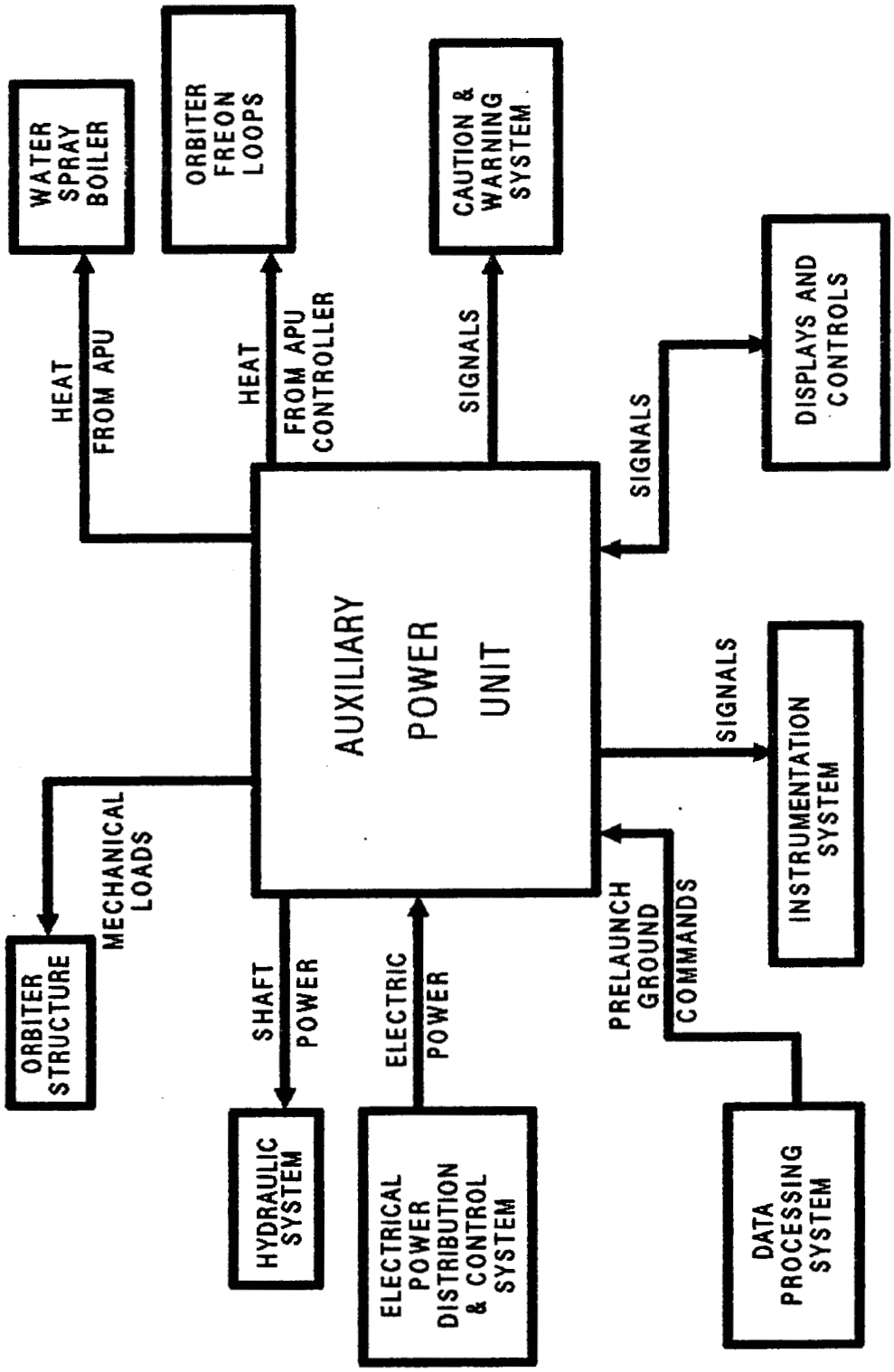


Figure 2 - APU INTERFACES

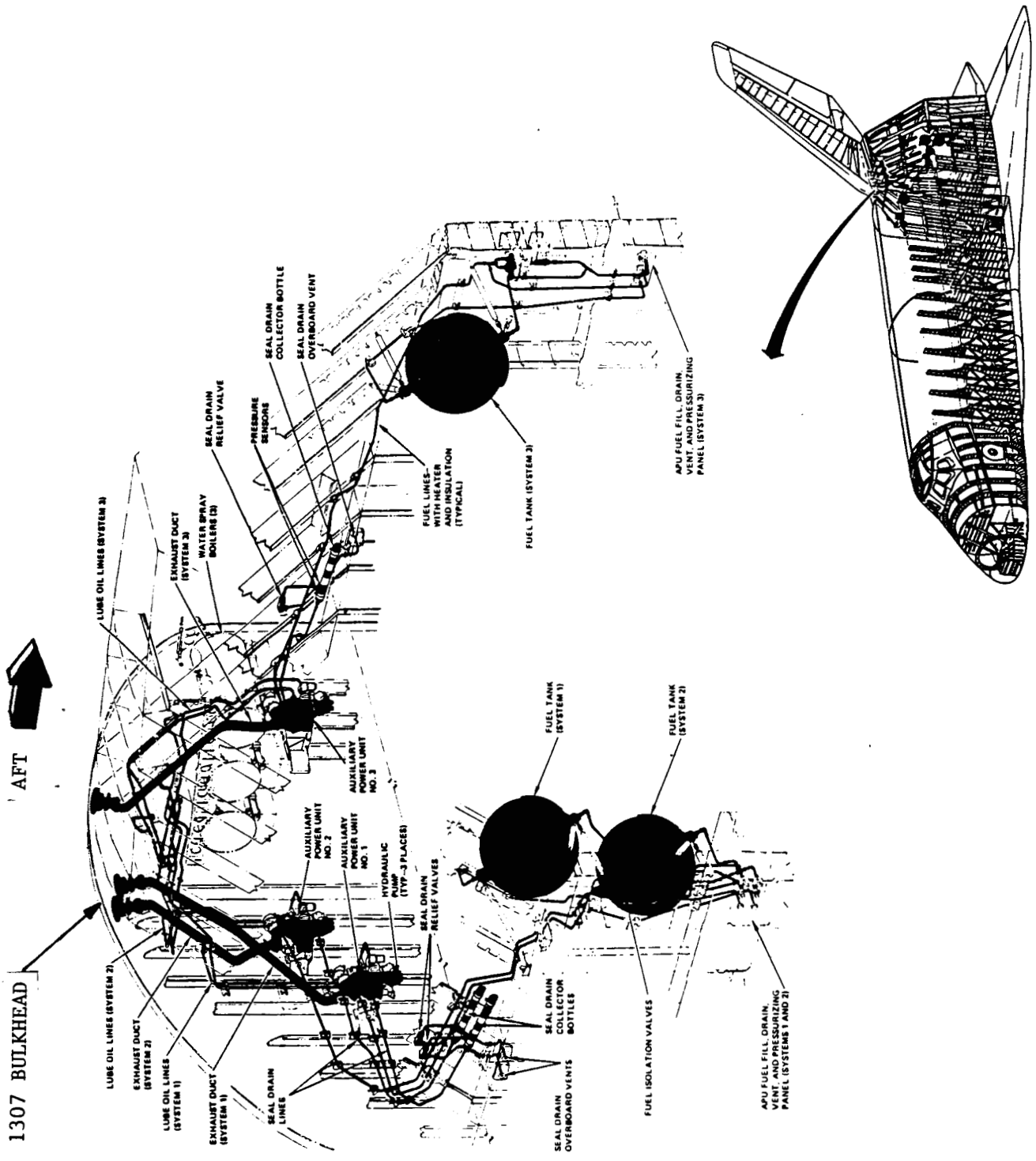


Figure 3 - APU LOCATION

2. The Fuel System consists of all components involved in storing fuel, and supplying it to the gas generator - the fuel tank, fuel lines, valves, fuel pump, and heaters.

3. The Lube Oil System includes the lube oil lines, pump, couplings, accumulators, and heaters.

4. The Gas Generator Injector Cooling System includes all valves, water tanks, water lines, couplings, and heaters associated with this cooling system.

5. The Fuel Pump/GGVM Cooling System includes all valves, water tanks, water lines, nitrogen lines, couplings, and heaters associated with this cooling system.

6. The Structures analyzed include the APU turbine and gearbox housings.

7. The Electrical System includes circuitry specifically associated with the APU, including the APU switches.

8. Displays include all APU gauges and talkbacks.

9. Instrumentation includes all APU transducers except for the turbine speed sensors, which are covered under the Power System.

10. The APU Controller was analyzed to the functional level only. The analysis examines the consequences of loss of the Controller's important functions.

Figure 4 presents a highly simplified breakdown of the APU components, reflecting the functional subsystems described above (except for the structures, electrical, displays, and instrumentation subsystems).

Figure 5 presents the top-level hierarchy used in the APU analysis.

Figures 6 through 15 present the breakdown hierarchy of the ten APU subsystems described above.

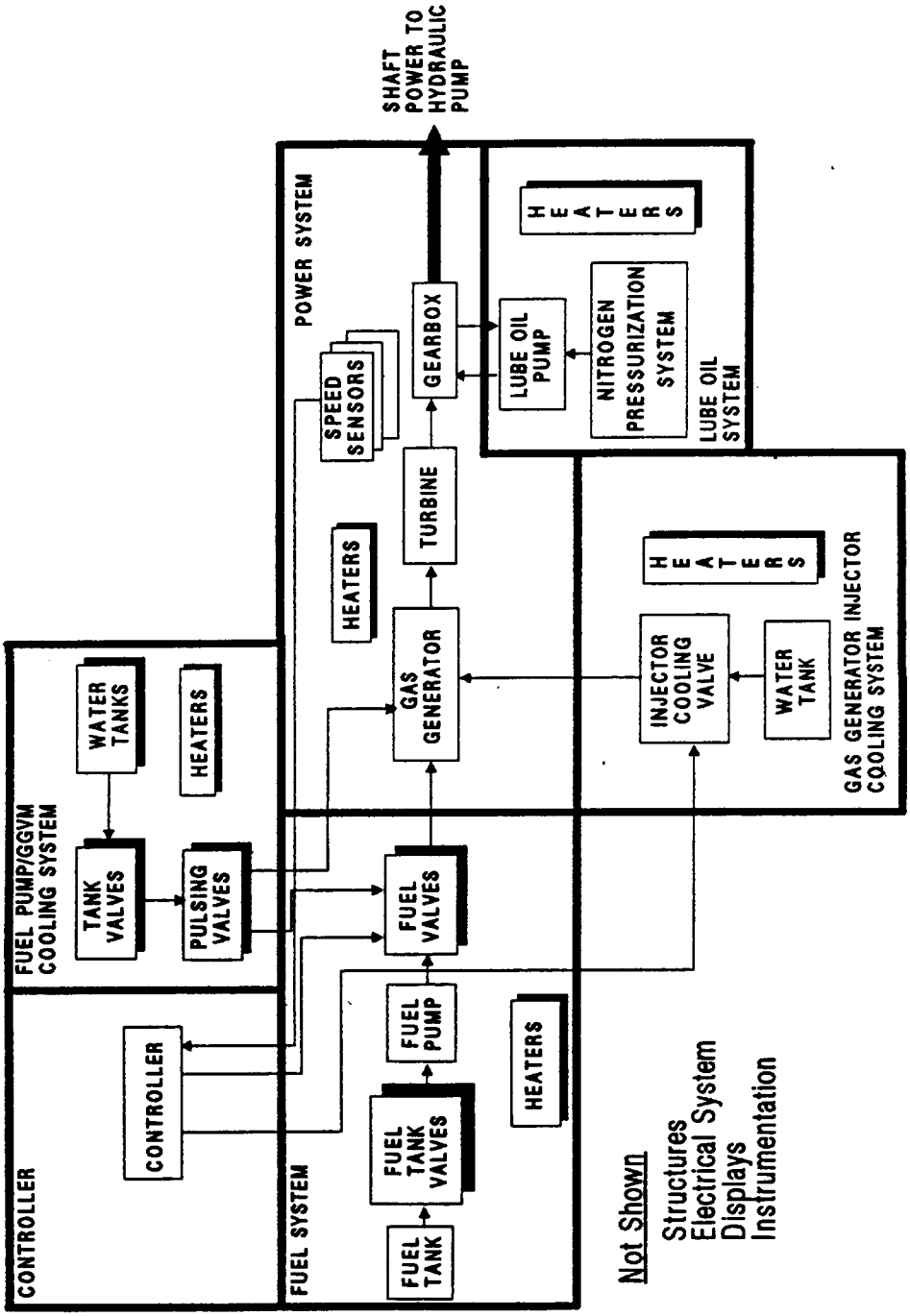


Figure 4 - APU FUNCTIONAL BREAKDOWN

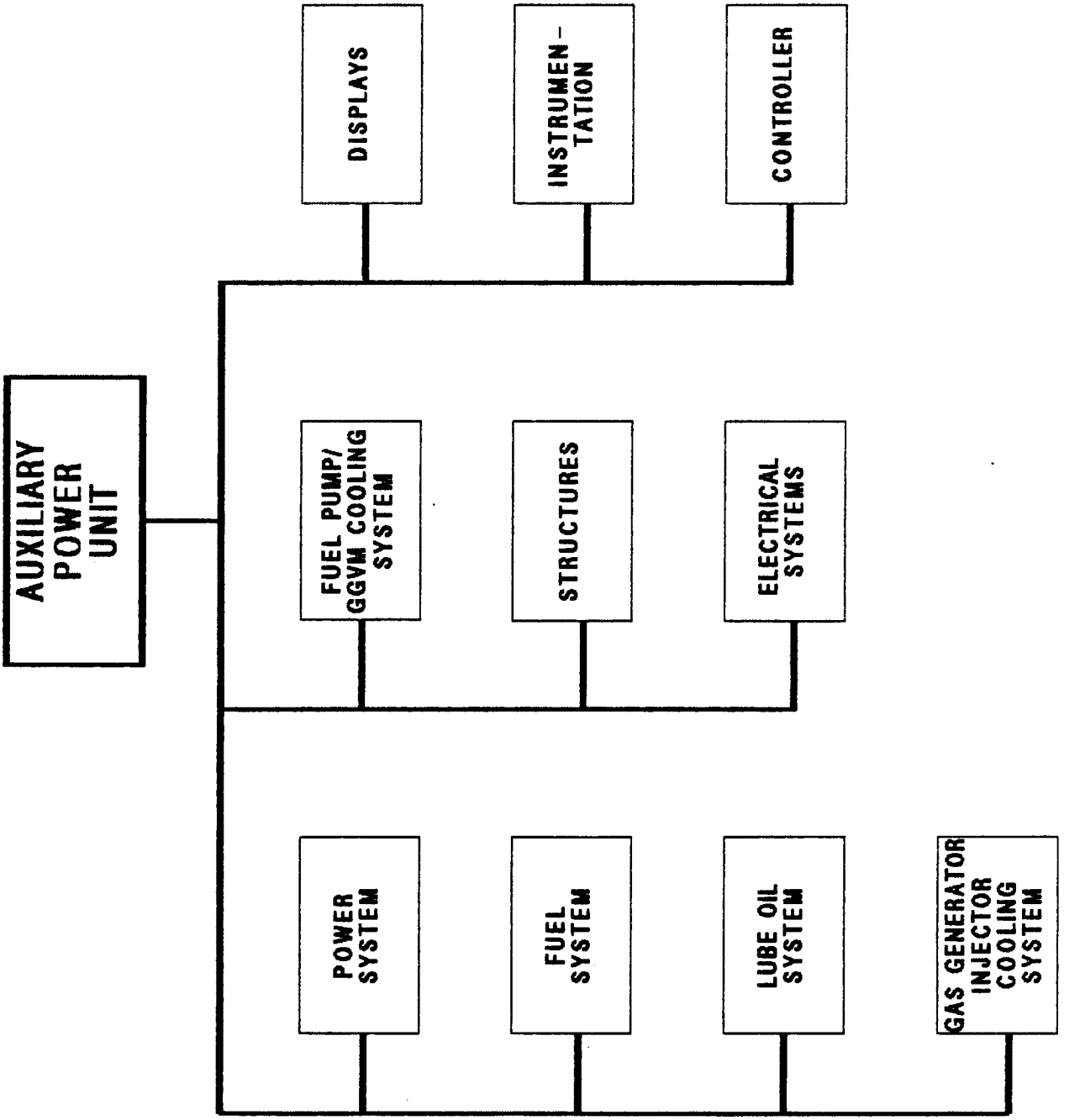


Figure 5 - APU TOP LEVEL HIERARCHY

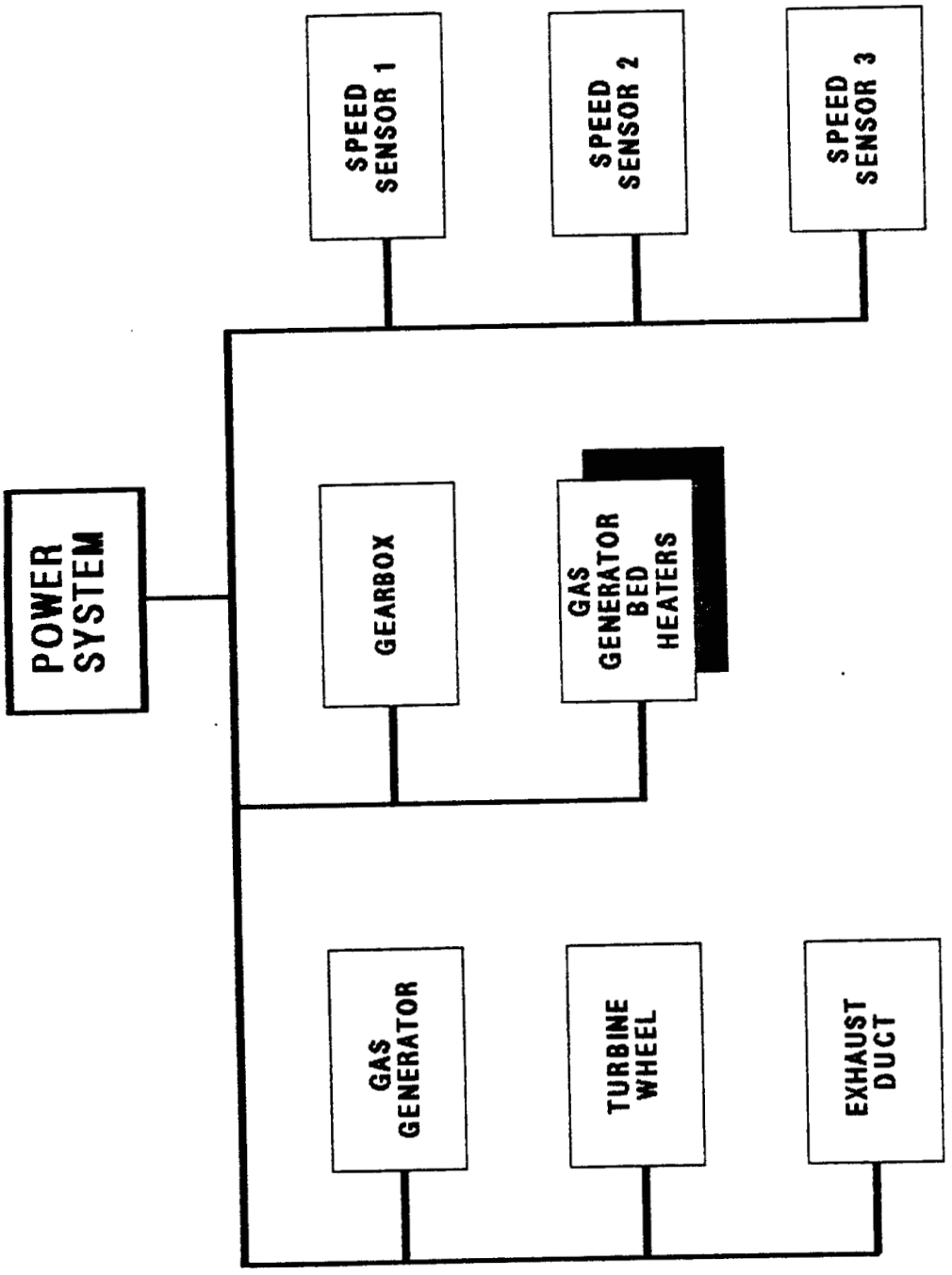


Figure 6 - POWER SYSTEM HIERARCHY

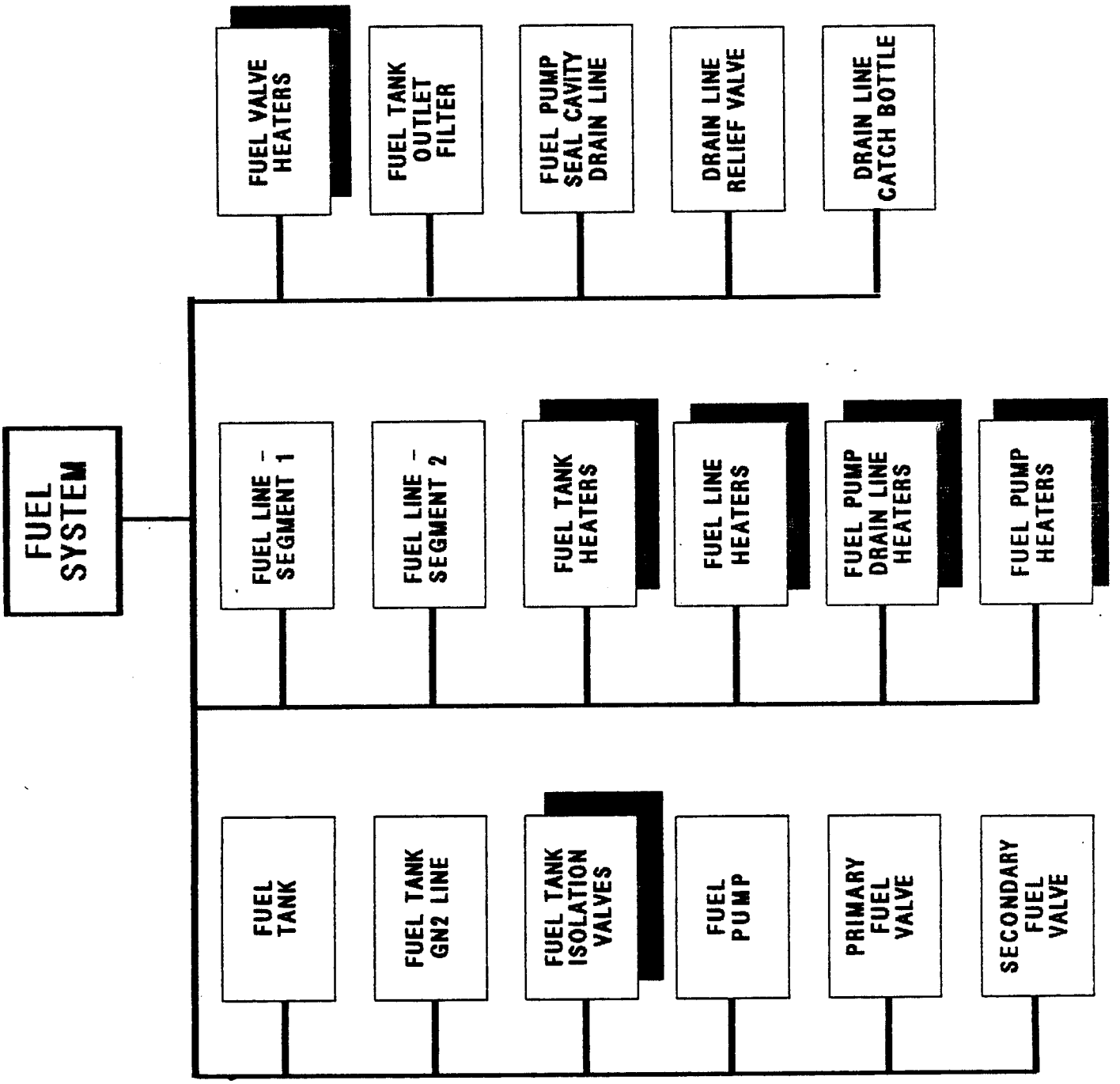


Figure 7 - FUEL SYSTEM HIERARCHY

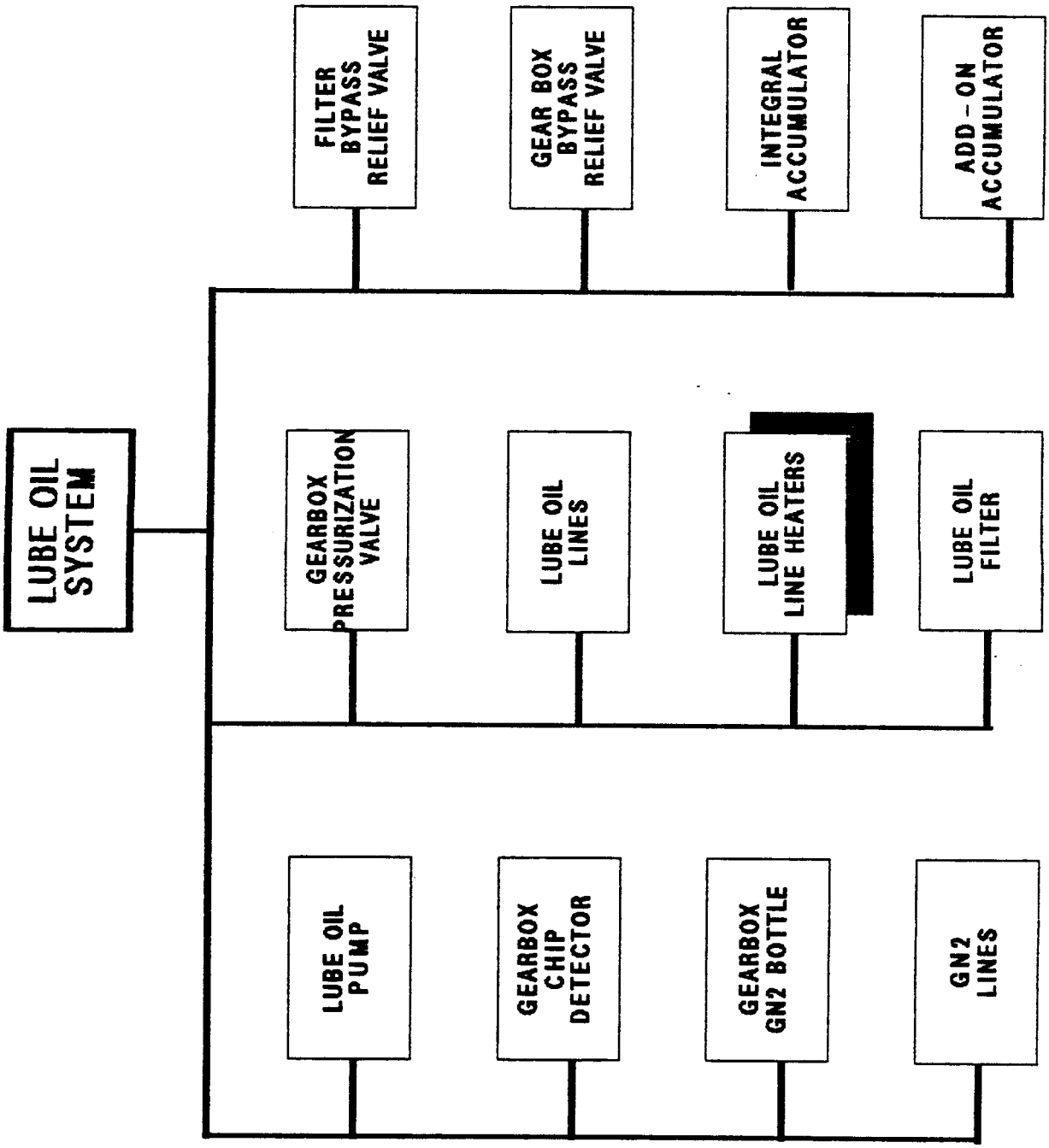


Figure 8 - LUBE OIL SYSTEM HIERARCHY

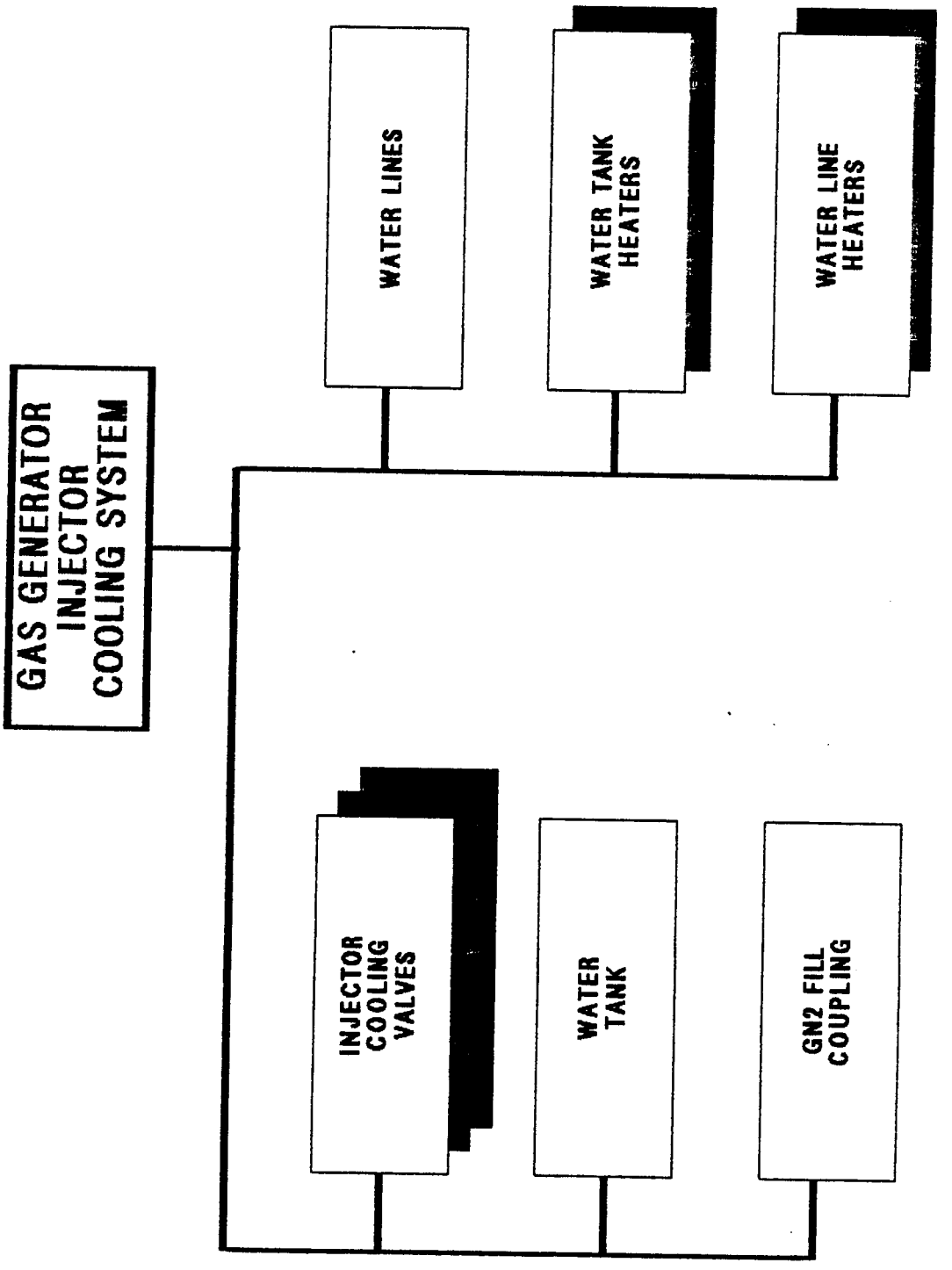


Figure 9 - GAS GENERATOR INJECTOR COOLING SYSTEM HIERARCHY

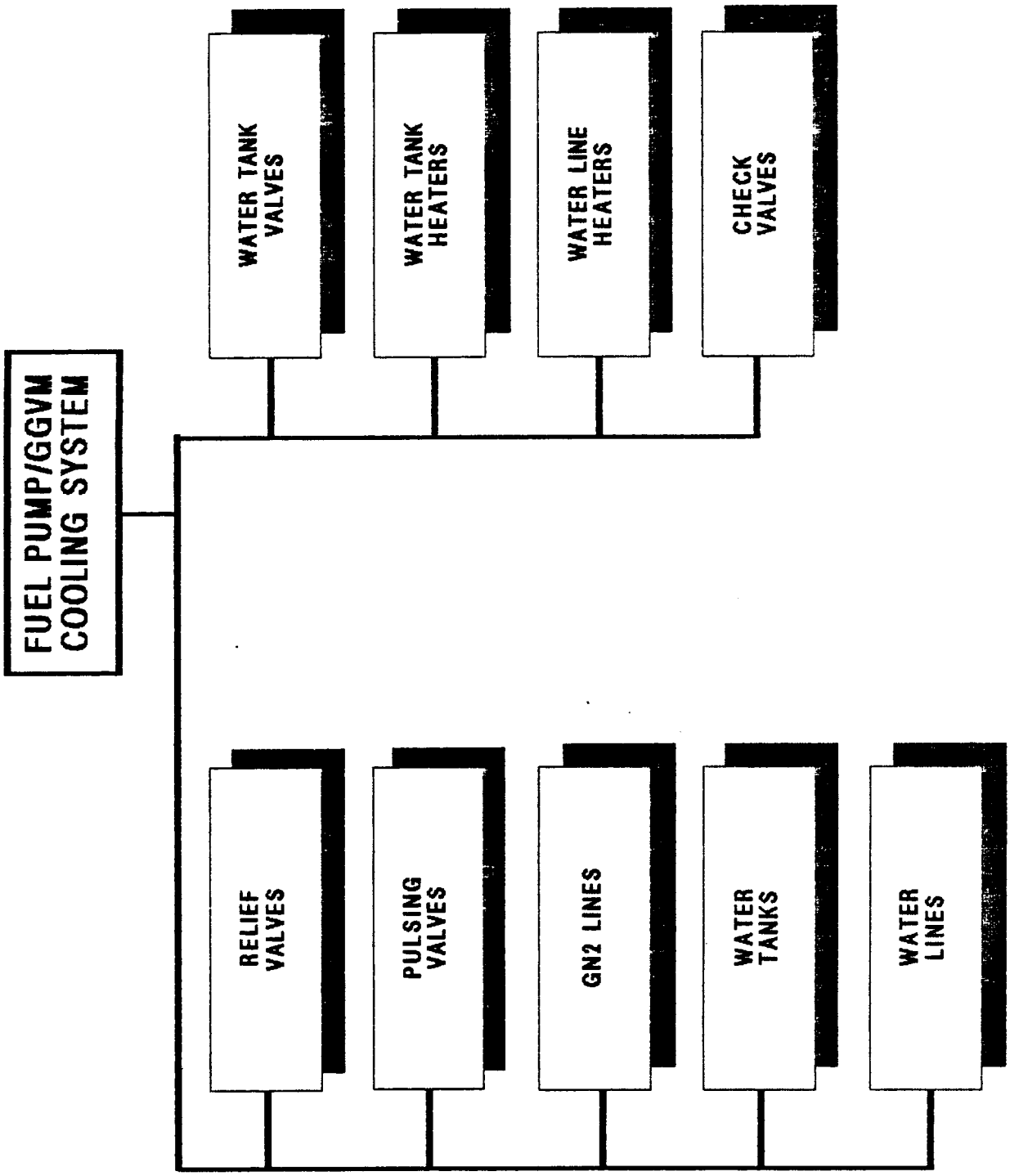


Figure 10 - FUEL PUMP/GGVM COOLING SYSTEM HIERARCHY

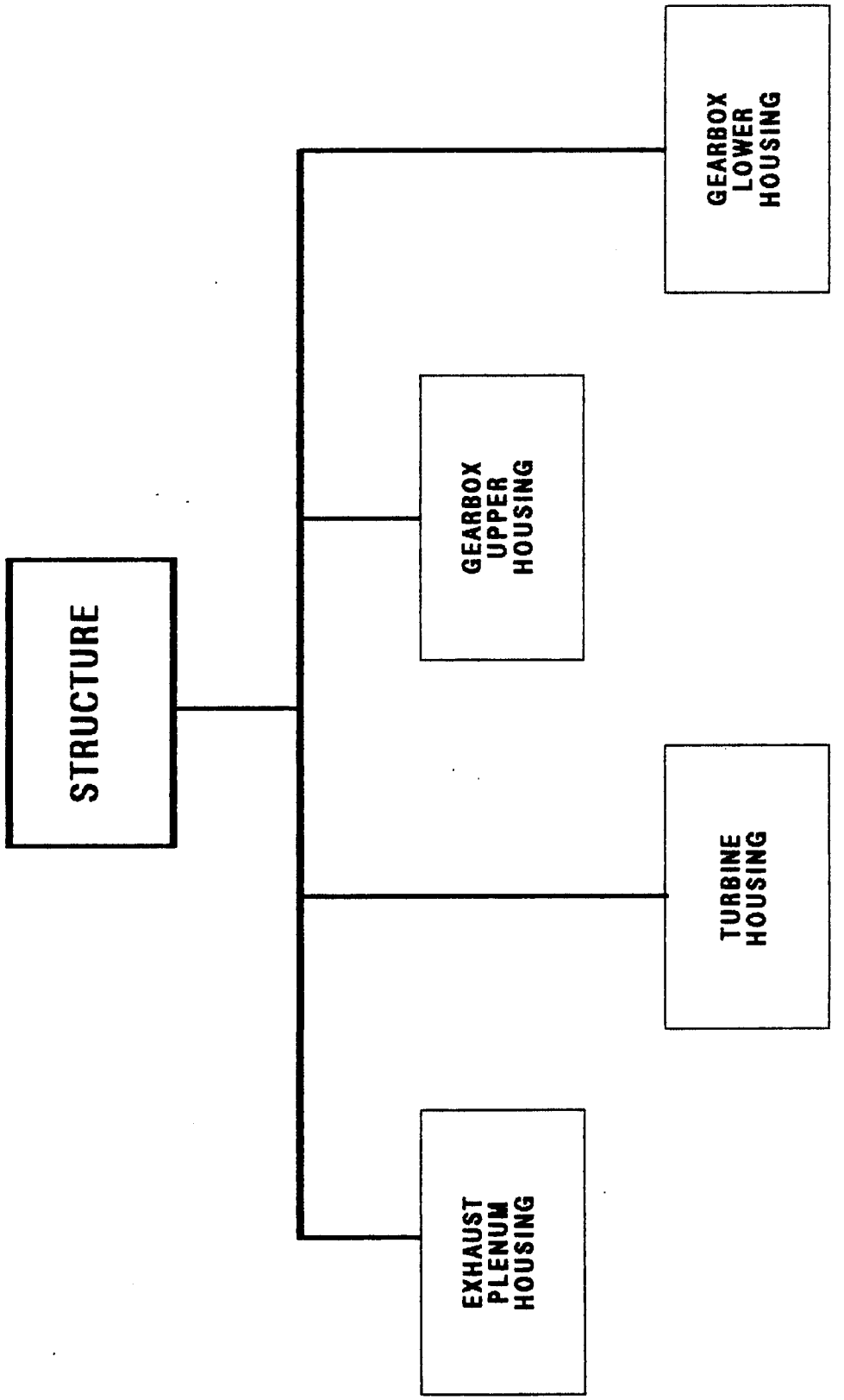


Figure 11 - STRUCTURES HIERARCHY

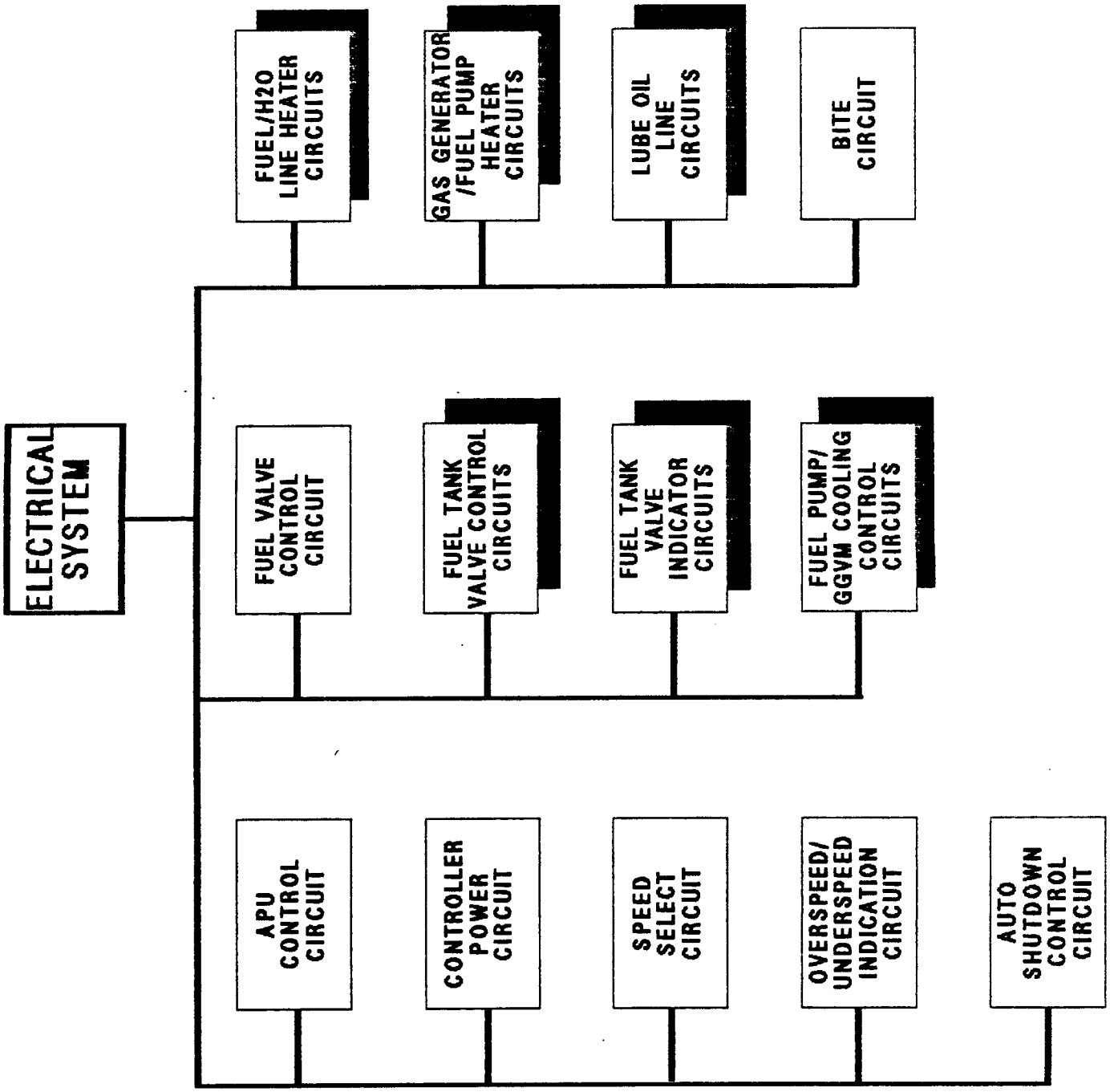


Figure 12 - ELECTRICAL SYSTEM HIERARCHY

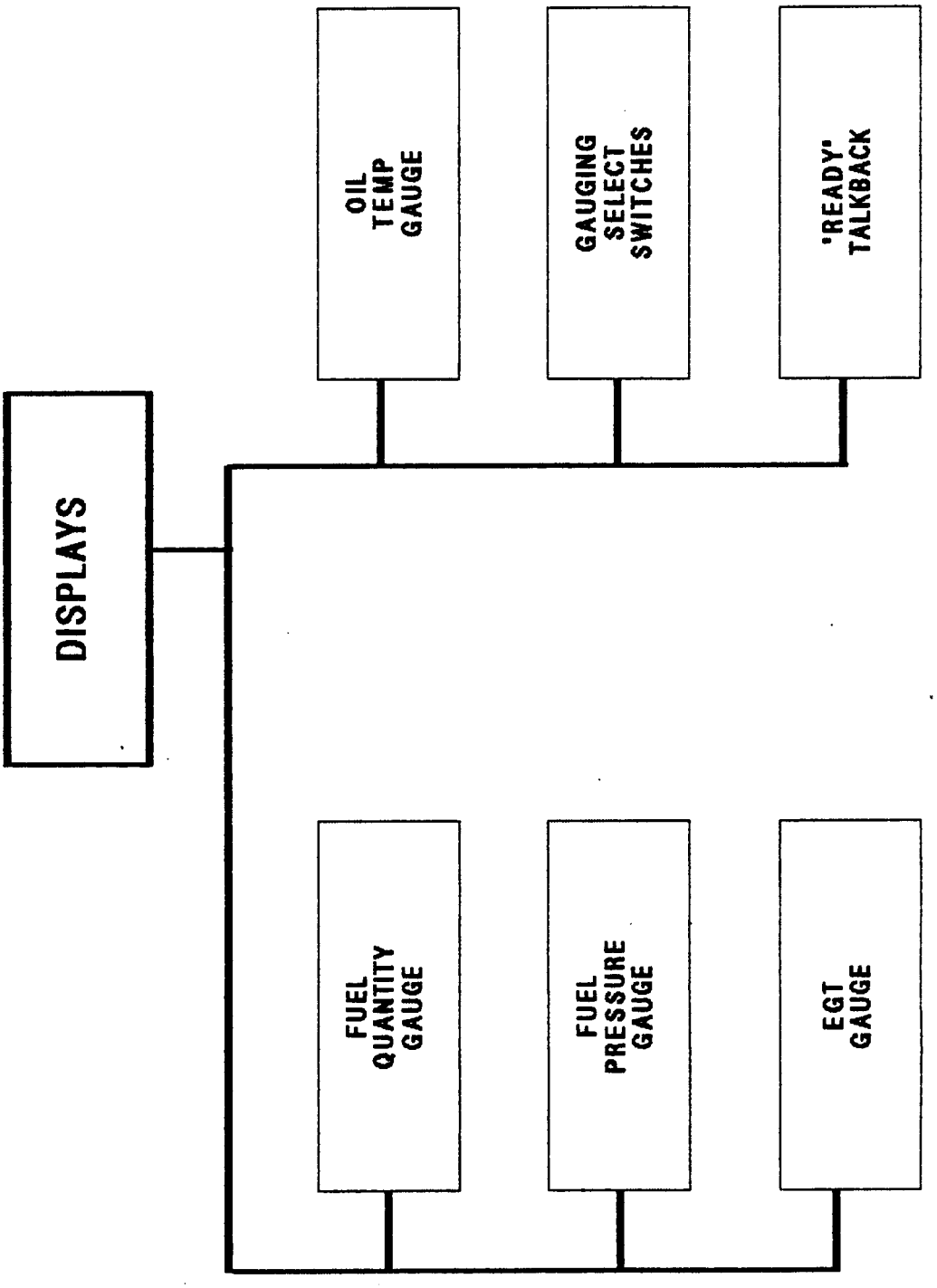


Figure 13 - DISPLAYS HIERARCHY

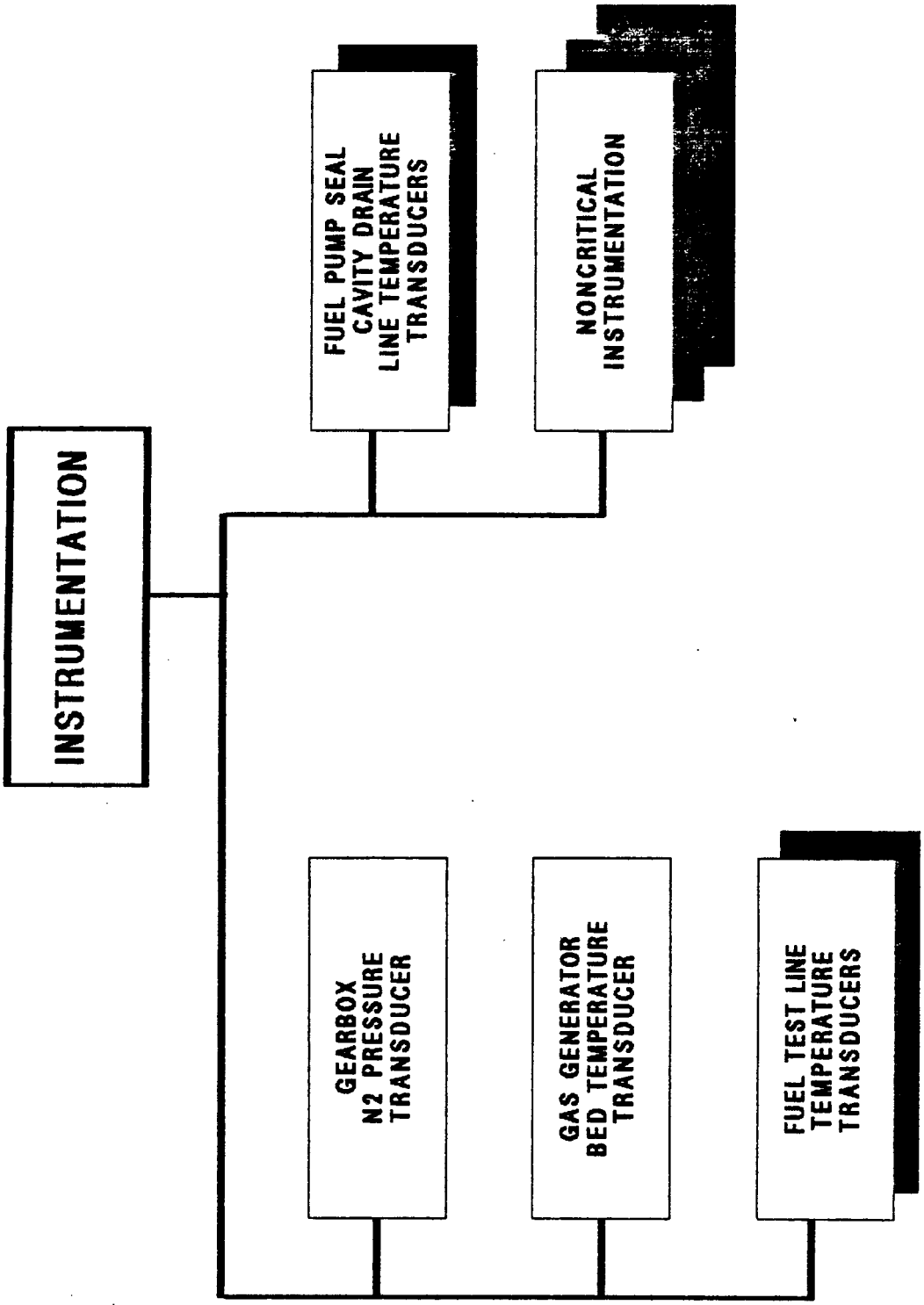


Figure 14 - INSTRUMENTATION HIERARCHY

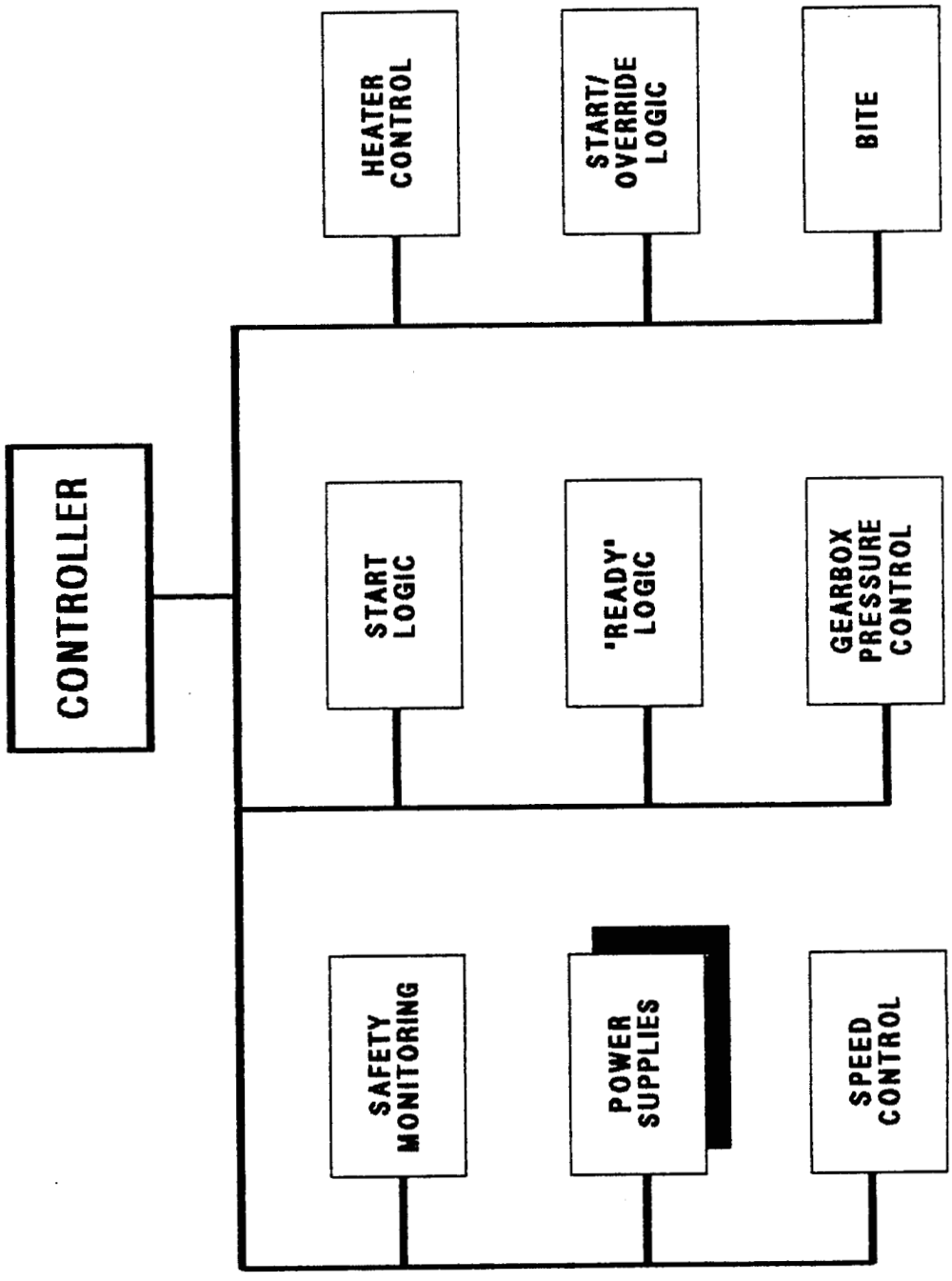


Figure 15 - CONTROLLER HIERARCHY

4.0 ASSESSMENT RESULTS

The IOA analysis of the APU subsystem initially generated 301 failure mode worksheets and identified 149 Potential Critical Items (PCIs) before starting the assessment process. In order to facilitate comparison, forty-three additional failure mode analysis worksheets were generated. These analysis results were compared to the proposed NASA Post 51-L baseline (17 December 1986) of 184 FMEAs and fifty-seven CIL items, and to the proposed NASA Post 51-L EPDC baseline (10 July 1987) of 120 FMEAS and forty-five CIL items. The discrepancy in the number of IOA and NASA FMEAs is due to the different approaches used by NASA and IOA to group failure modes. Upon completion of the assessment, and after a discussion with the NASA subsystem manager, nineteen hardware issues were carried to the NASA/Rockwell FMEA/CIL working group for consideration. These nineteen issues resulted in four new FMEAs being added to the NASA hardware FMEA baseline. An assessment of the EPDC CIL items produced nine issues which were provided to the NASA/Rockwell FMEA/CIL working group for consideration. These nine issues were resolved satisfactorily without adding any FMEAs to the NASA APU EPDC baseline.

The assessment report divides the APU into the same ten subsystems used in the analysis report. The IOA electrical subsystem corresponds to the NASA APU EPDC FMEAs.

At the completion of the assessment, there are two remaining IOA issues. One involves the APU instrumentation, and is a carryover from the original nineteen hardware issues. The other is a new issue which arose as a result of a discrepancy identified between the APU hardware and APU EPDC FMEA criticalities. These two issues are discussed in Sections 4.9 and 4.7, respectively.

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-VA86001-14, Analysis of the Auxiliary Power Unit, 12 December 1986. Appendix F provides a cross-reference between the NASA FMEA and corresponding IOA worksheet(s). IOA recommendations are also summarized.

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 FMEA ASSESSMENT			
Component	NASA	IOA	Issues
Power	12	12	-
Fuel	51	54	7
Lube Oil	16	22	10
GG Injector Cooling	16	16	-
FP/GGVM Cooling	21	21	-
Structure	-	1	1
Electrical	120	121	9
Displays	8	8	-
Instrumentation	48	49	1
Controller	12	12	-
TOTAL	304	316	28

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 CIL ASSESSMENT			
Component	NASA	IOA	Issues
Power	8	8	-
Fuel	29	31	7
Lube Oil	6	8	8
GG Injector Cooling	8	8	-
FP/GGVM Cooling	-	-	-
Structure	-	1	1
Electrical	45	39	9
Displays	-	-	-
Instrumentation	-	-	-
Controller	6	6	-
TOTAL	102	101	25

Table III presents a summary of the IOA recommended 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 RECOMMENDED FAILURE CRITICALITIES

Criticality:	1/1	2/1R	2/2	3/1R	3/2R	3/3	TOTAL
Power	3	4	-	2	-	3	12
Fuel	6	21	-	14	6	7	54
Lube Oil	-	5	-	6	3	8	22
GG Injector Cooling	-	-	-	-	-	16	16
FP/GGVM Cooling	-	-	-	-	-	21	21
Structure	-	1	-	-	-	-	1
Electrical	1	11	3	39	17	50	121
Displays	-	-	-	-	2	6	8
Instrumentation	-	-	-	5	3	41	49
Controller	-	4	-	5	-	3	12
TOTAL	10	46	3	71	31	155	316

Of the failure modes analyzed, 101 were determined to be critical items. A summary of the IOA recommended critical items is presented in Table IV.

Table IV SUMMARY OF IOA RECOMMENDED CRITICAL ITEMS

Criticality:	1/1	2/1R	2/2	3/1R	3/2R	3/3	TOTAL
Power	3	4	-	1	-	-	8
Fuel	6	21	-	3	1	-	31
Lube Oil	-	5	-	3	-	-	8
GG Injector Cooling	-	-	-	-	-	8	8
FP/GGVM Cooling	-	-	-	-	-	-	-
Structure	-	1	-	-	-	-	1
Electrical	1	9	3	23	2	1	39
Displays	-	-	-	-	-	-	-
Instrumentation	-	-	-	-	-	-	-
Controller	-	4	-	1	-	1	6
TOTAL	10	44	3	31	3	10	101

The scheme for assigning IOA assessment (Appendix C) and analysis (Appendix E) worksheet numbers is shown in Table V.

Table V IOA Worksheet Numbers

Component	IOA ID Number
Power	APU-100 to APU-114
Fuel	APU-115 to APU-186, APU-401X, APU-402X
Lube Oil	APU-187 to APU-223, APU-403X
GG Injector Cooling	APU-224 to APU-245, APU-404X
FP/GGVM Cooling	APU-246 to APU-275, APU-405X
Structure	APU-276 to APU-279
Electrical	APU-280 to APU-363, APU-406X to APU-411X, APU-420X to APU-443X
Displays	APU-364 to APU-373
Instrumentation	APU-375 to APU-378, APU-412X to APU-417X
Controller	APU-379 to APU-400, APU-418X, APU-419X

4.1 Power Subsystem Assessment Results

The first assessment between the fourteen IOA failure modes and the Post 51-L NASA FMEA baseline produced one issue. This issue was an external leak in the exhaust duct bellows (MDAC ID 105). The IOA listed this as a separate failure mode, based on the NSTS 22206 rule concerning special lines (paragraph 2.3.7.c). In a meeting held on 29 January 1987, the NASA subsystem manager asserted that this rule did not apply to the APU exhaust duct, since it does not flex or bend while operating. He felt that the existing exhaust duct leakage failure mode was sufficient (FMEA 04-2-L4-11). The IOA agreed to accept this reasoning.

4.2 Fuel Subsystem Assessment Results

The IOA analysis generated seventy-four failure modes for this subsystem (seventy-two original failure modes plus two supplemental failure modes). The initial assessment between the IOA failure modes and the Post-51L NASA FMEA/CIL baseline produced thirty-one issues, including separate failure modes for "special lines" (MDAC ID 178), external leaks from additional components (MDAC ID 117, 129, 144, 150, 175, and 183), a higher criticality for fuel heaters and thermostats failing off (MDAC ID 160, 161, 163, 164, 166, 171, 172, 401X, and 402X), disagreements about redundancy screens (MDAC ID 136, 153, 158, 174, 184, and 185), failure modes not covered by the NASA FMEA baseline (MDAC ID 134 and 143), and various other differences (MDAC ID 127, 155, 170, 176, 177, 180, and 181).

The meeting with the NASA subsystem manager on 29 January 1987 resulted in seven issues which the subsystem manager felt should be considered by the APU FMEA/CIL review working group. These seven issues were failure modes of the fuel pump (MDAC ID 134 and

136), fuel line couplings (MDAC ID 153 and 158), fuel line filter (MDAC ID 174), and fuel pump seal cavity drain system (MDAC ID 178 and 183). The IOA recommended that failure modes be added for the fuel pump relief valve failing to relieve, for a leak in the seal cavity drain flex hose, and for an external leak from the seal cavity drain relief valve. The fuel pump relief valve failure mode was determined by the APU FMEA/CIL review working group to have no effect on the APU. The two seal cavity drain failure modes were incorporated into the NASA FMEA baseline of 24 July 1987.

The IOA recommended that redundancy screen A be passed for the fuel line quick-disconnect coupling, fuel pump filter, and fuel line filter failure modes, since the prelaunch APU run time constitutes checkout of the fuel filters for blockage, and the fuel couplings are capable of checkout by removing their caps. The APU FMEA/CIL review working group did not feel that the prelaunch run time constituted checkout of the fuel filters, and the NASA opinion concerning checkout of quick-disconnect couplings is that if the quick-disconnect itself is not leaking, then there is no way to verify that the cap will not leak. The IOA agrees with this reasoning.

4.3 Lube Oil Subsystem Assessment Results

During the initial assessment, thirty-eight lube oil system failure modes were compared to the Post 51-L NASA FMEA/CIL baseline which produced eighteen issues. These included external leaks from additional components (MDAC ID 195 and 215), failure modes for hardware items not specifically covered by the FMEAs (MDAC ID 188, 189, 203, 216, 217, 218, 219, 221, and 223), a higher criticality for lube oil heaters and thermostats failing off (MDAC ID 210, and 211), disagreements about redundancy screens (MDAC ID 199, 201, 204, and 214), and other differences (MDAC ID 194).

The meeting with the NASA subsystem manager on 29 January 1987 resulted in ten issues which the subsystem manager felt should be considered by the APU FMEA/CIL review working group. These ten issues were failure modes of the gearbox pressurization system (MDAC ID 188 and 195), gearbox oil service couplings (MDAC ID 199, 201, and 204), gearbox internal relief valves (MDAC ID 216, 218, and 219), and gearbox accumulators (MDAC ID 221 and 223). The IOA recommended individual FMEAs for external leaks from the gearbox GN2 bottle and the gearbox pressurization valve. The APU FMEA/CIL working group added these failures as additional causes to the existing FMEAs 04-2-MD19-2 and 04-2-GT11-2, respectively.

The IOA recommended an individual FMEA for failure of the lube oil filter bypass valve to relieve. This failure mode was incorporated into the NASA FMEA baseline of 24 July 1987. The IOA recommended individual FMEAs for the gearbox relief valve failing open and failing to relieve. The APU FMEA/CIL working group ascertained that failure of this valve in the open position would have no effect on the APU, so no additional FMEA was warranted. This is in accordance with the general NASA philosophy of considering the overall gearbox as one component, rather than attempting to write FMEAs for each component inside the gearbox.

The failure of the gearbox relief valve to relieve was judged not to be a credible cause for failure of the APU, so again no additional FMEA was warranted.

The IOA recommended FMEAs covering internal leaks in the two gearbox accumulators. The APU FMEA/CIL working group ascertained that these failure modes would have no effect on the APU, so no additional FMEAs were warranted.

The IOA recommended that the external leak failure modes for the gearbox fill, vent, and drain couplings be shown as passing redundancy screen A because the couplings are capable of checkout and show "NA" for Screen B because the cap can be considered standby redundancy. NASA reasoned that if the quick disconnect coupling itself is not leaking, then there is no way to ascertain whether or not the cap will leak, so Screen A is failed. The IOA accepts this reasoning. NASA also reasons that the quick disconnect is not a standby redundant item, and IOA accepts this reasoning.

During the assessment of the electrical FMEAs (Section 4.7), it was established that a lube oil heater stuck on may lead to loss of an APU. Thus, IOA feels that FMEA 04-2-S18A-2 should show criticality 3/1R, since the effect of it, in combination with a lube oil heater switch contact failed on, would be to cause a lube oil heater to be stuck on.

4.4 Gas Generator Injector Cooling Subsystem Assessment Results

The IOA analysis was based on the philosophy that loss of the injector cooling subsystem represented a 1/1 criticality, since APU hot restart would be required for a sudden deorbit soon after orbit insertion. This produced a large number of 1/1 and 2/1R failure modes.

The NASA FMEAs reflect the philosophy that the injector cooling subsystem is not needed for a normal flight, and that the situation described above, where it is needed, constitutes an intact abort. Therefore, the criticality for loss of the injector cooling subsystem is 3/3, but is 1/1 for intact aborts. The IOA agreed that this is the proper approach to follow in assigning criticalities to failure modes of the injector cooling subsystem.

The IOA analysis produced 23 failure modes for the gas generator injector cooling subsystem. The initial assessment between the IOA failure modes and the post 51-L NASA FMEA/CIL baseline produced no issues.

4.5 Fuel Pump/GGVM Cooling Subsystem Assessment Results

The IOA analysis was based on the philosophy that loss of the entire fuel pump/GGVM cooling subsystem represented a 1/1 criticality, since in this case the APUs might detonate if restarted for a sudden deorbit soon after orbit insertion. This produced a substantial number of 1/1, 2/1R, and 3/1R failure modes. The NASA FMEAs reflect the philosophy that this subsystem is not needed for a normal flight, and that the situation described above, where it is needed, constitutes an intact abort. Therefore, the criticality for loss of the entire fuel pump/GGVM cooling system is 3/3, but is 1/1 for intact aborts. The IOA agreed that this is the proper approach.

The IOA analysis produced 31 failure modes for the fuel pump/GGVM cooling subsystem. The initial assessment between the IOA failure modes and the post 51-L NASA FMEA/CIL baseline produced six issues, all involving failure modes not covered by the baseline FMEAs. These failure modes included external leakage from the water relief valve (MDAC ID 248), blockage at the water line filter (MDAC ID 261), leakage at the water line flex hose (MDAC ID 262), leakage into the water tank isolation valve solenoid (MDAC ID 266), and the fail open and fail closed modes of the water line check valve (MDAC ID 274 and 275).

The meeting with the NASA subsystem manager on 29 January 1987 resulted in all these issues being dropped, due to the overall lack of criticality of the fuel pump/GGVM cooling subsystem and to the fact that all the failure effects involved could be considered to be covered as part of the existing FMEAs.

4.6 Structure Subsystem Assessment Results

During the initial assessment, four structure failure modes were compared to the post 51-L NASA FMEA/CIL baseline, which produced two issues, both involving failure modes not covered by the baseline FMEAs. These failure modes were external leaks from the APU turbine housing (MDAC ID 276) and cracking of the APU turbine housing (MDAC ID 277).

The meeting with the NASA subsystem manager on 29 January 1987 resulted in these two issues being combined into one failure mode, leakage of the APU turbine housing. IOA recommended a criticality of 1/1, but the subsystem manager insisted on a criticality of 2/1R because the turbine housing is of two-walled construction. The resulting failure mode was incorporated into the NASA FMEA baseline of 24 July 1987.

4.7 Electrical Subsystem Assessment Results

The IOA analysis generated 114 failure modes for the electrical subsystem (84 original failure modes, plus 30 supplemental failure modes generated to match the revised CIL produced by the APU EPDC FMEA/CIL review working group). The APU EPDC FMEAs were completely re-done, to a greater level of detail, in the FMEA/CIL review working group meetings, but only the CIL items were available to the IOA for full review. The non-CIL items were assessed based on partial information (hardware item identification, failure mode, and criticality).

The initial assessment between the IOA baseline and the NASA APU EPDC CIL baseline of 10 July 1987 produced nine issues. These issues were provided to the APU EPDC FMEA/CIL review working group for consideration.

The IOA recommended a 3/3 criticality for failure modes resulting in lube oil heaters being stuck on (MDAC ID 361, 432X, and 433X), since this is the criticality shown in the hardware FMEAs for lube oil heaters and thermostats. The working group was aware of recent concerns that overheated lube oil might solidify on orbit and block lube oil circulation at a subsequent APU restart. These FMEAs will remain 2/1R pending the outcome of lube oil overheating tests. The hardware FMEAs should match the electrical FMEAs, of course, so APU hardware FMEA 04-2-S18A-2 should be set at criticality 3/1R, rather that 3/3. The IOA is showing this as a remaining outstanding IOA issue.

IOA recommended a criticality of 2/2 for open circuit failure of the gas generator/fuel pump power isolation diode. The working group correctly pointed out that two failures are required to cause loss of the redundant heaters for one APU, so the criticality stands as originally established, at 3/2R.

IOA recommended a new CIL covering the stuck on failure mode of the type IV hybrid driver in the gas generator heater power circuit, because it is criticality 3/1R and fails redundancy screen B (MDAC ID 439X). The working group pointed out that this is the thermostat driver and thus would be detectable if it failed on, since the heater would be on while the "heater on" command from the APU controller was absent. Thus it passes screen B and escapes the CIL. The IOA disagreed with the sequence of failures for the short circuit failure mode of the APU controller power circuit switch scan isolation diode (MDAC ID 429X) and claimed that the failure mode passes redundancy screen B. The working group called the control bus voltage difference that blows the fuses a second failure, rather than a pre-existing condition, meaning that the diode short has no immediate effect and is, therefore, not detectable. The IOA concurred with this reasoning. The IOA pointed out that a short circuit in the APU start circuit circulation pump inhibit circuit is of 1/1 criticality only in the event of an APU hot restart (i.e., an abort), so the criticality should be 3/3, with 1/1 for intact

abort. The working group felt it should keep this FMEA at a criticality of 1/1 to emphasize its importance.

The IOA assessed a criticality of 2/1R for the short circuit failure of the tank/fuel line heater power circuit switch scan isolation diode (MDAC ID 434X), based on considering a control bus voltage difference a pre-existing condition, rather than a related failure, and showing redundant heaters failed off as the effect. The working group considers the control bus voltage difference a related failure, and sets the criticality at 3/1R based on a failure sequence leading to a heater stuck on. IOA agrees with the NASA FMEA.

As a result of the APU EPDC FMEA/CIL review working group meetings, all nine issues were resolved.

4.8 Displays Subsystem Assessment Results

During the initial assessment, 10 display subsystem failure modes were compared to the post 51-L NASA FMEA/CIL baseline. This assessment produced no issues.

4.9 Instrumentation Subsystem Assessment Results

The IOA analysis consolidated all 3/3 instrumentation failure modes into one FMEA, as allowed by NSTS-22206, Rule 2.3.6.a. This is the reason for the large discrepancy in number of FMEAs between the IOA and NASA.

The IOA analysis generated 10 failure modes for this subsystem (4 original failure modes plus 6 supplemental failure modes). The initial assessment between the IOA failure modes and the post 51-L NASA FMEA/CIL baseline produced six issues, including the gas generator bed temperature sensor (MDAC ID 375) and several fuel line temperature sensors (MDAC ID 376, 377, 412X, 413X, and 417X).

The meeting with the NASA subsystem manager on 29 January 1987 resulted in one outstanding issue in this subsystem. The IOA had recommended a criticality of 3/1R for failure of the gas generator bed temperature sensor (MDAC ID 375), based on its importance in the APU logic. The subsystem manager pointed out that this sensor was to be removed from the APU start-up logic prior to the next flight. The IOA agreed with the NASA FMEA criticality of 3/3. The IOA showed failure modes of the fuel test line temperature sensors (MDAC ID 376 and 412X) and fuel pump seal cavity drain line temperature sensors (MDAC ID 377 and 413X) failing redundancy screen C, because redundant sensors were mounted on a common clamp. The subsystem manager pointed out that this design was to be changed to individual clamps prior to the next flight. IOA agreed with the NASA FMEA that screen C was passed.

IOA pointed out that no FMEAs existed covering failure of the fuel pump bypass line temperature sensors (MDAC ID 417X) which the IOA recommended at criticality 3/2R based on possible curtailment of orbit activities if insight into fuel line temperatures is lost. The subsystem manager agreed that this failure mode was not covered, but stated that consideration of APU instrumentation FMEAs had been deferred indefinitely to allow completion of the review of higher priority FMEAs. This remains as an IOA issue pending NASA review of the instrumentation FMEAs.

4.10 Controller Subsystem Assessment Issues

The IOA analysis produced 24 failure modes for the APU controller (22 original failure modes plus 2 supplemental failure modes). The initial assessment between the IOA failure modes and the post 51-L NASA FMEA/CIL baseline produced eight issues. One of these issues involved a disagreement on criticality (MDAC ID 385), and the rest involved failure modes not covered by the NASA FMEA baseline (MDAC ID 381, 386, 387, 391, 396, 397, and 399).

The meeting with the NASA subsystem manager on 29 January 1987 resulted in the resolution of all these issues. The IOA had recommended setting the criticality of a failed on output from the controller high speed control circuit at 2/1R, based on being one failure away from APU overspeed. The subsystem manager established that an APU overspeed was in actuality two failures away, confirming the NASA FMEA criticality of 3/1R.

With regard to the additional failure modes, the subsystem manager pointed out that the current philosophy of the NASA FMEAs was to include failures in controller outputs only and to exclude purely internal controller failures. He also stated that a comprehensive APU controller FMEA would eventually be developed. Thus, these seven issues were rejected. The additional failure modes included controller power supply failure (MDAC ID 381), APU start-up logic output fails off (MDAC ID 386), APU start-up logic output fails on (MDAC ID 387), gearbox pressure control output fails on (MDAC ID 391), APU start override logic output fails off (MDAC ID 396), APU start override logic output fails on (MDAC ID 397), and APU injector cooling command fails on (MDAC ID 399). The failure modes involving controller outputs can be considered covered as part of the existing FMEAs.

5.0 REFERENCES

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

1. JSC-11174, Space Shuttle Systems Handbook, Rev. C., DCN-5, 9/13/85.

2. VS70-946099, Rockwell International Integrated System Schematic Orbiter OV099-APU, Rev. A09, 5/10/85.

3. JSC-18341, Mechanical Systems Console Handbook, Vol. II - Systems Briefs Basic, Rev. A, PCN-3, 2/7/86.

4. JSC-08171, Space Shuttle Operations and Maintenance Requirements and Specification Document, V46 File III APU, 4/15/86.

5. JSC-12820, STS Operational Flight Rules Baseline, 9/1/87.

6. JSC-12770, Shuttle Flight Operations Manual, Vol. 9, Auxiliary Power Unit/Hydraulics Basic, 3/16/81.

7. APU/HYD TM 2101, APU?Hydraulics System Training Manual, 11/85.

8. V070-465XXX, Rockwell International APU Installation Drawings.

9. NSTS-22206, National Space Transportation System Instructions for Preparation of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL), 10/10/86.

10. VS70-460109, Rockwell International Schematic Diagram - Auxiliary Power Unit Subsystem, Rev. G, 1/27/87.

11. Rockwell specifications for APU:

a. MC201-0001	Auxiliary Power Unit
b. MC271-0080	Exhaust Duct
c. MC282-0084	APU Subsystem Diaphragm Fuel Tank
d. MC284-0431	H_2O Relief Valve
e. MC286-0051	Fuel Filter
f. MC363-0025	Fuel Tank Electrical Heater
g. MC363-0026	Fuel Line Electrical Heater
h. MC363-0027	Oil Line Electrical Heater
i. MC450-0017	Remote Power Controller
j. Mc452-0147	Thermal Switch
k. MC477-0261	150 Milliamp Hybrid Driver Controller
l. MC477-0262	Time Delay Hybrid Driver
m. MC477-0263	5 Amp Hybrid Driver Controller
n. MC621-0038	Water Boiler Quick Disconnects
o. ME271-0079	Medium and High Pressure Hydraulic Hose Assemblies
p. ME271-0030	Servicing Coupling

q. ME276-0032 Test Point Coupling
r. ME282-0100 Positive Expulsion Tank
s. ME284-0543 Drain Valve
t. ME284-0544 Relief Valve
u. ME284-0552 H_2O Solenoid Valve
v. ME284-0558 Fuel Tank Valve
w. ME360-0017 Snap Action Thermostat
x. ME449-0150 Piezoelectric Accelerometer
y. ME449-0160 Surface Temperature Sensor
z. ME449-0177 Low/Medium/High Range Pressure Transducer
aa. ME449-0187 Tip Sensitive Temperature Sensor
bb. ME451-0018 Subminiature Fuse
cc. ME452-0102 Hermetically Sealed Toggle Switch

12. Sundstrand Aviation Drawings - 7XXXXX.

13. RE-1882A, Sundstrand Aviation Failure Mode Effects Analysis of the Auxiliary Power Unit Model APU01, 7/19/76.

14. JSC Report M4001002, Auxiliary Power Unit Full Problem Record (FPR), 7/17/86.

15. MDAC IOA APU Working Paper 1.0-WP-VA86001-14, 12/12/86.

16. STS-82-0027, Orbiter Vehicle Operational Configuration Failure Mode Effects Analysis Auxiliary Power Unit Subsystem, Change 2, 1/28/83.

17. STS82-0033, Orbiter Vehicle Operational Configuration Failure Mode Effects Analysis Auxiliary Power Unit Subsystem Electrical Power Distribution and Control, 1/19/84.

18. APU FMEA/CIL Review Presentation of Results, 12/16/86.

19. APU Phase I FMEA/CIL/OMRSD CCB, 4/22/87.

20. APU EPDC CIL Review, 7/10/87.

21. APU FMEA/CIL Review Presentation of Results, 7/24/87.

22. APU FMEA/CIL Review Presentation of Results, 8/21/87.

23. Auxiliary Power Unit Subsystem (APUS) FMEA/CIL Review, Vol. I - Hardware, 10/2/87.

24. Auxiliary Power Unit Subsystem (APUS) FMEA/CIL Review, Vol. II - Electrical Power, Displays, and Control (EPD&C), 10/2/87.

APPENDIX A
ACRONYMS

AOA	- Abort-Once-Around
APU	- Auxiliary Power Unit
ATO	- Abort-To-Orbit
BITE	- Built-In Test Equipment
CCB	- Change Control Board
CIL	- Critical Items List
CRT	- Cathode-Ray Tube
DCN	- Document Change Notice
EGT	- Exhaust Gas Temperature
EPDC	- Electrical Power, Distribution and Control
F	- Fahrenheit, Functional
FM	- Failure Mode
FMEA	- Failure Modes and Effects Analysis
FP	- Fuel Pump
FPR	- Full Problem Record
GFE	- Government Furnished Equipment
GG	- Gas Generator
GGVM	- Gas Generator Valve Module
GN2	- Gaseous Nitrogen
H2O	- Water
HW	- Hardware
ID	- Identification
IOA	- Independent Orbiter Assessment
LCA	- Load Controller Assembly
MDAC	- McDonnell Douglas Astronautics Company
MDM	- Multiplexer/Demultiplexer
N2	- Nitrogen
NA	- Not Applicable
NASA	- National Aeronautics and Space Administration
NH3	- Ammonia
NSTS	- National Space Transportation System
OMRSD	- Operational Maintenance Requirements and Specifications Document
PCI	- Potential Critical Item
PCN	- Page Change Notice
psia	- Pounds per Square Inch Absolute
RTLS	- Return-to-Launch Site
STS	- Space Transportation System
STSEOS	- Space Transportation System Engineering and Operations Support
TAL	- Transatlantic Abort Landing
WSB	- Water Spray Boiler

APPENDIX B

DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

APPENDIX B
DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.1 Definitions

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

INTACT ABORT DEFINITIONS:

RTLS - begins at transition to OPS 6 and ends at transition to OPS 9, post-flight

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

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

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

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

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

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

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

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

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

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

MISSION - assigned performance of a specific Orbiter flight with payload/objective accomplishments including orbit phasing and altitude (excludes secondary payloads such as GAS cans, middeck P/L, etc.)

MULTIPLE ORDER FAILURE - describes the failure due to a single cause or event of all units which perform a necessary (critical) function

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

OPS - software operational sequence

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

PHASE DEFINITIONS:

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

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

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

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

LANDING/SAFING PHASE - begins at first main gear touchdown and ends with the completion of post-landing safing operations

APPENDIX B
DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.2 IOA Project Level Ground Rules and Assumptions

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

1. The operational flight software is an accurate implementation of the Flight System Software Requirements (FSSRs).

   RATIONALE: Software verification is out-of-scope of this task.

2. After liftoff, any parameter which is monitored by system management (SM) or which drives any part of the Caution and Warning System (C&W) will support passage of Redundancy Screen B for its corresponding hardware item.

   RATIONALE: Analysis of on-board parameter availability and/or the actual monitoring by the crew is beyond the scope of this task.

3. Any data employed with flight software is assumed to be functional for the specific vehicle and specific mission being flown.

   RATIONALE: Mission data verification is out-of-scope of this task.

4. All hardware (including firmware) is manufactured and assembled to the design specifications/drawings.

   RATIONALE: Acceptance and verification testing is designed to detect and identify problems before the item is approved for use.

5. All Flight Data File crew procedures will be assumed performed as written, and will not include human error in their performance.

   RATIONALE: Failures caused by human operational error are out-of-scope of this task.

6. All hardware analyses will, as a minimum, be performed at the level of analysis existent within NASA/Prime Contractor Orbiter FMEA/CILs, and will be permitted to go to greater hardware detail levels but not lesser.

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

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

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

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

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

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

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

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

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

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

    RATIONALE: Clarify definition of emergency systems to ensure consistency throughout IOA project.

APPENDIX B
DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.3 APU-Specific Ground Rules and Assumptions

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

1. The APU Controller was analyzed only to the functional level.

   RATIONALE: This is in keeping with the NASA and Rockwell analyses, and is due to lack of adequate data, and resource and schedule constraints.

2. Couplings with caps were considered as one unit for analysis purposes.

   RATIONALE: This simplified the analysis, and took into account the worst case failure (external leak).

3. Switches were analyzed as failing totally open or totally closed, regardless of the number of switch contacts. For multiposition switches, the analysis considered the worst-case position for failed-on cases.

   RATIONALE: This simplified the analysis, and took into account the worst case failure (failure of all contacts is worse than failure of any one contact).

4. Fuel line temperature sensor failures were considered criticality 3/3, except in cases where fewer than 3 sensors were available to monitor the status of a particular fuel line heater.

   RATIONALE: This was to avoid classifying all fuel line temperature sensor failures as 3/1R or greater, based on loss of detection of a failed-on heater.

5. The APU Fuel Pump/GGVM Cooling System and Gas Generator Injector Cooling System failures were assigned criticalities based on the effects of the failure during a flight situation where these cooling systems were required to be used.

   RATIONALE: This approach considered the worst case effects of loss of a system - loss of that system under circumstances where use of the system is required.

APPENDIX C
DETAILED ASSESSMENT

This section contains the IOA assessment worksheets generated during the assessment of this subsystem. 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: 12/10/86
ASSESSMENT ID: APU-100
NASA FMEA #: 04-2-GG11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 100
ITEM: GAS GENERATOR

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-101
NASA FMEA #: 04-2-GG11-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 101
ITEM: GAS GENERATOR

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-102
NASA FMEA #: 04-2-TR12-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 102
ITEM: TURBINE WHEEL

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-103
NASA FMEA #: 04-2-TR11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 103
ITEM: TURBINE WHEEL

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-104
NASA FMEA #: 04-2-L4-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 104
ITEM: EXHAUST DUCT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-105
NASA FMEA #: 04-2-L4-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 105
ITEM: EXHAUST DUCT BELLOWS

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT LIST EXHAUST DUCT BELLOWS AS SEPARATE ITEM. IOA CONCURS WITH NASA DECISION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-106
NASA FMEA #: 04-2-GT11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 106
ITEM: GEARBOX

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-107
NASA FMEA #: 04-2-HR13-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 107
ITEM: GAS GENERATOR BED HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA HAS NEW TEST DATA WHICH SHOWS APU CAN BE STARTED SAFELY WITH COLD GAS GENERATOR BED. IOA ACCEPTS NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-108
NASA FMEA #: 04-2-HR13-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 108
ITEM: GAS GENERATOR BED HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA DID NOT LIST THIS AS A SEPARATE FAILURE MODE. SINCE HEATER LOSS IS 3/3, IOA ACCEPTS NASA FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-109
NASA FMEA #: 04-2-HR13-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 109
ITEM: GAS GENERATOR BED HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA HAS NEW TEST DATA WHICH SHOWS APU CAN BE STARTED SAFELY WITH COLD GAS GENERATOR BED. IOA ACCEPTS NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-110
NASA FMEA #: 04-2-S111-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 110
ITEM: GAS GENERATOR BED HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA HAS NEW TEST DATA WHICH SHOWS APU CAN BE STARTED SAFELY WITH COLD GAS GENERATOR BED. IOA ACCEPTS NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-111 BASELINE [ ]
NASA FMEA #: 04-2-S111-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 111
ITEM: GAS GENERATOR BED HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-112
NASA FMEA #: 04-2-MPU1-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 112
ITEM: MAGNETIC PICKUP UNIT 1

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-113
NASA FMEA #: 04-2-MPU2-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 113
ITEM: MAGNETIC PICKUP UNIT 2

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-114
NASA FMEA #: 04-2-MPU3-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 114
ITEM: MAGNETIC PICKUP UNIT 3

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-115
NASA FMEA #: 04-2-TK11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 115
ITEM: FUEL TANK

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-116
NASA FMEA #: 04-2-TK11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 116
ITEM: FUEL TANK

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA LISTED FUEL LEAK AND RUPTURE AS SEPARATE FAILURE MODES. NASA COVERED BOTH AS ONE FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-117
NASA FMEA #: 04-2-TK11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 117
ITEM: FUEL TANK

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[NA]	[NA]	[NA]	[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:
NASA DID NOT LIST THIS FAILURE MODE SEPARATELY FROM FUEL LEAK.
IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-118
NASA FMEA #: 04-2-TK11-12

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 118
ITEM: FUEL TANK

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-119
NASA FMEA #: 04-2-L3-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 119
ITEM: FUEL TANK GN2 LINE

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-120
NASA FMEA #: 04-2-MD12-13

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 120
ITEM: FUEL TANK GN2 FILL COUPLING

LEAD ANALYST: J. BARNES

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONSIDERED COUPLING AND CAP AS ONE UNIT. NASA CONSIDERED CAP AS REDUNDANT ITEM. IOA ACCEPTS NASA CRITICALITY, AND NASA REDUNDANCY SCREENS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-121
NASA FMEA #: 04-2-MD12-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 121
ITEM: FUEL TANK GN2 FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-122
NASA FMEA #: 04-2-LV11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 122
ITEM: FUEL TANK ISOLATION VALVE

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-123
NASA FMEA #: 04-2-LV11-12

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 123
ITEM: FUEL TANK ISOLATION VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA ANALYSIS DID NOT CONSIDER FUEL VALVE AS REDUNDANT TO FUEL TANK ISOLATION VALVE. IOA CONCURS WITH NASA CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-124
NASA FMEA #: 04-2-LV11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 124
ITEM: FUEL TANK ISOLATION VALVE

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-125 BASELINE [ ]
NASA FMEA #: 04-2-LV11-10 NEW [X]

SUBSYSTEM: APU
MDAC ID: 125
ITEM: FUEL TANK ISOLATION VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-126
NASA FMEA #: 04-2-LV11-10

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 126
ITEM: FUEL TANK ISOLATION VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-127
NASA FMEA #: 04-2-LV11-14

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 127
ITEM: FUEL TANK ISOLATION VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-128
NASA FMEA #: 04-2-PP11-10

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 128
ITEM: FUEL PUMP

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-129
NASA FMEA #: 04-2-PP11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 129
ITEM: FUEL PUMP

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ACCEPTS NASA ANALYSIS. FUEL PUMP EXTERNAL LEAK IS COVERED IN HAZARD ANALYSIS, AND THIS IS REFERENCED IN FMEA 04-2-PP11-11.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-130
NASA FMEA #: 04-2-PP11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 130
ITEM: FUEL PUMP

LEAD ANALYST: J. BARNES

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: 12/10/86
ASSESSMENT ID: APU-131
NASA FMEA #: 04-2-PP11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 131
ITEM: FUEL PUMP BYPASS VALVE

LEAD ANALYST: J. BARNES

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 ANALYSIS DID NOT CONSIDER THIS ITEM SEPARATELY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-132
NASA FMEA #: 04-2-PP11-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 132
ITEM: FUEL PUMP BYPASS VALVE

LEAD ANALYST: J. BARNES

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: 12/10/86
ASSESSMENT ID: APU-133
NASA FMEA #: 04-2-PP11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 133
ITEM: FUEL PUMP RELIEF VALVE

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:
NASA DOES NOT ANALYZE RELIEF VALVE AS A SEPARATE ITEM.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-134
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 134
ITEM: FUEL PUMP RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS FAILURE MODE, DUE TO LACK OF EFFECT ON SYSTEM. IOA CONCURS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-135
NASA FMEA #: 04-2-PP11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 135
ITEM: FUEL PUMP RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA DOES NOT CONSIDER FUEL PUMP RELIEF VALVE AS SEPARATE ITEM.
EXTERNAL LEAK OF FUEL PUMP IS COVERED BY HAZARD ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-136
NASA FMEA #: 04-2-FL12-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 136
ITEM: FUEL PUMP FILTER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-137
NASA FMEA #: 04-2-FL12-12

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 137
ITEM: FUEL PUMP FILTER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS; APU OVERSPEED TO DESTRUCTION IS WORST CASE RESULT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-138
NASA FMEA #: 04-2-PP11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 138
ITEM: FUEL PUMP DRAIN COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA DOES NOT ANALYZE FUEL PUMP DRAIN COUPLING AS SEPARATE ITEM. FUEL PUMP EXTERNAL LEAK IS 2/1R BY NASA ANALYSIS; IOA CALLS IT 1/1 PER NSTS 22206 SECT. 2.3.3.h. THIS DISCREPANCY IS RESOLVED IN ASSESSMENT #129, AND IS NOT CONSIDERED AN ISSUE FOR THIS ASSESSMENT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-139
NASA FMEA #: 04-2-LV12-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 139
ITEM: PRIMARY FUEL VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-140
NASA FMEA #: 04-2-LV12-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 140
ITEM: PRIMARY FUEL VALVE

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-141
NASA FMEA #: 04-2-LV12-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 141
ITEM: PRIMARY FUEL VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-142
NASA FMEA #: 04-2-LV12-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 142
ITEM: PRIMARY FUEL VALVE

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-143
NASA FMEA #: 04-2-V12-13-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 143
ITEM: PRIMARY FUEL VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-144
NASA FMEA #: 04-2-V12-13-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 144
ITEM: PRIMARY FUEL VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-145
NASA FMEA #: 04-2-LV13-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 145
ITEM: SECONDARY FUEL VALVE

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-146
NASA FMEA #: 04-2-LV13-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 146
ITEM: SECONDARY FUEL VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-147
NASA FMEA #: 04-2-LV13-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 147
ITEM: SECONDARY FUEL VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-148
NASA FMEA #: 04-2-LV13-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 148
ITEM: SECONDARY FUEL VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-149
NASA FMEA #: 04-2-LV13-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 149
ITEM: SECONDARY FUEL VALVE

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-150
NASA FMEA #: 04-2-V12-13-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 150
ITEM: SECONDARY FUEL VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-151 BASELINE [ ]
NASA FMEA #: 04-2-L1-11 NEW [X]

SUBSYSTEM: APU
MDAC ID: 151
ITEM: FUEL LINE-UPSTREAM OF TANK ISOL VALVES

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-152
NASA FMEA #: 04-2-L1-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 152
ITEM: FUEL LINE-DOWNSTREAM OF TANK ISOL VALVES

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-153
NASA FMEA #: 04-2-MD11-13

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 153
ITEM: FUEL TANK HYDRAZINE FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS CONSIDERED CAP AS REDUNDANT TO COUPLING. IOA CONSIDERED COUPLING AND CAP AS ONE UNIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-154
NASA FMEA #: 04-2-MD11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 154
ITEM: FUEL TANK HYDRAZINE FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88 NASA DATA:
ASSESSMENT ID: APU-155 BASELINE [ ]
NASA FMEA #: 04-2-TP11-13 NEW [X]

SUBSYSTEM: APU
MDAC ID: 155
ITEM: FUEL LINE TEST POINT COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONSIDERED COUPLING AND CAP AS ONE UNIT. NASA CONSIDERS CAP REDUNDANT TO COUPLING.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-156
NASA FMEA #: 04-2-TP11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 156
ITEM: FUEL LINE TEST POINT COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-157
NASA FMEA #: 04-2-L1A-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 157
ITEM: FUEL LINE FLEX HOSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-158
NASA FMEA #: 04-2-MD13-13

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 158
ITEM: FUEL LINE HIGH POINT BLEED COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA CONSIDERS CAP REDUNDANT TO COUPLING. IOA CONSIDERS COUPLING AND CAP AS ONE UNIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-159 BASELINE [ ]
NASA FMEA #: 04-2-MD13-11 NEW [X]

SUBSYSTEM: APU
MDAC ID: 159
ITEM: FUEL LINE HIGH POINT BLEED COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-160 BASELINE [ ]
NASA FMEA #: 04-2-HR11-11 NEW [X]

SUBSYSTEM: APU
MDAC ID: 160
ITEM: FUEL TANK HEATER
(11A,11B,12A,12B,21A,21B,22A,22B,31A,31B,32A,32B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-161
NASA FMEA #: 04-2-S11A-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 161
ITEM: FUEL TANK HEATER THERMOSTAT (S11A, S11B, S21A, S21B, S31A, S31B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-162
NASA FMEA #: 04-2-S11A-12

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 162
ITEM: FUEL TANK HEATER THERMOSTAT (S11A, S11B, S21A, S21B, S31A, S31B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-163
NASA FMEA #: 04-2-HR14-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 163
ITEM: FUEL LINE HEATER (14, 15)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-164
NASA FMEA #: 04-2-S16A-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 164
ITEM: FUEL LINE HEATER THERMOSTAT
(S16A,S16B,S112A,S112B,S11A,S11B,S26A,S26B,S212A,S212B,S21A,S21B,S36A,S3

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /2R]	[F]	[P]	[P]	[X] *
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 CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-165
NASA FMEA #: 04-2-S16A-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 165
ITEM: FUEL LINE HEATER THERMOSTAT
(S16A,S16B,S112A,S112B,S11A,S11B,S26A,S26B,S212A,S212B,S21A,S21B,S36A,S3

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-166
NASA FMEA #: 04-2-S14A-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 166
ITEM: FUEL LINE HEATER THERMOSTAT (REDUNDANT)
(S19A,S19B,S14A,S14B,S29A,S29B,S24A,S24B,S39A,S39B,S34A,S34B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-167
NASA FMEA #: 04-2-S14A-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 167
ITEM: FUEL LINE HEATER THERMOSTAT (REDUNDANT)
(S19A,S19B,S14A,S14B,S29A,S29B,S24A,S24B,S39A,S39B,S34A,S34B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-168
NASA FMEA #: 04-2-HR111-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 168
ITEM: FUEL PUMP SEAL CAVITY DRAIN LINE HEATER

LEAD ANALYST: J. BARNES

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: 12/10/86
ASSESSMENT ID: APU-169
NASA FMEA #: 04-2-S112A-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 169
ITEM: FUEL PUMP SEAL CAVITY DRAIN LINE HEATER THERMOSTAT (S112A,S112B,S212A,S212B,S312A,S312B)

LEAD ANALYST: J. BARNES

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: 12/10/86
ASSESSMENT ID: APU-170
NASA FMEA #: 04-2-S112A-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 170
ITEM: FUEL PUMP SEAL CAVITY DRAIN LINE HEATER THERMOSTAT (S112A,S112B,S212A,S212B,S312A,S312B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA PLACED CRITICALITY AT 1/1 BASED ON ROCKWELL INTERNATIONAL RECOMMENDED CIL CHANGE (6/13/86).
AN ENGINEERING CHANGE TO THE VEHICLE HAS BEEN APPROVED TO ELIMINATE THIS PROBLEM. IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-171
NASA FMEA #: 04-2-HR17-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 171
ITEM: FUEL PUMP/VALVE HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-172
NASA FMEA #: 04-2-S17A-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 172
ITEM: FUEL PUMP/VALVE HEATER THERMOSTAT
(S17A,S17B,S27A,S27B,S37A,S37B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-173 BASELINE [ ]
NASA FMEA #: 04-2-S17A-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 173
ITEM: FUEL PUMP/VALVE HEATER THERMOSTAT
(S17A,S17B,S27A,S27B,S37A,S37B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA AGREES WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-174
NASA FMEA #: 04-2-FL11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 174
ITEM: FUEL IN-LINE FILTER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-175
NASA FMEA #: 04-2-L1-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 175
ITEM: FUEL IN-LINE FILTER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-176
NASA FMEA #: 04-2-FL11-12

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 176
ITEM: FUEL IN-LINE FILTER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
THIS FAILURE MODE HAS NO EFFECT, DUE TO UPSTREAM FILTER AT FILL COUPLING. IOA CONCURS NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-177
NASA FMEA #: 04-2-L1-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 177
ITEM: SEAL CAVITY DRAIN LINE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS, DUE TO PRESENCE OF FUEL VAPORS IN LINE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-178
NASA FMEA #: 04-2-CL1A-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 178
ITEM: SEAL CAVITY DRAIN FLEX HOSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-179
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 179
ITEM: SEAL CAVITY DRAIN LINE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS FAILURE MODE.

IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-180
NASA FMEA #: 04-2-RV02-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 180
ITEM: SEAL CAVITY DRAIN RELIEF VALVE

LEAD ANALYST: J. BARNES

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-181
NASA FMEA #: 04-2-RV02-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 181
ITEM: SEAL CAVITY DRAIN RELIEF VALVE

LEAD ANALYST: J. BARNES

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-182
NASA FMEA #: 04-2-RV02-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 182
ITEM: SEAL CAVITY DRAIN RELIEF VALVE

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88 NASA DATA:
ASSESSMENT ID: APU-183 BASELINE [ ]
NASA FMEA #: 04-2-RV02-3 NEW [X]

SUBSYSTEM: APU
MDAC ID: 183
ITEM: SEAL CAVITY DRAIN RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-184
NASA FMEA #: 04-2-CL01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 184
ITEM: SEAL CAVITY DRAIN CATCH BOTTLE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-185
NASA FMEA #: 04-2-MV01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 185
ITEM: SEAL CAVITY DRAIN CATCH BOTTLE DRAIN VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-186
NASA FMEA #: 04-2-MV01-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 186
ITEM: SEAL CAVITY DRAIN CATCH BOTTLE DRAIN VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-187
NASA FMEA #: 04-2-PP12-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 187
ITEM: LUBE OIL PUMP

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-188
NASA FMEA #: 04-2-MD19-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 188
ITEM: GEARBOX GN2 BOTTLE

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-189
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 189
ITEM: GEARBOX GN2 BOTTLE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM. THIS FAILURE MODE CAN BE CONSIDERED COVERED BY ASSESSMENT #188. SHRAPNEL HAZARD IS NOT CREDIBLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-190
NASA FMEA #: 04-2-MD19-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 190
ITEM: GEARBOX GN2 BOTTLE FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-191 BASELINE [ ]
NASA FMEA #: 04-2-MD19-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 191
ITEM: GEARBOX GN2 BOTTLE FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-192
NASA FMEA #: 04-2-LV14-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 192
ITEM: GEARBOX PRESSURIZATION VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-193
NASA FMEA #: 04-2-LV14-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 193
ITEM: GEARBOX PRESSURIZATION VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-194
NASA FMEA #: 04-2-LV14-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 194
ITEM: GEARBOX PRESSURIZATION VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-195
NASA FMEA #: 04-2-GT11-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 195
ITEM: GEARBOX PRESSURIZATION VALVE

LEAD ANALYST: J. BARNES

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: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-196 BASELINE [ ]
NASA FMEA #: NONE NEW [X]

SUBSYSTEM: APU
MDAC ID: 196
ITEM: GEARBOX PRESSURIZATION VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DID NOT COVER THIS FAILURE MODE (BARRIER LEAK).

IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-197
NASA FMEA #: 04-2-L2-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 197
ITEM: LUBE OIL LINES

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-198
NASA FMEA #: 04-2-L2A-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 198
ITEM: LUBE OIL LINE FLEX HOSES

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-199
NASA FMEA #: 04-2-MD14-13

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 199
ITEM: GEARBOX FILL COUPLING

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS CONSIDERED CAP AS REDUNDANT TO COUPLING. IOA ANALYSIS CONSIDERED COUPLING AND CAP AS ONE UNIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-200
NASA FMEA #: 04-2-MD14-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 200
ITEM: GEARBOX FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-201
NASA FMEA #: 04-2-MD14-13

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 201
ITEM: GEARBOX HIGH POINT VENT COUPLING

LEAD ANALYST: J. BARNES

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS CONSIDERED CAP AS REDUNDANT TO COUPLING. IOA ANALYSIS CONSIDERED COUPLING AND CAP AS ONE UNIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-202
NASA FMEA #: 04-2-MD14-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 202
ITEM: GEARBOX HIGH POINT VENT COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-203
NASA FMEA #: 04-2-GT11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 203
ITEM: GEARBOX CHIP DETECTOR

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS ITEM SEPARATELY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-204
NASA FMEA #: 04-2-MD14-13

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 204
ITEM: GEARBOX LOW POINT DRAIN COUPLING

LEAD ANALYST: J. BARNES

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS CONSIDERED CAP AS REDUNDANT TO COUPLING. IOA ANALYSIS CONSIDERED COUPLING AND CAP AS ONE UNIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-205
NASA FMEA #: 04-2-MD14-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 205
ITEM: GEARBOX LOW POINT DRAIN COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-206 BASELINE [ ]
NASA FMEA #: 04-2-MD17-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 206
ITEM: GEARBOX HIGH POINT DRAIN COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS CONSIDERED CAP AS REDUNDANT TO COUPLING. IOA ANALYSIS CONSIDERED COUPLING AND CAP AS ONE UNIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-207 BASELINE [ ]
NASA FMEA #: 04-2-MD17-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 207
ITEM: GEARBOX HIGH POINT DRAIN COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-208
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 208
ITEM: WSB DRAIN COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS CONSIDERS THIS ITEM UNDER HYDRAULIC/WATER SPRAY BOILER SYSTEM.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-209
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 209
ITEM: WSB DRAIN COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS CONSIDERS THIS ITEM UNDER HYDRAULIC/WATER SPRAY BOILER SYSTEM.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-210
NASA FMEA #: 04-2-HR18-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 210
ITEM: LUBE OIL LINE HEATER (18A, 18B, 19A, 19B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-211
NASA FMEA #: 04-2-S18A-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 211
ITEM: LUBE OIL LINE HEATER THERMOSTAT (S18A,S18B)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/28/88
ASSESSMENT ID: APU-212
NASA FMEA #: 04-2-S18A-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 212
ITEM: LUBE OIL LINE HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
CRITICALITY MUST BE SET AT 3/1R TO MATCH APU EPDC FMEA; HEATER STUCK ON MAY CAUSE LOSS OF AN APU DUE TO LUBE OIL SOLIDIFICATION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-213
NASA FMEA #: 04-2-FL13-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 213
ITEM: LUBE OIL FILTER

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-214
NASA FMEA #: 04-2-FL13-12

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 214
ITEM: LUBE OIL FILTER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-215
NASA FMEA #: 04-2-GT11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 215
ITEM: LUBE OIL FILTER

LEAD ANALYST: J. BARNES

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 ANALYSIS DOES NOT CONSIDER THIS ITEM SEPARATELY AS A LEAK SOURCE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-216
NASA FMEA #: 04-2-FBRV01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 216
ITEM: OIL FILTER BYPASS RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-217
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 217
ITEM: OIL FILTER BYPASS RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA DOES NOT CONSIDER THIS TO BE A CREDIBLE FAILURE MODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-218
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 218
ITEM: GEARBOX BYPASS RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM. NO ISSUE, DUE TO LACK OF CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-219
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 219
ITEM: GEARBOX BYPASS RELIEF VALVE

LEAD ANALYST: J. BARNES

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:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM, DUE TO LACK OF EFFECT ON SYSTEM. IOA CONCURS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-220
NASA FMEA #: 04-2-GT11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 220
ITEM: LUBE OIL ACCUMULATOR (ADD-ON)

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM SEPARATELY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-221
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 221
ITEM: LUBE OIL ACCUMULATOR (ADD-ON)

LEAD ANALYST: J. BARNES

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:
NASA ANALYSIS DOES NOT COVER THIS ITEM, DUE TO LACK OF EFFECT ON SYSTEM. IOA CONCURS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-222
NASA FMEA #: 04-2-GT11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 222
ITEM: LUBE OIL ACCUMULATOR (INTEGRAL)

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT COVER THIS ITEM SEPARATELY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-223
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 223
ITEM: LUBE OIL ACCUMULATOR (INTEGRAL)

LEAD ANALYST: J. BARNES

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:
NASA ANALYSIS DOES NOT COVER THIS ITEM, DUE TO LACK OF EFFECT ON SYSTEM. IOA CONCURS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-224
NASA FMEA #: 04-2-CLV13-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 224
ITEM: INJECTOR COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-225
NASA FMEA #: 04-2-CLV13-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 225
ITEM: INJECTOR COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-226
NASA FMEA #: 04-2-CLV13-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 226
ITEM: INJECTOR COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-227
NASA FMEA #: 04-2-CLV13-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 227
ITEM: INJECTOR COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-228
NASA FMEA #: 04-2-CLV13-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 228
ITEM: INJECTOR COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-229
NASA FMEA #: 04-2-CTK01-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 229
ITEM: INJECTOR COOLING WATER TANK

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-230
NASA FMEA #: 04-2-CTK01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 230
ITEM: INJECTOR COOLING WATER TANK

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-231 BASELINE [ ]
NASA FMEA #: 04-2-CGC01-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 231
ITEM: INJECTOR COOLING GN2 FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-232
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 232
ITEM: INJECTOR COOLING GN2 FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS FAILURE MODE (FAIL CLOSED).

NO ISSUE, DUE TO LACK OF SYSTEM IMPACT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-233 BASELINE [ ]
NASA FMEA #: 04-2-CL03-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 233
ITEM: INJECTOR COOLING WATER LINES (MANIFOLD)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-234
NASA FMEA #: 04-2-CL03-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 234
ITEM: INJECTOR COOLING WATER LINES (MANIFOLD)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-235
NASA FMEA #: 04-2-CFD01-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 235
ITEM: INJECTOR COOLING WATER FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-236
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 236
ITEM: INJECTOR COOLING WATER FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS FAILURE MODE.

NO ISSUE, DUE TO LACK OF SYSTEM IMPACT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-237 BASELINE [ ]
NASA FMEA #: 04-2-CL03-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 237
ITEM: INJECTOR COOLING WATER LINE-APU X

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM SEPARATELY.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-238
NASA FMEA #: 04-2-CL03-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 238
ITEM: INJECTOR COOLING WATER LINE-APU X

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM SEPARATELY.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-239
NASA FMEA #: 04-2-CFH02-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 239
ITEM: INJECTOR COOLING WATER LINE FLEX HOSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-240
NASA FMEA #: 04-2-CHR01-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 240
ITEM: INJECTOR COOLING WATER TANK HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-241
NASA FMEA #: 04-2-CS01-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 241
ITEM: INJECTOR COOLING WATER TANK HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-242
NASA FMEA #: 04-2-CS01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 242
ITEM: INJECTOR COOLING WATER TANK HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-243 BASELINE [ ]
NASA FMEA #: 04-2-CHR03-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 243
ITEM: INJECTOR COOLING WATER LINE HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-244
NASA FMEA #: 04-2-CS03-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 244
ITEM: INJECTOR COOLING WATER LINE HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-245
NASA FMEA #: 04-2-CS03-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 245
ITEM: INJECTOR COOLING WATER LINE HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-246
NASA FMEA #: 04-2-CRV01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 246
ITEM: FUEL PUMP/GGVM COOLING RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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 ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-247 BASELINE [ ]
NASA FMEA #: 04-2-CRV01-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 247
ITEM: FUEL PUMP/GGVM COOLING RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

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

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-248 BASELINE [ ]
NASA FMEA #: 04-2-CL10-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 248
ITEM: FUEL PUMP/GGVM COOLING RELIEF VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS FAILURE MODE (EXTERNAL LEAK) SEPARATELY.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-249
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 249
ITEM: FUEL PUMP/GGVM COOLING GN2 LINE

LEAD ANALYST: J. BARNES

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:
NASA ANALYSIS DID NOT CONSIDER THIS ITEM. NO ISSUE, DUE TO LACK OF CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-250
NASA FMEA #: 04-2-CLV15-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 250
ITEM: FUEL PUMP/GGVM COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-251
NASA FMEA #: 04-2-CLV15-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 251
ITEM: FUEL PUMP/GGVM COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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 ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-252
NASA FMEA #: 04-2-CLV15-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 252
ITEM: FUEL PUMP/GGVM COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-253 BASELINE [ ]
NASA FMEA #: 04-2-CL10-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 253
ITEM: FUEL PUMP/GGVM COOLING VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-254
NASA FMEA #: 04-2-CTK06-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 254
ITEM: FUEL PUMP/GGVM COOLING WATER TANK

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-255 BASELINE [ ]
NASA FMEA #: 04-2-CTK06-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 255
ITEM: FUEL PUMP/GGVM COOLING WATER TANK

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-256
NASA FMEA #: 04-2-CL10-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 256
ITEM: FUEL PUMP/GGVM COOLING WATER LINES-BETWEEN TANK AND TANK VALVES

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-257
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 257
ITEM: FUEL PUMP/GGVM COOLING WATER LINES-BETWEEN TANK AND TANK VALVES

LEAD ANALYST: J. BARNES

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:
NASA ANALYSIS DID NOT CONSIDER THIS FAILURE MODE. IOA CONCURS WITH NASA - THIS FAILURE MODE IS NOT CREDIBLE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-258
NASA FMEA #: 04-2-CFD02-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 258
ITEM: FUEL PUMP/GGVM COOLING WATER FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-259
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 259
ITEM: FUEL PUMP/GGVM COOLING WATER FILL COUPLING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA DID NOT CONSIDER THIS FAILURE MODE. NO ISSUE, DUE TO LACK OF SYSTEM IMPACT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-260
NASA FMEA #: 04-2-CL10-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 260
ITEM: FUEL PUMP/GGVM COOLING WATER LINES-BETWEEN TANK VALVE AND APU

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-261
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 261
ITEM: FUEL PUMP/GGVM COOLING WATER LINES-BETWEEN TANK VALVE AND APU

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS FAILURE MODE (LINE BLOCKAGE AT FILTER). NO ISSUE - BLOCKAGE IS COVERED BY FMEA 04-2-CNA01-1.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-262
NASA FMEA #: 04-2-CFH01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 262
ITEM: FUEL PUMP/GGVM COOLING WATER LINE FLEX HOSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-263
NASA FMEA #: 04-2-CNA01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 263
ITEM: SPRAY ORIFICE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-264
NASA FMEA #: 04-2-CLV06-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 264
ITEM: FUEL PUMP/GGVM COOLING WATER TANK VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-265 BASELINE [ ]
NASA FMEA #: 04-2-CLV06-3 NEW [X]

SUBSYSTEM: APU
MDAC ID: 265
ITEM: FUEL PUMP/GGVM COOLING WATER TANK VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-266
NASA FMEA #: 04-2-CLV13-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 266
ITEM: FUEL PUMP/GGVM COOLING WATER TANK VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
NASA ANALYSIS DID NOT CONSIDER THIS FAILURE MODE (INTERNAL BARRIER LEAK) SEPARATELY.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-267 BASELINE [ ]
NASA FMEA #: 04-2-CLV06-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 267
ITEM: FUEL PUMP/GGVM COOLING WATER TANK VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-268
NASA FMEA #: 04-2-CHR01-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 268
ITEM: FUEL PUMP/GGVM COOLING WATER TANK HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-269
NASA FMEA #: 04-2-CS01-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 269
ITEM: FUEL PUMP/GGVM COOLING WATER TANK HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-270
NASA FMEA #: 04-2-CS01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 270
ITEM: FUEL PUMP/GGVM COOLING WATER TANK HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-271 BASELINE [ ]
NASA FMEA #: 04-2-CHR03-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 271
ITEM: FUEL PUMP/GGVM COOLING WATER LINE HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-272
NASA FMEA #: 04-2-CS10-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 272
ITEM: FUEL PUMP/GGVM COOLING WATER LINE HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-273 BASELINE [ ]
NASA FMEA #: 04-2-CS10-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 273
ITEM: FUEL PUMP/GGVM COOLING WATER LINE HEATER THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-274
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 274
ITEM: FUEL PUMP/GGVM COOLING CHECK VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS ITEM. NO ISSUE, DUE TO LACK OF CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-275
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 275
ITEM: FUEL PUMP/GGVM COOLING CHECK VALVE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS ITEM. NO ISSUE, DUE TO LACK OF CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-276
NASA FMEA #: 04-2-TH11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 276
ITEM: EXHAUST PLENUM HOUSING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-277
NASA FMEA #: 04-2-TR11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 277
ITEM: EXHAUST PLENUM HOUSING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM SEPARATELY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-278
NASA FMEA #: 04-2-GT11-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 278
ITEM: EXHAUST PLENUM HOUSING

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS ITEM SEPARATELY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-279
NASA FMEA #: 04-2-GT11-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 279
ITEM: GEARBOX HOUSING

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-280
NASA FMEA #: 05-6N-2035-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 280
ITEM: "APU CONTROL" SWITCH

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-281
NASA FMEA #: 05-6N-2035-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 281
ITEM: "APU CONTROL" SWITCH

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-282
NASA FMEA #: 05-6N-2035-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 282
ITEM: "APU CONTROL" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[1 /1]	[NA]	[NA]	[NA]	[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 [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-283
NASA FMEA #: 05-6N-2035-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 283
ITEM: "APU CONTROL" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-284
NASA FMEA #: 05-6N-2038-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 284
ITEM: APU CONTROL CIRCUIT GROUND CONTROL INPUT DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-285 BASELINE [ ]
NASA FMEA #: 05-6N-2038-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 285
ITEM: APU CONTROL CIRCUIT GROUND CONTROL INPUT DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-286
NASA FMEA #: 05-6N-2034-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 286
ITEM: APU CONTROL CIRCUIT SWITCH POWER FUSE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-287
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 287
ITEM: APU CONTROL CIRCUIT START CONTROL INPUT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
LATEST DRAWINGS DO NOT SHOW THIS DIODE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-288
NASA FMEA #: 05-6N-2016-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 288
ITEM: "APU CNTLR PWR" SWITCH

LEAD ANALYST: J. BARNES

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: 8/05/87
ASSESSMENT ID: APU-289
NASA FMEA #: 05-6N-2016-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 289
ITEM: "APU CNTLR PWR" SWITCH

LEAD ANALYST: J. BARNES

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: 8/05/87
ASSESSMENT ID: APU-290
NASA FMEA #: 05-6N-2016-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 290
ITEM: "APU CNTLR PWR" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS ASSESSES CRITICALITY BASED ON A "RELATED FAILURE".

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-291
NASA FMEA #: 05-6N-2016-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 291
ITEM: "APU CNTLR PWR" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS ASSESSES CRITICALITY BASED ON A "RELATED FAILURE".

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-292
NASA FMEA #: 05-6N-2017-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 292
ITEM: CONTROLLER POWER CIRCUIT RPC

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-293
NASA FMEA #: 05-6N-2017-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 293
ITEM: CONTROLLER POWER CIRCUIT RPC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS ASSESSES CRITICALITY BASED ON A "RELATED FAILURE".

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-294
NASA FMEA #: 05-6N-2018-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 294
ITEM: CONTROLLER POWER CIRCUIT POWER INPUT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-295 BASELINE [ ]
NASA FMEA #: 05-6N-2019-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 295
ITEM: CONTROLLER POWER SWITCH POWER FUSE

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-296
NASA FMEA #: 05-6N-2018-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 296
ITEM: CONTROLLER POWER CIRCUIT CONTROL INPUT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /1R]	[P]	[NA]	[P]	[ ] *
IOA	[3 /1R]	[P]	[P]	[P]	[ ]
COMPARE	[/]	[ ]	[N]	[ ]	[ ]
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: APU-297 BASELINE [ ]
NASA FMEA #: 05-6N-2032-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 297
ITEM: CONTROLLER POWER CIRCUIT GROUND CONTROL INPUT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-298 BASELINE [ ]
NASA FMEA #: 05-6N-200400-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 298
ITEM: "APU SPEED SELECT" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THE SWITCH SEPARATELY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-299 BASELINE [ ]
NASA FMEA #: 05-6N-200400-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 299
ITEM: "APU SPEED SELECT" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THE SWITCH SEPARATELY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-300
NASA FMEA #: 05-6N-200400-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 300
ITEM: "APU SPEED SELECT" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THE SWITCH SEPARATELY.

SCREENS ARE NA BY NSTS-22206, SECT. 2.3.4.b.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-301 BASELINE [ ]
NASA FMEA #: 05-6N-200400-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 301
ITEM: "APU SPEED SELECT" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THE SWITCH SEPARATELY.

SCREENS ARE NA BY NSTS-22206, SECT. 2.3.4.b.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-302
NASA FMEA #: 05-6N-200400-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 302
ITEM: SPEED SELECT CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-303
NASA FMEA #: 05-6N-200400-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 303
ITEM: SPEED SELECT CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
SCREENS ARE NA BY NSTS-22206, SECT. 2.3.4.b.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-304
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 304
ITEM: OVERSPEED/UNDERSPEED INDICATION CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM. NO ISSUE, DUE TO LACK OF SYSTEM IMPACT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-305
NASA FMEA #: 05-6N-2042-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 305
ITEM: "APU AUTO SHUTDOWN" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-306
NASA FMEA #: 05-6N-2042-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 306
ITEM: "APU AUTO SHUTDOWN" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. DESIGN CHANGE HAS PROVIDED SEPARATE SWITCH FOR EACH APU.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-307
NASA FMEA #: 05-6N-2042-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 307
ITEM: "APU AUTO SHUTDOWN" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-308
NASA FMEA #: 05-6N-2042-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 308
ITEM: "APU AUTO SHUTDOWN" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-309
NASA FMEA #: 05-6N-2040-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 309
ITEM: AUTO SHUTDOWN SWITCH POWER FUSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. DESIGN CHANGE PROVIDES SEPARATE SWITCH FOR EACH APU.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-310
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 310
ITEM: AUTO SHUTDOWN CONTROL CIRCUIT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM. NO ISSUE, DUE TO LACK OF CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-311
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 311
ITEM: AUTO SHUTDOWN CONTROL CIRCUIT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT COVER THIS ITEM. NO ISSUE, DUE TO LACK OF CRITICALITY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-312
NASA FMEA #: 05-6N-201000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 312
ITEM: FUEL VALVE GROUND CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-313
NASA FMEA #: 05-6N-201000-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 313
ITEM: FUEL VALVE GROUND CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-314
NASA FMEA #: 05-6N-2013-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 314
ITEM: FUEL TANK VALVE SWITCH

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-315
NASA FMEA #: 05-6N-2013-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 315
ITEM: FUEL TANK VALVE SWITCH

LEAD ANALYST:. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-316
NASA FMEA #: 05-6N-2013-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 316
ITEM: FUEL TANK VALVE SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. DESIGN CHANGE ADDED CIRCUIT BREAKER TO KILL VALVE "ON" SIGNAL.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-317
NASA FMEA #: 05-6N-2013-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 317
ITEM: FUEL TANK VALVE SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. DESIGN CHANGE ADDED CIRCUIT BREAKER TO KILL VALVE "ON" SIGNAL.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-318
NASA FMEA #: 05-6N-2014-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 318
ITEM: FUEL TANK VALVE CIRCUIT DRIVER

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-319
NASA FMEA #: 05-6N-2014-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 319
ITEM: FUEL TANK VALVE CIRCUIT DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. DESIGN CHANGE PROVIDES THREE DRIVERS IN SERIES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-320
NASA FMEA #: 05-6N-2029-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 320
ITEM: FUEL TANK VALVE AUTO SHUTDOWN DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-321 BASELINE [ ]
NASA FMEA #: 05-6N-2029-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 321
ITEM: FUEL TANK VALVE AUTO SHUTDOWN DRIVER

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-322
NASA FMEA #: 05-6N-2027-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 322
ITEM: FUEL TANK VALVE SWITCH POWER FUSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-323
NASA FMEA #: 05-6N-2022-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 323
ITEM: FUEL TANK VALVE SWITCH OUTPUT DIODE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-324
NASA FMEA #: 04-2-0115-1

NASA DATA:
BASELINE [X]
NEW [ ]

SUBSYSTEM: APU
MDAC ID: 324
ITEM: FUEL TANK VALVE INDICATOR SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-325
NASA FMEA #: 04-2-0115-2

NASA DATA:
BASELINE [X]
NEW [ ]

SUBSYSTEM: APU
MDAC ID: 325
ITEM: FUEL TANK VALVE INDICATOR SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-326
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 326
ITEM: "PUMP/VLV COOL" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-327
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 327
ITEM: "PUMP/VLV COOL" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-328
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 328
ITEM: "PUMP/VLV COOL" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
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:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-329
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 329
ITEM: "PUMP/VLV COOL" SWITCH POWER FUSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-330
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 330
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT POWER FUSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-331 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 331
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT POWER INPUT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-332
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 332
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT POWER INPUT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-333
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 333
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT INPUT RESISTOR

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-334 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 334
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT INPUT RESISTOR

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-335 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 335
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT POWER INPUT DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-336
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 336
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT POWER INPUT DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-337 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 337
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT POWER INPUT DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED. IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-338
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 338
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT TIMING DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-339 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 339
ITEM: FUEL PUMP/GGVM COOLING VALVE POWER DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-340 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 340
ITEM: FUEL PUMP/GGVM COOLING VALVE POWER DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-341
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 341
ITEM: FUEL PUMP/GGVM COOLING VALVE INDICATION RESISTOR

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-342
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 342
ITEM: FUEL PUMP/GGVM COOLING VALVE INDICATION RESISTOR

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-343 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 343
ITEM: FUEL PUMP/GGVM COOLING TANK VALVE POWER FUSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-344
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 344
ITEM: FUEL PUMP/GGVM COOLING TANK VALVE DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-345 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 345
ITEM: FUEL PUMP/GGVM COOLING TANK VALVE DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-346 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 346
ITEM: FUEL PUMP/GGVM COOLING THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-347 BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 347
ITEM: FUEL PUMP/GGVM COOLING THERMOSTAT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87 NASA DATA:
ASSESSMENT ID: APU-348 BASELINE [ ]
NASA FMEA #: 05-6N-2055-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 348
ITEM: "APU HEATER-TANK/FUEL LINE/H20 SYS" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. POSSIBLE FUEL LEAK AFTER TWO FAILURES REPRESENTS FIRE HAZARD.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87 NASA DATA:
ASSESSMENT ID: APU-349 BASELINE [ ]
NASA FMEA #: 05-6N-2055-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 349
ITEM: APU HEATER, TANK/FUEL LINE/H20 SYS SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. DETONATION AND FIRE HAZARD AFTER TWO FAILURES.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-350
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 350
ITEM: FUEL/H20 HEATER CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS CONSIDERS CIRCUIT ELEMENTS INDIVIDUALLY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-351
NASA FMEA #: 05-6N-2059-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 351
ITEM: FUEL/H20 HEATER CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-352
NASA FMEA #: 05-6N-2059-A2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 352
ITEM: FUEL/H2O HEATER CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
ENGINEERING CHANGE HAS BEEN APPROVED TO ELIMINATE 1/1 FAILURE.
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87 NASA DATA:
ASSESSMENT ID: APU-353 BASELINE [ ]
NASA FMEA #: 05-6N-2064-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 353
ITEM: "APU HEATER-GAS GEN/FUEL PUMP" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

WORST CASE SWITCH FAILURE CAN FAIL BOTH SETS OF HEATERS, ALLOWING FUEL FREEZING, FUEL LEAK, AND LOSS OF MISSION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-354
NASA FMEA #: 05-6N-2064-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 354
ITEM: "APU HEATER-GAS GEN/FUEL PUMP" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. STARTING APU TO DISABLE HEATERS IS NOT CONSIDERED, PER NSTS-22206, SECT. 2.3.3.f.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-355
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 355
ITEM: GAS GEN/FUEL PUMP HEATER CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS CONSIDERS CIRCUIT COMPONENTS INDIVIDUALLY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-356
NASA FMEA #: 05-6N-2074-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 356
ITEM: GAS GEN/FUEL PUMP HEATER CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. NO SINGLE FAILURE CAN FAIL MULTIPLE DRIVERS ON.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87 NASA DATA:
ASSESSMENT ID: APU-357 BASELINE [ ]
NASA FMEA #: 05-6N-2047-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 357
ITEM: "APU HEATER, LUBE OIL LINE" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. LOSS OF LUBE OIL HEATERS REPRESENTS LOSS OF MISSION.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-358
NASA FMEA #: 05-6N-2047-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 358
ITEM: "APU HEATER, LUBE OIL LINE" SWITCH

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-359 BASELINE [ ]
NASA FMEA #: 05-6N-2047-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 359
ITEM: "APU HEATER, LUBE OIL LINE" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-360
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 360
ITEM: LUBE OIL LINE HEATER CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS CONSIDERED CIRCUIT COMPONENTS INDIVIDUALLY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-361 BASELINE [ ]
NASA FMEA #: 05-6N-2051-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 361
ITEM: LUBE OIL LINE HEATER CONTROL CIRCUIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-362
NASA FMEA #: 05-6N-2024-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 362
ITEM: BITE INITIATE DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-363
NASA FMEA #: 05-6N-2024-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 363
ITEM: BITE INITIATE DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-364
NASA FMEA #: 05-6N-200900-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 364
ITEM: "APU FUEL/H2O QTY" GAUGE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-365 BASELINE [ ]
NASA FMEA #: 05-6N-200900-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 365
ITEM: "APU FUEL/H20 QTY" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-366
NASA FMEA #: 05-6N-200900-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 366
ITEM: "APU FUEL/H20 QTY" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-367
NASA FMEA #: 05-6N-200900-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 367
ITEM: "APU FUEL PRESS" GAUGE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-368
NASA FMEA #: 05-6N-200900-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 368
ITEM: "APU EGT" GAUGE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-369
NASA FMEA #: 05-6N-200900-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 369
ITEM: "APU OIL TEMP" GAUGE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-370
NASA FMEA #: 05-6N-200900-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 370
ITEM: GAUGING APU SELECT SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-371
NASA FMEA #: 05-6N-200900-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 371
ITEM: GAUGING APU SELECT SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-372
NASA FMEA #: 05-6N-200100-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 372
ITEM: "APU/HYD READY TO START" TALKBACK

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-373 BASELINE [ ]
NASA FMEA #: 05-6N-200100-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 373
ITEM: "APU/HYD READY TO START" TALKBACK

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-374
NASA FMEA #: 04-2-0151-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 374
ITEM: GEARBOX N2 PRESSURE SENSOR V46P0151A(251,351)

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-375 BASELINE [ ]
NASA FMEA #: 04-2-0122-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 375
ITEM: GAS GENERATOR BED TEMPERATURE SENSOR
V46T0122A(222,322)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
A VEHICLE ENGINEERING CHANGE HAS ELIMINATED THIS SENSOR FROM THE APU START LOGIC. IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-376 BASELINE [ ]
NASA FMEA #: 04-2-0183-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 376
ITEM: FUEL TEST LINE TEMPERATURE SENSOR V46T0183A (283,383) V46T0184A (284,384)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AN ENGINEERING CHANGE HAS BEEN APPROVED TO REMOVE ONE SENSOR FROM THE CLAMP - SCREEN C IS PASSED.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-377
NASA FMEA #: 04-2-0186-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 377
ITEM: FUEL PUMP SEAL CAVITY DRAIN LINE TEMPERATURE
SENSOR V46T0186A (286,386) V46T0170A (270,370)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
AN ENGINEERING CHANGE HAS BEEN APPROVED TO REMOVE ONE SENSOR FROM THE CLAMP - SCREEN C IS PASSED.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-378
NASA FMEA #: 04-2-01XX-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 378
ITEM: NONCRITICAL INSTRUMENTATION

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA LUMPED ALL NONCRITICAL INSTRUMENTATION TOGETHER, PER NSTS-22206, SECT. 2.3.6.a.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-379
NASA FMEA #: 04-2-CONTL5-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 379
ITEM: CONTROLLER SAFETY MONITORING

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-380
NASA FMEA #: 04-2-CONTL5-12

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 380
ITEM: CONTROLLER SAFETY MONITORING

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-381
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 381
ITEM: CONTROLLER POWER SUPPLY

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS ITEM, BECAUSE IT IS INTERNAL TO THE CONTROLLER. IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-382
NASA FMEA #: 04-2-CONTL1-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 382
ITEM: CONTROLLER PRIMARY SPEED CONTROL

LEAD ANALYST: J. BARNES

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:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-383 BASELINE [ ]
NASA FMEA #: 04-2-CONTL1-12 NEW [X]

SUBSYSTEM: APU
MDAC ID: 383
ITEM: CONTROLLER PRIMARY SPEED CONTROL

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-384
NASA FMEA #: 04-2-CONTL2-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 384
ITEM: CONTROLLER SECONDARY SPEED CONTROL

LEAD ANALYST: J. BARNES

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 [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-385
NASA FMEA #: 04-2-CONTL2-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 385
ITEM: CONTROLLER SECONDARY SPEED CONTROL

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-386
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 386
ITEM: CONTROLLER APU START LOGIC

LEAD ANALYST: J. BARNES

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:
NASA ANALYSIS DOES NOT CONSIDER THIS FUNCTION. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-387
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 387
ITEM: CONTROLLER APU START LOGIC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS FUNCTION. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-388
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 388
ITEM: CONTROLLER "READY" LOGIC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS FUNCTION. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-389
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 389
ITEM: CONTROLLER "READY" LOGIC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS FUNCTION. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-390
NASA FMEA #: 04-2-CONTL6-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 390
ITEM: CONTROLLER GEARBOX PRESSURE CONTROL

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS. GEARBOX PRESSURE CONTROL FUNCTION IS NOT CHECKED OUT BY CONTROLLER BITE.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-391
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 391
ITEM: CONTROLLER GEARBOX PRESSURE CONTROL

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS FAILURE MODE. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-392
NASA FMEA #: 04-2-CONTL3-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 392
ITEM: CONTROLLER GG BED HEATER CONTROL

LEAD ANALYST: J. BARNES

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-393 BASELINE [ ]
NASA FMEA #: 04-2-CONTL3-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 393
ITEM: CONTROLLER GG BED HEATER CONTROL

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-394
NASA FMEA #: 04-2-CONTL3-3

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 394
ITEM: CONTROLLER GG/FUEL PUMP HEATER INHIBIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-395 BASELINE [ ]
NASA FMEA #: 04-2-CONTL3-4 NEW [X]

SUBSYSTEM: APU
MDAC ID: 395
ITEM: CONTROLLER GG/FUEL PUMP HEATER INHIBIT

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH 3/1R, DUE TO LOSS OF ONE OF TWO METHODS OF STARTING ONE APU, AND APU REDUNDANCY.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-396
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 396
ITEM: CONTROLLER START/OVERRIDE LOGIC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS CONTROLLER FUNCTION. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-397
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 397
ITEM: CONTROLLER START/OVERRIDE LOGIC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DID NOT CONSIDER THIS CONTROLLER FUNCTION. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-398
NASA FMEA #: 04-2-CONTL7-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 398
ITEM: CONTROLLER START/OVERRIDE LOGIC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-399
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 399
ITEM: CONTROLLER START/OVERRIDE LOGIC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS FAILURE MODE. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

IOA WOULD RECOMMEND 3/3, BY NASA APPROACH TO INJECTOR COOLING SYSTEM CRITICALITY (1/1 FOR INTACT ABORT).

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-400
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 400
ITEM: CONTROLLER BITE LOGIC

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
NASA ANALYSIS DOES NOT CONSIDER THIS CONTROLLER FUNCTION. NO ISSUE; A COMPLETE CONTROLLER FMEA IS PLANNED BY NASA.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-401X
NASA FMEA #: 04-2-HR116-11

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 401
ITEM: FUEL LINE HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-402X
NASA FMEA #: 04-2-HR10-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 402
ITEM: FUEL VALVE HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-403X BASELINE [ ]
NASA FMEA #: 04-2-MD14-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 403
ITEM: GEARBOX FILL, VENT, AND DRAIN COUPLINGS

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
NASA ANALYSIS CONSIDERED CAP AS REDUNDANT TO COUPLING. IOA ANALYSIS CONSIDERED COUPLING AND CAP AS ONE UNIT.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-404X
NASA FMEA #: 04-2-CHR01-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 404
ITEM: INJECTOR COOLING WATER TANK HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-405X BASELINE [ ]
NASA FMEA #: 04-2-CHR01-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 405
ITEM: FUEL PUMP/GGVM COOLING WATER TANK HEATER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON CONDITIONS WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-406X
NASA FMEA #: 05-6N-2035-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 406
ITEM: "APU CONTROL" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-407X BASELINE [ ]
NASA FMEA #: 05-6N-2031-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 407
ITEM: CONTROLLER POWER CIRCUIT CONTROL INPUT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[3 /3]	[NA]	[NA]	[NA]	[ ] *
IOA	[3 /3]	[NA]	[NA]	[NA]	[ ]
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: APU-408X
NASA FMEA #: 05-6N-2014-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 408
ITEM: FUEL TANK VALVE DRIVER - APU 2,3

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
SAME AS APU 1 DRIVERS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-409X BASELINE [ ]
NASA FMEA #: 05-6N-2014-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 409
ITEM: FUEL TANK VALVE CIRCUIT DRIVER - APU 2,3

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
SAME AS APU 1 DRIVERS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88
ASSESSMENT ID: APU-410X
NASA FMEA #: 05-6N-2000-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 410
ITEM: "PUMP/VLV COOL" SWITCH

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/06/88 NASA DATA:
ASSESSMENT ID: APU-411X BASELINE [ ]
NASA FMEA #: 05-6N-2000-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 411
ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT TIMIMG DRIVER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA ASSESSED CRITICALITY BASED ON SITUATION WHERE COOLING IS REQUIRED.

IOA ACCEPTS NASA APPROACH.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86 NASA DATA:
ASSESSMENT ID: APU-412X BASELINE [ ]
NASA FMEA #: 04-2-0183-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 412
ITEM: FUEL TEST LINE TEMPERATURE SENSOR V46T0183A (283,383) V46T0184A (284,384)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-413X
NASA FMEA #: 04-2-0186-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 413
ITEM: FUEL PUMP SEAL CAVITY DRAIN LINE TEMPERATURE
SENSOR V46T0186A (286,386) V46T0170A (270,370)

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-414X
NASA FMEA #: 04-2-0104-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 414
ITEM: FUEL LINE TEMPERATURE SENSOR V46T0104A (204,304)

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-415X
NASA FMEA #: 04-2-0108-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 415
ITEM: FUEL LINE TEMPERATURE SENSOR V46T0108A (208,308)

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-416X
NASA FMEA #: 04-2-0112-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 416
ITEM: FUEL PUMP OUTLET TEMPERATURE SENSOR V46T0112A (212,312)

LEAD ANALYST: J. BARNES

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: APU-417X
NASA FMEA #: NONE

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 417
ITEM: FUEL PUMP BYPASS LINE TEMPERATURE SENSOR
V46T0128A (228,328)

LEAD ANALYST: J. BARNES

ASSESSMENT:

	CRITICALITY FLIGHT HDW/FUNC	REDUNDANCY SCREENS A	B	C	CIL ITEM
NASA	[/]	[ ]	[ ]	[ ]	[ ] *
IOA	[3 /2R]	[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:
NASA ANALYSIS DID NOT CONSIDER THIS ITEM.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 7/25/87
ASSESSMENT ID: APU-418X
NASA FMEA #: 04-2-CONTL7-12

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 418
ITEM: CONTROLLER GG INJECTOR COOLING CONTROL

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 7/25/87 NASA DATA:
ASSESSMENT ID: APU-419X BASELINE [ ]
NASA FMEA #: 04-2-CONTL2-12 NEW [X]

SUBSYSTEM: APU
MDAC ID: 419
ITEM: CONTROLLER SECONDARY SPEED CONTROL

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:
IOA CONCURS WITH NASA ANALYSIS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/04/87
ASSESSMENT ID: APU-420X
NASA FMEA #: 05-6N-2043-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 420
ITEM: LUBE OIL LINE HEATER SWITCH POWER FUSE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87 NASA DATA:
ASSESSMENT ID: APU-421X BASELINE [ ]
NASA FMEA #: 05-6N-2015-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 421
ITEM: FUEL TANK VALVE CONTROL CIRCUIT BREAKER

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-422X
NASA FMEA #: 05-6N-2018-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 422
ITEM: CONTROLLER POWER CIRCUIT POWER INPUT DIODE

LEAD ANALYST: J. BARNES

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

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

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87 NASA DATA:
ASSESSMENT ID: APU-423X BASELINE [ ]
NASA FMEA #: 05-6N-2022-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 423
ITEM: FUEL TANK VALVE SWITCH OUTPUT DIODE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-424X
NASA FMEA #: 05-6N-2025-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 424
ITEM: FUEL TANK VALVE GROUND MDM COMMAND DIODE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87 NASA DATA:
ASSESSMENT ID: APU-425X BASELINE [ ]
NASA FMEA #: 05-6N-2026-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 425
ITEM: FUEL TANK VALVE SWITCH OUTPUT RESISTOR

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87 NASA DATA:
ASSESSMENT ID: APU-426X BASELINE [ ]
NASA FMEA #: 05-6N-2030-1 NEW [X]

SUBSYSTEM: APU
MDAC ID: 426
ITEM: FUEL TANK VALVE AUTO SHUTDOWN DIODE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-427X
NASA FMEA #: 05-6N-2030A-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 427
ITEM: FUEL TANK VALVE AUTO SHUTDOWN INHIBIT DRIVER POWER FUSE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: APU-428X
NASA FMEA #: 05-6N-2033-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 428
ITEM: CONTROLLER POWER CIRCUIT SWITCH SCAN DIODE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-429X
NASA FMEA #: 05-6N-2036-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 429
ITEM: APU CONTROL CIRCUIT SWITCH SCAN DIODE

LEAD ANALYST: J. BARNES

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88 NASA DATA:
ASSESSMENT ID: APU-430X BASELINE [ ]
NASA FMEA #: 05-6N-2037-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 430
ITEM: APU CONTROL CIRCUIT CIRC PUMP INHIBIT DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

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

REMARKS:
CRITICALITY IS 1/1 FOR ABORT. NASA ANALYSIS SHOWS 1/1 FOR NORMAL MISSION TO EMPHASIZE FAILURE MODE CRITICALITY. IOA CONCURS.

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/05/87
ASSESSMENT ID: APU-431X
NASA FMEA #: 05-6N-2045-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 431
ITEM: LUBE OIL LINE HEATER SWITCH POWER DIODE - CR2

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-432X
NASA FMEA #: 05-6N-2048-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 432
ITEM: LUBE OIL LINE HEATER SWITCH SCAN DIODE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88 NASA DATA:
ASSESSMENT ID: APU-433X BASELINE [ ]
NASA FMEA #: 05-6N-2050-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 433
ITEM: LUBE OIL LINE HEATER GSE DRIVER DIODE

LEAD ANALYST: J. BARNES

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-434X
NASA FMEA #: 05-6N-2056-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 434
ITEM: TANK/FUEL LINE HEATER SWITCH SCAN DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87 NASA DATA:
ASSESSMENT ID: APU-435X BASELINE [ ]
NASA FMEA #: 05-6N-2057-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 435
ITEM: TANK/FUEL LINE HEATER GSE DRIVER DIODE

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88
ASSESSMENT ID: APU-436X
NASA FMEA #: 05-6N-2063-1

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 436
ITEM: GAS GEN/FUEL PUMP HEATER SWITCH DIODE - CR1, CR2, CR3, CR4

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/11/88 NASA DATA:
ASSESSMENT ID: APU-437X BASELINE [ ]
NASA FMEA #: 05-6N-2065-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 437
ITEM: GAS GEN/FUEL PUMP HEATER SWITCH SCAN DIODE

LEAD ANALYST: J. BARNES

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)

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

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

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/07/87
ASSESSMENT ID: APU-438X
NASA FMEA #: 05-6N-2066-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 438
ITEM: GAS GEN/FUEL PUMP HEATER GROUND COMMAND DRIVER DIODE

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: APU-439X
NASA FMEA #: 05-6N-2073-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 439
ITEM: GAS GEN HEATER DRIVER

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: APU-440X
NASA FMEA #: 05-6N-2074A-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 440
ITEM: FUEL PUMP/LINE HEATER DRIVER - TYPE 3

LEAD ANALYST: J. BARNES

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)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/28/88 NASA DATA:
ASSESSMENT ID: APU-441X BASELINE [ ]
NASA FMEA #: 05-6N-2045-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 441
ITEM: LUBE OIL LINE HEATER SWITCH POWER DIODE-CR2

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/28/88
ASSESSMENT ID: APU-442X
NASA FMEA #: 05-6N-2044-2

NASA DATA:
BASELINE [ ]
NEW [X]

SUBSYSTEM: APU
MDAC ID: 442
ITEM: LUBE OIL LINE HEATER SWITCH POWER RESISTOR

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 1/28/88 NASA DATA:
ASSESSMENT ID: APU-443X BASELINE [ ]
NASA FMEA #: 05-6N-2061-2 NEW [X]

SUBSYSTEM: APU
MDAC ID: 443
ITEM: GAS GENERATOR/FUEL PUMP HEATER SWITCH POWER RESISTOR

LEAD ANALYST: J. BARNES

ASSESSMENT:

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

RECOMMENDATIONS: (If different from NASA)

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

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [X]
INADEQUATE [ ]

REMARKS:

APPENDIX D

CRITICAL ITEMS

APPENDIX D
POTENTIAL CRITICAL ITEMS

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE
04-2-CFH02-1	239	INJECTOR COOLING H2O LINE FLEX HOSE	EXTERNAL LEAK, RESTRICTED FLOW
04-2-CL01-1	184	FUEL PUMP SEAL CAVITY DRAIN COLLECTOR	LEAKAGE
04-2-CL03-1	233	INJECTOR COOLING H_2O LINE AND FITTINGS UPSTREAM OF VALVE	LEAKAGE
04-2-CL03-2	234	INJECTOR COOLING H_2O LINE AND FITTINGS	RESTRICTED FLOW
04-2-CL1A-11	178	FUEL PUMP SEAL CAVITY DRAIN FLEX HOSE	EXTERNAL LEAK
04-2-CLV13-2	224	INJECTOR COOLING VALVE	STUCK OPEN, EXTERNAL LEAK
04-2-CONTL1-12	383	CONTROLLER PRIMARY SPEED CONTROL	PREMATURE OUTPUT
04-2-CONTL2-11	384	CONTROLLER HIGH SPEED CONTROL	LOSS OF OUTPUT
04-2-CONTL2-12	419	CONTROLLER HIGH SPEED CONTROL	PREMATURE OUTPUT (INADVERTENT HOT RESTART)
04-2-CONTL5-1	379	CONTROLLER SAFETY MONITORING	LOSS OF OUTPUT
04-2-CONTL5-12	380	CONTROLLER SAFETY MONITORING	PREMATURE OUTPUT
04-2-CONTL6-1	390	CONTROLLER GEARBOX PRESSURE CONTROL	LOSS OF OUTPUT
04-2-CONTL7-12	418	CONTROLLER INJECTOR COOLING CONTROL	PREMATURE APU START COMMAND
04-2-CTK01-1	230	INJECTOR COOLING H2O TANK	DIAPHRAGM LEAK
04-2-CTK01-2	229	INJECTOR COOLING H2O TANK	EXTERNAL LEAK
04-2-FBRV01-1	216	LUBE OIL FILTER BYPASS RELIEF VALVE	FAILS CLOSED
04-2-FL11-11	174	FUEL IN-LINE FILTER	BLOCKAGE
04-2-FL12-11	136	FUEL PUMP FILTER	BLOCKAGE
04-2-FL12-12	137	FUEL PUMP FILTER	FAILS TO FILTER
04-2-GG11-11	100	GAS GENERATOR	FAILS TO FUNCTION
04-2-GG11-2	101	GAS GENERATOR	LEAKAGE
04-2-GT11-2	195	GEARBOX	LOSS OF PRESSURIZATION

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE
04-2-GT11-11	106	GEARBOX	LOSS OF OUTPUT
04-2-HR116-11	401	FUEL LINE HEATER	FAIL OFF
04-2-L1-11	151	FUEL LINE-UPSTREAM	EXTERNAL LEAK
04-2-L1-11	152	FUEL LINE-DOWNSTREAM	EXTERNAL LEAK
04-2-L1-11	177	SEAL CAVITY DRAIN	EXTERNAL LEAK
04-2-L1A-11	157	FUEL LINE FLEX HOSE	LEAK
04-2-L2-11	197	LUBE OIL LINES	LEAK
04-2-L2A-11	198	LUBE OIL LINE FLEX HOSE	LEAK
04-2-L3-11	119	FUEL TANK GN2 LINE	LEAK
04-2-L4-11	104	EXHAUST DUCT	LEAK
04-2-LV11-10	125	FUEL TANK ISOL VLVE	BARRIER LEAK
04-2-LV11-10	126	FUEL TANK ISOL VLV	EXTERNAL LEAK
04-2-LV12-1	140	PRIMARY FUEL VALVE	FAILS TO OPEN
04-2-LV12-1	142	PRIMARY FUEL VALVE	INTERNAL LEAK
04-2-LV12-2	139	PRIMARY FUEL VALVE	FAILS TO CLOSE
04-2-LV12-2	141	PRIMARY FUEL VALVE	INTERNAL LEAK
04-2-LV13-1	146	SECONDARY FUEL VLV	FAILS OPEN
04-2-LV13-1	147	SECONDARY FUEL VLV	FAILS MID-POSITION
04-2-LV13-1	148	SECONDARY FUEL VLV	INTERNAL LEAK
04-2-LV13-2	145	SECONDARY FUEL VLV	FAILS TO OPEN
04-2-LV13-2	149	SECONDARY FUEL VLV	INTERNAL LEAK
04-2-LV14-1	192	GEARBOX PRESS VLV	FAILS TO OPEN
04-2-MD11-13	153	FUEL TANK HYDRAZINE FILL Q.D.	EXTERNAL LEAK
04-2-MD12-13	120	FUEL TANK GN2 FILL Q.D.	EXTERNAL LEAK
04-2-MD13-13	158	FUEL LINE HI POINT BLEED Q.D.	EXTERNAL LEAK
04-2-MD14-13	199	GEARBOX FILL Q.D.	EXTERNAL LEAK
04-2-MD14-13	201	GEARBOX HIGH POINT BLEED Q.D.	EXTERNAL LEAK
04-2-MD14-13	204	GEARBOX LOW POINT DRAIN Q.D.	EXTERNAL LEAK
04-2-MPU1-11	112	MAGNETIC PICKUP	NO OUTPUT
04-2-MPU2-1	113	MAGNETIC PICKUP	NO OUTPUT
04-2-PP11-10	128	FUEL PUMP	INTERNAL LEAK
04-2-PP11-11	129	FUEL PUMP	EXTERNAL LEAK
04-2-PP11-11	130	FUEL PUMP	NO OUTPUT
04-2-PP11-11	131	FUEL PUMP BYPASS VLV	FAILS OPEN
04-2-PP11-11	133	FUEL PUMP RELIEF VLV	RELIEVES AT LOW PRESSURE
04-2-PP11-11	135	FUEL PUMP RELIEF VLV	EXTERNAL LEAK
04-2-PP11-3	132	FUEL PUMP BYPASS VLV	FAILS CLOSED
04-2-PP12-11	187	LUBE OIL PUMP	NO OUTPUT
04-2-S112A-2	170	FUEL PUMP SEAL DRAIN LINE THERMOSTAT	FAIL CLOSED
04-2-S14A-2	167	FUEL LINE HEATER THERMOSTAT	FAIL CLOSED
04-2-S16A-1	164	FUEL LINE HEATER THERMOSTAT	FAIL OPEN

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE
04-2-S16A-2	165	FUEL LINE HEATER THERMOSTAT	FAIL CLOSED
04-2-S17A-2	173	FUEL PUMP/VALVE HTR THERMOSTAT	FAIL CLOSED
04-2-TH11-11	276	EXHAUST PLENUM HOUSING	EXTERNAL LEAK
04-2-TK11-11	115	FUEL TANK	RUPTURE AT OPERATING PRESS.
04-2-TK11-11	116	FUEL TANK	EXTERNAL LEAK
04-2-TK11-11	117	FUEL TANK	EXTERNAL LEAK
04-2-TK11-12	118	FUEL TANK	INTERNAL LEAK
04-2-TP11-13	155	FUEL LINE TEST Q.D.	EXTERNAL LEAK
04-2-TR11-11	103	TURBINE WHEEL	LOSS OF OUTPUT
04-2-TR12-1	102	TURBINE WHEEL	STRUCTURAL FAILURE
04-2-V12-13-1	143	PRIMARY FUEL VALVE	INTERNAL LEAK
04-2-V12-13-1	144	PRIMARY FUEL VALVE	EXTERNAL LEAK
04-2-V12-13-1	150	SECONDARY FUEL VLV	EXTERNAL LEAK
05-6N-2013-1	314	FUEL TANK VALVE SW	FAIL TO CLOSE
05-6N-2013-1	315	FUEL TANK VALVE SW	FAIL TO REMAIN CLOSED
05-6N-2013-2	316	FUEL TANK VALVE SW	FAIL TO OPEN
05-6N-2013-2	317	FUEL TANK VALVE SW	INADVERTENT OPERATION
05-6N-2014-2	319	FUEL TANK VLV DRIVER	FAIL ON
05-6N-2014-2	409	FUEL TANK VLV DRIVER	FAIL ON
05-6N-2015-2	421	FUEL TANK VALVE CIRCUIT BREAKER	FAIL CLOSED
05-6N-2016-1	288	"APU CNTLR PWR" SW	FAIL TO CLOSE
05-6N-2016-1	289	"APU CNTLR PWR" SW	FAIL TO REMAIN CLOSED
05-6N-2016-2	290	"APU CNTLR PWR" SW	FAIL TO OPEN
05-6N-2016-2	291	"APU CNTLR PWR" SW	INADVERTENT OPERATION
05-6N-2017-2	293	CONTROLLER POWER	FAIL CLOSED
05-6N-2018-1	294	CNTLR POWER DIODE	FAIL OPEN
05-6N-2018-2	422	CNTLR POWER DIODE	INTERNAL SHORT
05-6N-2022-1	323	FUEL TANK VLV DIODE	FAIL OPEN
05-6N-2022-2	423	FUEL TANK VLV DIODE	INTERNAL SHORT
05-6N-2025-2	424	FUEL TANK VLV DIODE	INTERNAL SHORT
05-6N-2026-1	425	FUEL TANK VALVE RESISTOR	FAIL OPEN
05-6N-2029-1	320	FUEL TANK VLV DRIVER	FAIL OFF
05-6N-2030-1	426	FUEL TANK VLV DIODE	FAIL OPEN
05-6N-2030A-1	427	FUEL TANK VALVE FUSE	FAIL OPEN
05-6N-2033-2	428	CNTLR POWER DIODE	INTERNAL SHORT
05-6N-2034-1	286	APU CNTLR CRCT FUSE	FAIL OPEN
05-6N-2035-1	280	"APU CONTROL" SW	FAIL TO CLOSE
05-6N-2035-1	281	"APU CONTROL" SW	FAIL TO REMAIN CLOSED
05-6N-2035-2	282	"APU CONTROL" SW	FAIL TO OPEN
05-6N-2035-2	406	"APU CONTROL" SW	INADVERTENT START
05-6N-2036-2	429	APU CNTLR SW DIODE	INTERNAL SHORT

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE
05-6N-2037-2	430	APU CONTROL CIRC PUMP INH DIODE	INTERNAL SHORT
05-6N-2040-1	309	AUTO SHTDWN SW FUSE	FAIL OPEN
05-6N-2042-1	305	"APU AUTO SHTDWN" SW	FAIL TO CLOSE
05-6N-2042-1	306	"APU AUTO SHUTDOWN" SWITCH	FAIL TO REMAIN CLOSED
05-6N-2042-2	307	"APU AUTO SHTDWN" SW	FAIL TO OPEN
05-6N-2042-2	308	"APU AUTO SHUTDOWN" SWITCH	INADVERTENT OPERATION
05-6N-2043-1	420	LUBE OIL LINE HEATER FUSE	FAIL OPEN
05-6N-2044-2	442	LUBE OIL LINE HEATER RESISTOR	INTERNAL SHORT
05-6N-2045-1	431	LUBE OIL LINE HEATER DIODE	FAIL OPEN
05-6N-2045-2	441	LUBE OIL LINE HEATER DIODE	INTERNAL SHORT
05-6N-2047-1	357	LUBE OIL LINE HTR SW	FAIL TO CLOSE
05-6N-2048-2	432	LUBE OIL LINE HTR DIODE	INTERNAL SHORT
05-6N-2050-2	433	LUBE OIL LINE HEATER DIODE	INTERNAL SHORT
05-6N-2051-2	361	LUBE OIL LINE HEATER DRIVER	DRIVER FAIL ON
05-6N-2055-1	348	FUEL HEATER SW	FAIL TO CLOSE
05-6N-2055-2	349	FUEL HEATER SW	FAIL TO OPEN
05-6N-2056-2	434	TANK/FUEL LINE HTR DIODE	INTERNAL SHORT
05-6N-2057-2	435	TANK/FUEL LINE HTR DIODE	INTERNAL SHORT
05-6N-2059-2	351	FUEL/H20 HEATER DRIVER	CIRCUIT DRIVER FAIL ON
05-6N-2059-A2	352	FUEL/H2O HEATER DRIVER	FUEL PUMP DRAIN
05-6N-2061-2	443	GAS GENERATOR/FUEL HEATER RESISTOR	INTERNAL SHORT
05-6N-2063-1	436	GAS GEN/FUEL PUMP HEATER DIODE	FAIL OPEN
05-6N-2064-1	353	GAS GEN/FUEL PUMP HEATER SW	FAIL TO CLOSE
05-6N-2064-2	354	GAS GEN/FUEL PUMP HEATER SW	FAIL TO OPEN
05-6N-2065-2	437	GAS GEN/FUEL PUMP HEATER DIODE	INTERNAL SHORT
05-6N-2066-2	438	GAS GEN/FUEL PUMP HEATER DIODE	INTERNAL SHORT
05-6N-2073-2	439	GAS GEN HEATER DRIVER	FAIL ON
05-6N-2074-2	356	GAS GEN/FUEL PUMP HEATER DRIVER	CIRCUIT DRIVER FAIL ON
05-6N-2074A-2	440	FUEL PUMP/LINE HEATER DRIVER	FAIL ON

APPENDIX E
DETAILED ANALYSIS

This appendix contains the IOA analysis worksheets supplementing previous results reported in STSEOS Working Paper 1.0-WP-VA86001-014, Analysis of the Auxiliary Power Unit, (12 December 1986). 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, 10 October 1986. 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: 12/22/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 401 ABORT: 3/1R

ITEM: FUEL LINE HEATER
FAILURE MODE: FAIL OFF, OR LOW OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) FUEL SYSTEM
3) FUEL LINE HEATER
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: MC363-0026-0016

CAUSES: BROKEN WIRE, THERMOSTAT FAILED OPEN, SHORT CIRCUIT, INSTALLATION ERROR

EFFECTS/RATIONALE:
LOSS OF REDUNDANCY FOR HEATING FUEL LINES. IF BOTH HEATERS ARE LOST, FUEL CAN FREEZE AND APU MAY BE LOST. CRITICALITY IS 3/1R FOR DEORBIT: 2 FAILURES AWAY FROM CRITICAL (1 MORE HEATER AND 1 MORE APU).

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/23/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 402 ABORT: 3/1R

ITEM: FUEL VALVE HEATER
FAILURE MODE: FAIL OFF, OR LOW OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) FUEL SYSTEM
3) FUEL VALVE HEATER
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: MC201-0001

CAUSES: BROKEN WIRE, THERMOSTAT FAILED OPEN, SHORT CIRCUIT, INSTALLATION ERROR

EFFECTS/RATIONALE:
LOSS OF REDUNDANCY FOR HEATING FUEL VALVES. IF BOTH HEATERS ARE LOST, FUEL CAN FREEZE AND APU MAY BE LOST. CRITICALITY IS 3/1R FOR DEORBIT: 2 FAILURES AWAY FROM CRITICAL (1 MORE HEATER AND 1 MORE APU).

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/29/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 2/1R
MDAC ID: 403 ABORT: 1/1

ITEM: GEARBOX FILL, VENT, AND DRAIN COUPLINGS
FAILURE MODE: FAILS OPEN

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) LUBE OIL SYSTEM
3) LUBE OIL LINES
4) GEARBOX FILL, VENT, AND DRAIN COUPLINGS
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: MC621-0038-0500

CAUSES: CORROSION, CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
1) LOSS OF LUBE OIL. 2) LOSS OF APU DUE TO GEARBOX FAILURE. CRITICALITY IS 2/1R DUE TO LOSS OF APU. ABORT: CRITICALITY IS 1/1 FOR ENGINE-OUT ABORTS DUE TO POSSIBLE LOSS OF ANOTHER MAIN ENGINE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/30/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 404 ABORT: 3/1R

ITEM: INJECTOR COOLING WATER TANK HEATER
FAILURE MODE: SHORT CIRCUIT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) INJECTOR COOLING SYSTEM
3) WATER TANK HEATER
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: MC363-0025-0002

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF REDUNDANCY FOR HEATING INJECTOR COOLING WATER TANK. IF BOTH HEATERS ARE LOST, WATER WILL FREEZE, AND INJECTOR COOLING WILL BE LOST. CRITICALITY IS 3/1R FOR DEORBIT BEFORE APU COOLDOWN. APU STARTED HOT COULD CAUSE FUEL TO DETONATE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/31/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 405 ABORT: 3/1R

ITEM: FUEL PUMP/GGVM COOLING WATER TANK HEATER
FAILURE MODE: SHORT CIRCUIT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) FUEL PUMP/GGVM COOLING SYSTEM
3) WATER TANK HEATER
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: MC363-0025-0002

CAUSES: CONTAMINATION, CORROSION

EFFECTS/RATIONALE:
LOSS OF HEATER REDUNDANCY FOR ONE SYSTEM WATER TANK. IF THE OTHER HEATER SET IS LOST, THE WATER TANK CAN FREEZE, CAUSING LOSS OF FUEL PUMP/GGVM COOLING REDUNDANCY. CRITICALITY IS 3/1R FOR DEORBIT BEFORE APU COOLDOWN. APU STARTED HOT CAN CAUSE FUEL TO DETONATE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/3
MDAC ID: 406 ABORT: 3/3

ITEM: "APU CONTROL" SWITCH
FAILURE MODE: INADVERTENT START/OVERRIDE COMMAND

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) APU CONTROL CIRCUIT
4) "APU CONTROL" SWITCH
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL R2
PART NUMBER:

CAUSES: VIBRATION, CONTAMINATION (SHORT)

EFFECTS/RATIONALE:
NO EFFECT - APU FUEL TANK VALVES WILL PREVENT FUEL FROM REACHING GAS GENERATOR.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/3
MDAC ID: 407 ABORT: 3/3

ITEM: CONTROLLER POWER CIRCUIT CONTROL INPUT DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) CONTROLLER POWER CIRCUIT
4) CONTROL DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AV BAY 4, 5, 6 (AFT PCA 4, 5, 6)
PART NUMBER:

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
NO EFFECT, DUE TO DIODES IN SERIES WITHIN THE CONTROLLER.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/08/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 408 ABORT: 2/1R

ITEM: FUEL TANK VALVE DRIVER - APU 2,3
FAILURE MODE: FAIL OFF, OR SHORT TO GROUND

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL TANK VALVE CONTROL CIRCUIT
4) CIRCUIT DRIVER
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: MC477-0261-0002

CAUSES: MANUFACTURING DEFECT, VIBRATION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF REDUNDANT FUEL TANK VALVE; OTHER VALVE ALLOWS APU TO OPERATE. CRITICALITY IS 3/1R DUE TO VALVE AND APU REDUNDANCY. ABORT: CRITICALITY IS 2/1R FOR ENGINE-OUT ABORTS, WHERE LOSS OF ONE APU CAN BE CRITICAL.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/08/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 409 ABORT: 3/1R

ITEM: FUEL TANK VALVE CIRCUIT DRIVER - APU 2,3
FAILURE MODE: FAIL ON

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL TANK VALVE CONTROL CIRCUIT
4) CIRCUIT DRIVER
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: MC477-0261-0002

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
NO EFFECT, DUE TO TWO OTHER CIRCUIT DRIVERS IN SERIES. IF ALL 3 DRIVERS FAILED ON, VALVE COULD OVERHEAT AND DETONATE FUEL (FIRE HAZARD DURING ENTRY). CRITICALITY IS 3/1R: 2 FAILURES AWAY FROM CRITICALITY 1.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/08/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 2/1R
MDAC ID: 410 ABORT: 2/1R

ITEM: "PUMP/VLV COOL" SWITCH
FAILURE MODE: SHORTS TO GROUND, SHORTS POLE-TO-POLE

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL PUMP/GGVM COOLING CONTROL CIRCUIT
4) "PUMP/VLV COOL" SWITCH
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL R2
PART NUMBER: ME452-0102-7301

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
LOSS OF ONE OF TWO FUEL PUMP/GGVM COOLING SYSTEMS. CRITICALITY IS 2/1R FOR DEORBIT BEFORE APU COOLDOWN. APU STARTED HOT CAN CAUSE FUEL TO DETONATE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/12/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 411 ABORT: 3/1R

ITEM: FUEL PUMP/GGVM COOLING CONTROL CIRCUIT TIMIMG DRIVER
FAILURE MODE: LOSS OF OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL PUMP/GGVM COOLING CONTROL CIRCUIT
4) TIMING DRIVER
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: APU TIMER BOX 1, 2, 3
PART NUMBER: MC477-0262-0002

CAUSES: MANUFACTURING DEFECT, PIECE-PART MECHANICAL FAILURE

EFFECTS/RATIONALE:
WORST CASE EFFECT IS LOSS OF REDUNDANT POWER TO ONE APU COOLING VALVE. CRITICALITY IS 3/1R FOR DEORBIT BEFORE APU COOLDOWN. APU STARTED HOT CAN CAUSE FUEL TO DETONATE.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/31/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 412 ABORT: 3/1R

ITEM: FUEL TEST LINE TEMPERATURE SENSOR V46T0183A (283,383) V46T0184A (284,384)
FAILURE MODE: NO OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) INSTRUMENTATION
3) FUEL TEST LINE TEMPERATURE SENSOR
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: ME449-0160-0003

CAUSES: MANUFACTURING DEFECT, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MECHANICAL SHOCK, CONTAMINATION, HANDLING DAMAGE

EFFECTS/RATIONALE:
WITH NO TEMPERATURE SENSING, A FAILED-ON HEATER CAN CAUSE FUEL DETONATION AND FIRE HAZARD. CRITICALITY IS 3/1R (HEATER FAILED ON + 2 SENSORS FAILED = CRITICAL).

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/31/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 413 ABORT: 3/1R

ITEM: FUEL PUMP SEAL CAVITY DRAIN LINE TEMPERATURE
SENSOR V46T0186A (286,386) V46T0170A (270,370)
FAILURE MODE: NO OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) INSTRUMENTATION
3) FUEL PUMP SEAL CAVITY DRAIN LINE TEMPERATURE SENSOR
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: ME449-0160-0003

CAUSES: MANUFACTURING DEFECT, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MECHANICAL SHOCK, CONTAMINATION, HANDLING DAMAGE

EFFECTS/RATIONALE:
WITH NO TEMPERATURE SENSING, AND FUEL IN THE LINE FROM A FUEL PUMP SEAL LEAK, A FAILED-ON HEATER CAN CAUSE FUEL DETONATION AND FIRE HAZARD. CRITICALITY IS 3/1R (FUEL PUMP SEAL LEAK + HEATER FAILED ON + 2 SENSORS FAILED = CRITICAL).

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 414 ABORT: 3/3

ITEM: FUEL LINE TEMPERATURE SENSOR V46T0104A (204,304)
FAILURE MODE: ERRONEOUS OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) INSTRUMENTATION
3) FUEL LINE TEMPERATURE SENSOR 1
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: ME449-0160-0003

CAUSES: MANUFACTURING DEFECT, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MECHANICAL SHOCK, CONTAMINATION, HANDLING DAMAGE

EFFECTS/RATIONALE:
LOSS OF REDUNDANCY FOR MONITORING OF HEATER STATUS. IF BOTH SENSORS ARE LOST, MISSION MAY BE TERMINATED EARLY.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 415 ABORT: 3/3

ITEM: FUEL LINE TEMPERATURE SENSOR V46T0108A (208,308)
FAILURE MODE: ERRONEOUS OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) INSTRUMENTATION
3) FUEL LINE TEMPERATURE SENSOR 2
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: ME449-0160-0003

CAUSES: MANUFACTURING DEFECT, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MECHANICAL SHOCK, CONTAMINATION, HANDLING DAMAGE

EFFECTS/RATIONALE:
LOSS OF REDUNDANCY FOR MONITORING OF HEATER STATUS. IF BOTH SENSORS ARE LOST, MISSION MAY BE TERMINATED EARLY.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 416 ABORT: 3/3

ITEM: FUEL PUMP OUTLET TEMPERATURE SENSOR V46T0112A (212,312)
FAILURE MODE: ERRONEOUS OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) INSTRUMENTATION
3) FUEL PUMP OUTLET TEMPERATURE SENSOR
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER: MC201-0001-0001

CAUSES: MANUFACTURING DEFECT, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MECHANICAL SHOCK, CONTAMINATION, HANDLING DAMAGE

EFFECTS/RATIONALE:
LOSS OF REDUNDANCY FOR MONITORING OF HEATER STATUS. IF OTHER SENSOR IS LOST (V46T0128A, 228, 328), MISSION MAY BE TERMINATED EARLY.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 417 ABORT: 3/3

ITEM: FUEL PUMP BYPASS LINE TEMPERATURE SENSOR V46T0128A (228,328)
FAILURE MODE: ERRONEOUS OUTPUT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) INSTRUMENTATION
3) FUEL PUMP BYPASS LINE TEMPERATURE SENSOR
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT COMPARTMENT
PART NUMBER:

CAUSES: MANUFACTURING DEFECT, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MECHANICAL SHOCK, CONTAMINATION, HANDLING DAMAGE

EFFECTS/RATIONALE:
LOSS OF REDUNDANCY FOR MONITORING OF HEATER STATUS. IF OTHER SENSOR IS LOST (V46T0112A, 212, 312), MISSION MAY BE TERMINATED EARLY.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 7/25/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/3
MDAC ID: 418 ABORT: 1/1

ITEM: CONTROLLER GG INJECTOR COOLING CONTROL
FAILURE MODE: PREMATURE START COMMAND

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) CONTROLLER
3) GG INJECTOR COOLING CONTROL
4)
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AV BAY 4, 5, 6
PART NUMBER: MC201-0001

CAUSES: PIECE-PART FAILURE, SHORT

EFFECTS/RATIONALE:
PREMATURE START OF HOT APU MAY CAUSE DETONATION OF FUEL IN INJECTOR, WITH SUBSEQUENT FUEL LEAK AND FIRE HAZARD. THIS CIRCUIT IS NOT USED DURING NORMAL MISSION.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 7/25/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 1/1
MDAC ID: 419 ABORT: 1/1

ITEM: CONTROLLER SECONDARY SPEED CONTROL
FAILURE MODE: PREMATURE OUTPUT - INADVERTENT APU RESTART

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) CONTROLLER
3) SPEED CONTROL
4) SECONDARY SPEED CONTROL
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AV BAY 4, 5, 6
PART NUMBER: MC201-0001

CAUSES: PIECE-PART FAILURE, SHORT

EFFECTS/RATIONALE:
IF HOT APU RESTARTS INADVERTENTLY DUE TO SPURIOUS OUTPUT TO OPEN SECONDARY FUEL VALVE, RESULT COULD BE FUEL DETONATION IN THE INJECTOR, WITH SUBSEQUENT FUEL LEAK AND FIRE HAZARD.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/04/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 420 ABORT: 3/2R

ITEM: LUBE OIL LINE HEATER SWITCH POWER FUSE
FAILURE MODE: FAIL OPEN

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) LUBE OIL LINE HEATER CONTROL CIRCUIT
4) SWITCH POWER FUSE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL A12
PART NUMBER: ME451-0018-0100

CAUSES: PIECE-PART STRUCTURAL FAILURE, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
NO EFFECT FROM FIRST FAILURE, DUE TO SWITCH CONTACT REDUNDANCY. IF FUNCTION IS LOST, MISSION MAY HAVE TO BE CUT SHORT TO AVOID LOSS OF APUs DUE TO COLD LUBE OIL.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 2/1R
MDAC ID: 421 ABORT: 2/1R

ITEM: FUEL TANK VALVE CONTROL CIRCUIT BREAKER
FAILURE MODE: FAIL CLOSED

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL TANK VALVE CONTROL CIRCUIT
4) CIRCUIT BREAKER
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL R2
PART NUMBER: MC454-0026-2030

CAUSES: PIECE-PART STRUCTURAL FAILURE, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
IF SWITCH ALSO FAILS CLOSED, VALVE IS POWERED CONTINUOUSLY, FUEL CAN OVERHEAT AND DETONATE, LEADING TO FUEL LEAK AND POSSIBLE FIRE.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 422 ABORT: 3/1R

ITEM: CONTROLLER POWER CIRCUIT POWER INPUT DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) CONTROLLER POWER CIRCUIT
4) POWER INPUT DIODE
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:	3/1R		

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: AV BAY 4, 5, 6
PART NUMBER: JANTX1N1188R

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
FAILURE OF BOTH DIODES TO ONE APU CONTROLLER TIES TWO MAIN BUSES TOGETHER. A SHORT ON ONE MAIN BUS CAN DROP VOLTAGE ON BOTH MAINS, LEADING TO LOSS OF ONE APU AND OTHER EFFECTS.

REFERENCES:

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 423 ABORT: 3/1R

ITEM: FUEL TANK VALVE SWITCH OUTPUT DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL TANK VALVE CONTROL CIRCUIT
4) SWITCH OUTPUT DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
THIS FAILURE PLUS THREE OTHER FAILURES (SWITCH CONTACT SHORTS, DIODE SHORTS, SWITCH SHORTS POLE-TO-POLE) CAN CAUSE INADVERTENT ENERGIZING OF ISOLATION VALVE. SOLENOID CAN OVERHEAT ON-ORBIT, LEADING TO FUEL DECOMPOSITION AND FUEL LINE RUPTURE.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 424 ABORT: 3/1R

ITEM: FUEL TANK VALVE GROUND MDM COMMAND DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL TANK VALVE CONTROL CIRCUIT
4) GROUND MDM COMMAND DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
THIS FAILURE PLUS TWO OTHERS (2 SWITCH CONTACTS FAIL CLOSED, CIRCUIT BREAKER FAIL CLOSED) CAN CAUSE INADVERTENT ENERGIZING OF ISOLATION VALVE. SOLENOID CAN OVERHEAT ON-ORBIT, LEADING TO FUEL DECOMPOSITION AND FUEL LINE RUPTURE.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 425 ABORT: 3/1R

ITEM: FUEL TANK VALVE SWITCH OUTPUT RESISTOR
FAILURE MODE: FAIL OPEN

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL TANK VALVE CONTROL CIRCUIT
4) SWITCH OUTPUT RESISTOR
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:	3/1R		

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: RLR42C120GR

CAUSES: MECHANICAL SHOCK, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
FOUR RESISTORS MUST FAIL TO FAIL BOTH FUEL TANK VALVES AND LOSE ONE APU. LOSS OF VEHICLE REQUIRES ANOTHER APU FAILURE.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 426 ABORT: 3/1R

ITEM: FUEL TANK VALVE AUTO SHUTDOWN DIODE
FAILURE MODE: FAIL OPEN

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL TANK VALVE CONTROL CIRCUIT
4) AUTO SHUTDOWN DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANXV1N5551

CAUSES: MECHANICAL SHOCK, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
IN ORDER TO PREVENT APU AUTO SHUTDOWN, TWO DIODE FAILURES PLUS A SECONDARY FUEL VALVE FAILURE ARE REQUIRED. OVERSPEEDING APU CAN CAUSE SHRAPNEL AND FIRE HAZARD.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 427 ABORT: 3/1R

ITEM: FUEL TANK VALVE AUTO SHUTDOWN INHIBIT DRIVER POWER FUSE
FAILURE MODE: FAIL OPEN

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL TANK VALVE CONTROL CIRCUIT
4) FUEL TANK VALVE AUTO SHUTDOWN INHIBIT DRIVER POWER FUSE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT PCA 1, 2, 3
PART NUMBER: ME451-0018-0300

CAUSES: MECHANICAL SHOCK, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
LOSS OF THIS FUSE ELIMINATES AUTO SHUTDOWN CAPABILITY FOR FUEL TANK VALVES. APU OVERSPEED REQUIRES FAILURE OF SECONDARY FUEL VALVE PLUS FAILURE OF PRIMARY FUEL VALVE. APU OVERSPEED PRODUCES SHRAPNEL AND FIRE HAZARD.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	8/06/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	APU	FLIGHT:	3/1R
MDAC ID:	428	ABORT:	2/1R

ITEM: CONTROLLER POWER CIRCUIT SWITCH SCAN DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) CONTROLLER POWER CIRCUIT
4) SWITCH SCAN DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT PCA 4, 5, 6
PART NUMBER: JANTXV1N4246

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
FAILURE OF TWO DIODES REMOVES BUS ISOLATION FROM TWO CONTROL BUSES; ANY VOLTAGE DIFFERENCE CAN BLOW ONE FUSE AND LOSE ONE CONTROLLER POWER SOURCE. ONE SUBSEQUENT FAILURE CAN LOSE ONE APU. LOSS OF ONE MORE APU IS LOSS OF VEHICLE. ABORT: LOSS OF ONE APU CAN CAUSE LOSS OF VEHICLE.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 429 ABORT: 2/1R

ITEM: APU CONTROL CIRCUIT SWITCH SCAN DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) APU CONTROL CIRCUIT
4) SWITCH SCAN DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
FIRST FAILURE TIES ONE CONTROL BUS TO ANOTHER; VOLTAGE DIFFERENCE CAN BLOW A SWITCH POWER FUSE. SUBSEQUENT FAILURE OF SECOND FUSE CAUSES LOSS OF ONE APU. LOSS OF ANOTHER APU IS LOSS OF VEHICLE.
ABORT: LOSS OF ONE APU CAN CAUSE LOSS OF VEHICLE.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/3
MDAC ID: 430 ABORT: 1/1

ITEM: APU CONTROL CIRCUIT CIRC PUMP INHIBIT DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) APU CONTROL CIRCUIT
4) CIRC PUMP INHIBIT DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
SHORTS OVERRIDE START COMMAND TO NORMAL START COMMAND; APU HOT START CAN LEAD TO APU PREMATURE START, WITH POTENTIAL FOR DETONATION, FUEL LEAK, AND FIRE HAZARD. CRITICALITY IS 1/1 FOR ABORT.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/05/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 431 ABORT: 3/3

ITEM: LUBE OIL LINE HEATER SWITCH POWER DIODE - CR2
FAILURE MODE: FAIL OPEN

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) LUBE OIL LINE HEATER CONTROL CIRCUIT
4) SWITCH POWER DIODE - CR2
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL A12
PART NUMBER: JANTXV1N4626

CAUSES: MECHANICAL SHOCK, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
DIODE FAILURE PLUS ANOTHER DIODE FAILURE CAN FAIL BOTH LUBE OIL HEATERS ON ONE APU. THIS SITUATION REPRESENTS LOSS OF MISSION.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/11/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 432 ABORT: 3/1R

ITEM: LUBE OIL LINE HEATER SWITCH SCAN DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) LUBE OIL LINE HEATER CONTROL CIRCUIT
4) SWITCH SCAN DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
THIS FAILURE PLUS THREE OTHERS (SWITCH FAIL CLOSED, THERMOSTAT FAIL CLOSED, LOSS OF ANOTHER APU) IS LOSS OF CREW/VEHICLE. OVERHEATING OF LUBE OIL DUE TO HEATER STUCK ON CAN CAUSE OIL SOLIDIFICATION, LOSS OF APU.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 433 ABORT: 3/1R

ITEM: LUBE OIL LINE HEATER GSE DRIVER DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) LUBE OIL LINE HEATER CONTROL CIRCUIT
4) GSE DRIVER DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
FAILURE OF 2 DIODES ALLOWS ONE SWITCH CONTACT TO ACTIVATE HEATER. IF SWITCH CONTACT FAILS ON, HEATER IS STUCK ON. APU MAY BE LOST.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/11/88	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	APU	FLIGHT:	3/1R
MDAC ID:	434	ABORT:	3/1R

ITEM: TANK/FUEL LINE HEATER SWITCH SCAN DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL/H2O HEATER CONTROL CIRCUIT
4) TANK/FUEL LINE HEATER SWITCH SCAN DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
THIS FAILURE PLUS TWO OTHERS (SWITCH FAIL CLOSED, THERMOSTAT FAIL CLOSED) CAN LEAD TO FUEL DECOMPOSITION AND LINE RUPTURE - OVERHEAT DUE TO HEATER STUCK ON.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 435 ABORT: 3/1R

ITEM: TANK/FUEL LINE HEATER GSE DRIVER DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) FUEL/H2O LINE HEATER CONTROL CIRCUIT
4) TANK/FUEL LINE HEATER GSE DRIVER DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
TWO DIODE FAILURES ALLOW VOLTAGE DIFFERENCE BETWEEN CONTROL BUSES TO BLOW ONE SWITCH POWER FUSE, KILLING ONE SET OF HEATERS. SAME FAILURE MODE CAN KILL SECOND HEATER SET, ALLOWING FUEL LINES TO FREEZE, WITH POSSIBLE FUEL LEAK AND FIRE.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 436 ABORT: 3/2R

ITEM: GAS GEN/FUEL PUMP HEATER SWITCH DIODE - CR1, CR2, CR3, CR4
FAILURE MODE: FAIL OPEN

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) GG/FUEL PUMP HEATER CONTROL CIRCUIT
4) SWITCH DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL A12
PART NUMBER: JANTXV1N4246

CAUSES: MECHANICAL SHOCK, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
THIS FAILURE PLUS TWO OTHERS (DIODE FAIL OPEN, REDUNDANT HEATERS FAIL) CAUSES LOSS OF HEATERS FOR ONE APU. MISSION MUST BE TERMINATED EARLY.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/07/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 437 ABORT: 3/1R

ITEM: GAS GEN/FUEL PUMP HEATER SWITCH SCAN DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) GG/FUEL PUMP HEATER CONTROL CIRCUIT
4) SWITCH SCAN DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
TWO DIODE FAILURES CONNECT ALL 3 FUEL PUMP/VALVE HEATERS TO ONE SWITCH CONTACT. FAILURE OF SWITCH CONTACT (SHORTED) PLUS THERMOSTAT FAIL ON CAUSES HEATER TO BE STUCK ON. FUEL CAN DETONATE, LEADING TO LINE RUPTURE AND FIRE HAZARD.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/07/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 438 ABORT: 3/1R

ITEM: GAS GEN/FUEL PUMP HEATER GROUND COMMAND DRIVER DIODE
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) GG/FUEL PUMP HEATER CONTROL CIRCUIT
4) GROUND COMMAND DRIVER DIODE
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: JANTXV1N5551

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
TWO DIODE FAILURES TIE ALL 3 HEATER DRIVERS TO ONE SWITCH CONTACT. SWITCH CONTACT FAILURE (SHORT) PLUS THERMOSTAT FAILED CLOSED RESULTS IN HEATER STUCK ON. RESULT CAN BE FUEL DETONATION, WITH FUEL LEAK AND FIRE HAZARD.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 439 ABORT: 3/1R

ITEM: GAS GEN HEATER DRIVER
FAILURE MODE: FAIL ON

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) GG/FUEL PUMP HEATER CONTROL CIRCUIT
4) GG HEATER DRIVER
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: MC477-0263-0002

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
TWO DRIVERS FAILED ON WILL FAIL ONE HEATER ON. THAT APU WILL NOT BE SAFELY STARTABLE, IF INJECTOR COOLING IS LOST. LOSS OF ONE MORE APU IS LOSS OF CREW/VEHICLE.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 8/06/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/1R
MDAC ID: 440 ABORT: 3/1R

ITEM: FUEL PUMP/LINE HEATER DRIVER - TYPE 3
FAILURE MODE: FAIL ON

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) GG/FUEL PUMP HEATER CONTROL CIRCUIT
4) FUEL PUMP/LINE HEATER DRIVER - TYPE 3
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: AFT LCA 1, 2, 3
PART NUMBER: MC477-0263-0002

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
THREE DRIVER FAILURES CAUSE HEATER TO FAIL ON. RESULT CAN BE FUEL DETONATION, LEADING TO FUEL LEAK AND FIRE HAZARD DURING ENTRY.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/28/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 441 ABORT: 3/2R

ITEM: LUBE OIL LINE HEATER SWITCH POWER DIODE-CR2
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) LUBE OIL LINE HEATER CONTROL CIRCUIT
4) SWITCH POWER DIODE-CR2
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL A12
PART NUMBER: JANTXV1N4626

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
DIODE SHORT TIES TWO CONTROL BUSES TOGETHER. CONTROL BUS SHORT CAN BLOW FUSE, LEADING TO LOSS OF ONE LUBE OIL LINE HEATER. LOSS OF NEXT HEATER IS LOSS OF MISSION.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/28/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 442 ABORT: /

ITEM: LUBE OIL LINE HEATER SWITCH POWER RESISTOR
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) LUBE OIL LINE HEATER CONTROL CIRCUIT
4) SWITCH POWER RESISTOR
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL A12
PART NUMBER: RER65F2150M

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
RESISTOR SHORT PLUS DIODE SHORT IN SAME POWER CIRCUIT PLUS SHORTED CONTROL BUS KILLS ONE LUBE OIL LINE HEATER. LOSS OF REDUNDANT HEATER IS LOSS OF MISSION.

REFERENCES: VS70-460109, ROCKWELL INT.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/28/88 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: APU FLIGHT: 3/2R
MDAC ID: 443 ABORT: 3/2R

ITEM: GAS GENERATOR/FUEL PUMP HEATER SWITCH POWER RESISTOR
FAILURE MODE: INTERNAL SHORT

LEAD ANALYST: J. BARNES SUBSYS LEAD: J. BARNES

BREAKDOWN HIERARCHY:
1) APU
2) ELECTRICAL SYSTEM
3) GG/FUEL PUMP HEATER CONTROL CIRCUIT
4) SWITCH POWER RESISTOR
5)
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PANEL A12
PART NUMBER: RWR80N6190FR

CAUSES: CONTAMINATION, MANUFACTURING DEFECT

EFFECTS/RATIONALE:
RESISTOR SHORT PLUS DIODE SHORT PLUS CONTROL BUS VOLTAGE DIFFERENCE CAN DAMAGE WIRING, CAUSING LOSS OF GG/FUEL PUMP HEATER. IF REDUNDANT HEATERS ARE LOST, MISSION MUST BE TERMINATED.

REFERENCES: VS70-460109, ROCKWELL INT.

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 Resolution/Issue/Rationale Codes

Code	Definition
1	IOA recommends a higher criticality.
2	IOA recommends an additional failure mode.
3	IOA recommends a lower criticality.
4	IOA recommends a change to a redundancy screen.
5	IOA concurs with NASA analysis.
6	IOA generated a non-credible failure mode.

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
04-2-0104-2	APU-414X	3/2R	P	P	P	/				5	
04-2-0108-2	APU-415X	3/2R	P	P	P	/				5	
04-2-0112-2	APU-416X	3/2R	P	P	P	/				5	
04-2-0115-1	APU-324	3/3	NA	NA	NA	/				5	
04-2-0115-2	APU-325	3/3	NA	NA	NA	/				5	
04-2-0122-1	APU-375	3/3	NA	NA	NA	/				5	
04-2-0151-1	APU-374	3/1R	P	P	P	/				5	
04-2-0183-1	APU-412X	3/3	NA	NA	NA	/				5	
04-2-0183-2	APU-376	3/1R	P	P	P	/				5	
04-2-0186-1	APU-413X	3/3	NA	NA	NA	/				5	
04-2-0186-2	APU-377	3/1R	P	P	P	/				5	
04-2-CFD01-2	APU-235	1/1	NA	NA	NA	/				5	
04-2-CFD02-3	APU-258	3/3	NA	NA	NA	/				5	
04-2-CFH01-1	APU-262	3/3	P	P	P	/				5	
04-2-CFH02-1	APU-239	1/1	NA	NA	NA	/				5	
04-2-CGC01-1	APU-231	1/1	NA	NA	NA	/				5	
04-2-CHR01-1	APU-404X	3/3	NA	NA	NA	/				5	
	APU-405X	3/3	NA	NA	NA	/				5	
04-2-CHR01-2	APU-240	3/3	NA	NA	NA	/				5	
	APU-268	3/3	NA	NA	NA	/				5	
04-2-CHR03-1	APU-243	3/3	NA	NA	NA	/				5	
	APU-271	3/3	NA	NA	NA	/				5	
04-2-CL01-1	APU-184	2/1R	P	P	P	/				5	
04-2-CL03-1	APU-233	3/3	NA	NA	NA	/				5	
	APU-237	3/3	NA	NA	NA	/				5	
04-2-CL03-2	APU-234	3/3	NA	NA	NA	/				5	
	APU-238	3/3	NA	NA	NA	/				5	
04-2-CL10-1	APU-248	3/3	P	P	P	/				5	
	APU-253	3/3	P	P	P	/				5	
	APU-256	3/3	NA	NA	NA	/				5	
	APU-260	3/3	NA	NA	NA	/				5	
04-2-CL1A-11	APU-178	2/1R	P	P	P	/				5	
04-2-CLV06-1	APU-264	3/3	NA	NA	NA	/				5	
	APU-267	3/3	NA	NA	NA	/				5	
04-2-CLV06-3	APU-265	3/3	NA	NA	NA	/				5	
04-2-CLV13-1	APU-226	3/3	NA	NA	NA	/				5	
	APU-266	3/3	NA	NA	NA	/				5	
04-2-CLV13-2	APU-224	3/3	NA	NA	NA	/				5	
	APU-225	3/3	NA	NA	NA	/				5	
	APU-227	3/3	NA	NA	NA	/				5	
	APU-228	3/3	NA	NA	NA	/				5	
04-2-CLV15-1	APU-250	3/3	NA	NA	NA	/				5	
	APU-252	3/3	NA	NA	NA	/				5	
04-2-CLV15-2	APU-251	3/3	NA	NA	NA	/				5	
04-2-CNA01-1	APU-263	3/3	NA	NA	NA	/				5	

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
04-2-CONTL1-1	APU-382	3/1R	P	P	P	/				5	
04-2-CONTL1-12	APU-383	2/1R	P	P	P	/				5	
04-2-CONTL2-11	APU-384	2/1R	P	P	P	/				5	
04-2-CONTL2-12	APU-419X	1/1	NA	NA	NA	/				5	
04-2-CONTL2-2	APU-385	3/1R	P	P	P	/				5	
04-2-CONTL3-1	APU-392	3/1R	P	P	P	/				5	
04-2-CONTL3-2	APU-393	3/3	NA	NA	NA	/				5	
04-2-CONTL3-3	APU-394	3/3	NA	NA	NA	/				5	
04-2-CONTL3-4	APU-395	3/1R	P	P	P	/				5	
04-2-CONTL5-1	APU-379	2/1R	P	F	P	/				5	
04-2-CONTL5-12	APU-380	2/1R	P	P	P	/				5	
04-2-CONTL6-1	APU-390	3/1R	P	F	P	/				5	
04-2-CONTL7-1	APU-398	1/1	NA	NA	NA	/				5	
04-2-CONTL7-12	APU-418X	3/3	NA	NA	NA	/				5	
04-2-CRV01-1	APU-246	3/3	NA	NA	NA	/				5	
04-2-CRV01-2	APU-247	3/3	NA	NA	NA	/				5	
04-2-CS01-1	APU-242	3/3	NA	NA	NA	/				5	
	APU-270	3/3	NA	NA	NA	/				5	
04-2-CS01-2	APU-241	3/3	NA	NA	NA	/				5	
	APU-269	3/3	NA	NA	NA	/				5	
04-2-CS03-1	APU-245	3/3	NA	NA	NA	/				5	
04-2-CS03-2	APU-244	3/3	NA	NA	NA	/				5	
04-2-CS10-1	APU-273	3/3	NA	NA	NA	/				5	
04-2-CS10-2	APU-272	3/3	NA	NA	NA	/				5	
04-2-CTK01-1	APU-230	3/3	NA	NA	NA	/				5	
04-2-CTK01-2	APU-229	3/3	NA	NA	NA	/				5	
04-2-CTK06-1	APU-255	3/3	NA	NA	NA	/				5	
04-2-CTK06-2	APU-254	3/3	NA	NA	NA	/				5	
04-2-FBRV01-1	APU-216	3/1R	F	F	P	/				5	
04-2-FL11-11	APU-174	2/1R	F	P	P	/				5	
04-2-FL11-12	APU-176	3/3	NA	NA	NA	/				5	
04-2-FL12-11	APU-136	2/1R	F	P	P	/				5	
04-2-FL12-12	APU-137	2/1R	F	F	P	/				5	
04-2-FL13-11	APU-213	3/1R	P	P	P	/				5	
04-2-FL13-12	APU-214	3/1R	P	P	P	/				5	
04-2-GG11-11	APU-100	2/1R	P	P	P	/				5	
04-2-GG11-2	APU-101	1/1	NA	NA	NA	/				5	
04-2-GT11-11	APU-106	2/1R	P	P	P	/				5	
	APU-203	2/1R	P	P	P	/				5	
	APU-215	2/1R	P	P	P	/				5	
	APU-220	2/1R	P	P	P	/				5	
	APU-222	2/1R	P	P	P	/				5	
	APU-278	2/1R	P	P	P	/				5	
04-2-GT11-2	APU-195	2/1R	P	P	P	/				5	
	APU-279	2/1R	P	P	P	/				5	
04-2-HR10-2	APU-402X	3/2R	F	P	P	/				5	
04-2-HR11-11	APU-160	3/2R	P	P	P	/				5	
04-2-HR111-1	APU-168	3/1R	P	P	P	/				5	
04-2-HR116-11	APU-401X	3/2R	F	P	P	/				5	
04-2-HR13-11	APU-107	3/3	NA	NA	NA	/				5	

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
04-2-HR13-11	APU-108	3/3	NA	NA	NA	/				5	
	APU-109	3/3	NA	NA	NA	/				5	
04-2-HR14-11	APU-163	3/2R	P	P	P	/				5	
04-2-HR17-11	APU-171	3/2R	P	P	P	/				5	
04-2-HR18-11	APU-210	3/2R	P	P	P	/				5	
04-2-L1-11	APU-151	1/1	NA	NA	NA	/				5	
	APU-152	1/1	NA	NA	NA	/				5	
	APU-175	1/1	P	P	P	/				5	
	APU-177	1/1	P	P	P	/				5	
04-2-L1A-11	APU-157	1/1	NA	NA	NA	/				5	
04-2-L2-11	APU-197	2/1R	P	P	P	/				5	
04-2-L2A-11	APU-198	2/1R	P	P	P	/				5	
04-2-L3-11	APU-119	2/1R	P	P	P	/				5	
04-2-L4-11	APU-104	1/1	NA	NA	NA	/				5	
	APU-105	1/1	NA	NA	NA	/				5	
04-2-LV11-10	APU-125	1/1	NA	NA	NA	/				5	
	APU-126	1/1	NA	NA	NA	/				5	
04-2-LV11-11	APU-122	3/1R	P	P	P	/				5	
	APU-124	3/1R	P	P	P	/				5	
04-2-LV11-12	APU-123	3/1R	F	P	P	/				5	
04-2-LV11-14	APU-127	3/1R	P	P	P	/				5, 6	
04-2-LV12-1	APU-140	2/1R	P	P	P	/				5	
	APU-142	2/1R	P	P	P	/				5	
04-2-LV12-2	APU-139	2/1R	P	P	F	/				5	
	APU-141	2/1R	P	P	P	/				5	
04-2-LV13-1	APU-146	1/1	NA	NA	NA	/				5	
	APU-147	1/1	NA	NA	NA	/				5	
	APU-148	1/1	NA	NA	NA	/				5	
04-2-LV13-2	APU-145	2/1R	P	P	P	/				5	
	APU-149	2/1R	P	P	P	/				5	
04-2-LV14-1	APU-192	3/1R	F	F	P	/				5	
04-2-LV14-2	APU-193	3/3	P	P	P	/				5	
	APU-194	3/3	P	P	P	/				5	
04-2-MD11-11	APU-154	3/3	NA	NA	NA	/				5	
04-2-MD11-13	APU-153	2/1R	F	F	P	/				5	
04-2-MD12-11	APU-121	3/3	NA	NA	NA	/				5	
04-2-MD12-13	APU-120	3/1R	F	F	P	/				5	
04-2-MD13-11	APU-159	3/3	NA	NA	NA	/				5	
04-2-MD13-13	APU-158	2/1R	F	F	P	/				5	
04-2-MD14-1	APU-200	3/3	NA	NA	NA	/				5	
	APU-202	3/3	NA	NA	NA	/				5	
	APU-205	3/3	NA	NA	NA	/				5	
04-2-MD14-13	APU-199	3/1R	F	F	P	/				5	
	APU-201	3/1R	F	F	P	/				5	
	APU-204	3/1R	F	F	P	/				5	
04-2-MD14-2	APU-403X	3/1R	P	NA	P	/				5	
04-2-MD17-1	APU-207	3/3	NA	NA	NA	/				5	
04-2-MD17-2	APU-206	3/1R	P	NA	P	/				5	
04-2-MD19-1	APU-191	3/3	NA	NA	NA	/				5	
04-2-MD19-2	APU-188	3/1R	P	P	P	/				5	

IDENTIFIERS		NASA				IDA RECOMMENDATIONS *					
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04-2-MD19-2	APU-190	3/2R	P	P	P	/				5	
04-2-MPU1-11	APU-112	2/1R	P	P	P	/				5	
04-2-MPU2-1	APU-113	3/1R	P	F	P	/				5	
04-2-MPU3-1	APU-114	3/1R	P	P	P	/				5	
04-2-MV01-1	APU-185	3/1R	P	P	P	/				5	
04-2-MV01-2	APU-186	3/3	NA	NA	NA	/				5	
04-2-01XX-1	APU-378	3/3	NA	NA	NA	/				5	
04-2-PP11-10	APU-128	1/1	NA	NA	NA	/				5	
04-2-PP11-11	APU-129	2/1R	P	P	P	/				5	
	APU-130	2/1R	P	P	P	/				5	
	APU-131	2/1R	P	P	P	/				5	
	APU-133	2/1R	P	P	P	/				5	
	APU-135	2/1R	P	P	P	/				5	
	APU-138	2/1R	P	P	P	/				5	
04-2-PP11-3	APU-132	2/1R	P	P	P	/				5	
04-2-PP12-11	APU-187	2/1R	P	P	P	/				5	
04-2-RV02-1	APU-182	3/1R	P	P	P	/				5	
04-2-RV02-2	APU-180	3/1R	P	P	P	/				5	
	APU-181	3/1R	P	P	P	/				5	
04-2-RV02-3	APU-183	3/1R	P	P	P	/				5	
04-2-S111-1	APU-110	3/3	NA	NA	NA	/				5	
04-2-S111-2	APU-111	3/3	NA	NA	NA	/				5	
04-2-S112A-1	APU-169	3/1R	P	P	P	/				5	
04-2-S112A-2	APU-170	2/1R	P	P	P	/				5	
04-2-S11A-11	APU-161	3/2R	P	P	P	/				5	
04-2-S11A-12	APU-162	3/3	NA	NA	NA	/				5	
04-2-S14A-1	APU-166	3/2R	P	P	P	/				5	
04-2-S14A-2	APU-167	2/1R	P	P	P	/				5	
04-2-S16A-1	APU-164	3/2R	F	P	P	/				5	
04-2-S16A-2	APU-165	2/1R	P	P	P	/				5	
04-2-S17A-1	APU-172	3/2R	P	P	P	/				5	
04-2-S17A-2	APU-173	2/1R	P	P	P	/				5	
04-2-S18A-1	APU-211	3/2R	P	P	P	/				5	
04-2-S18A-2	APU-212	3/3	NA	NA	NA	3/1R	P	P	P	1	X
04-2-TH11-11	APU-276	2/1R	F	P	P	/				5	
04-2-TK11-11	APU-115	1/1	NA	NA	NA	/				5	
	APU-116	1/1	NA	NA	NA	/				5	
	APU-117	1/1	NA	NA	NA	/				5	
04-2-TK11-12	APU-118	2/1R	P	P	P	/				5	
04-2-TP11-11	APU-156	3/3	NA	NA	NA	/				5	
04-2-TP11-13	APU-155	2/1R	F	F	P	/				5	
04-2-TR11-11	APU-103	2/1R	P	P	P	/				5	
	APU-277	2/1R	P	P	P	/				5	
04-2-TR12-1	APU-102	1/1	NA	NA	NA	/				5	
04-2-V12-13-1	APU-143	1/1	NA	NA	NA	/				5	
	APU-144	1/1	NA	NA	NA	/				5	
	APU-150	1/1	NA	NA	NA	/				5	
05-6N-2000-1	APU-326	3/3	NA	NA	NA	/				5	
	APU-327	3/3	NA	NA	NA	/				5	
	APU-328	3/3	NA	NA	NA	/				5	

IDENTIFIERS		NASA				IOA RECOMMENDATIONS *				
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05-6N-2000-1	APU-329	3/3	NA	NA	NA	/				5	
	APU-330	3/3	NA	NA	NA	/				5	
	APU-331	3/3	NA	NA	NA	/				5	
	APU-332	3/3	NA	NA	NA	/				5	
	APU-333	3/3	NA	NA	NA	/				5	
	APU-334	3/3	NA	NA	NA	/				5	
	APU-335	3/3	NA	NA	NA	/				5	
	APU-336	3/3	NA	NA	NA	/				5	
	APU-337	3/3	NA	NA	NA	/				5	
	APU-338	3/3	NA	NA	NA	/				5	
	APU-339	3/3	NA	NA	NA	/				5	
	APU-340	3/3	NA	NA	NA	/				5	
	APU-341	3/3	NA	NA	NA	/				5	
	APU-342	3/3	NA	NA	NA	/				5	
	APU-343	3/3	NA	NA	NA	/				5	
	APU-344	3/3	NA	NA	NA	/				5	
	APU-345	3/3	NA	NA	NA	/				5	
	APU-346	3/3	NA	NA	NA	/				5	
	APU-347	3/3	NA	NA	NA	/				5	
	APU-410X	3/3	NA	NA	NA	/				5	
	APU-411X	3/3	NA	NA	NA	/				5	
05-6N-200100-1	APU-372	3/3	NA	NA	NA	/				5	
	APU-373	3/3	NA	NA	NA	/				5	
05-6N-200400-1	APU-298	3/1R	P	P	P	/				5	
	APU-299	3/1R	P	P	P	/				5	
	APU-302	3/3	NA	NA	NA	/				5	
05-6N-200400-2	APU-300	3/3	P	P	P	/				5	
	APU-301	3/3	P	P	P	/	NA	NA	NA	5	
	APU-303	3/3	P	P	P	/	NA	NA	NA	5	
05-6N-200900-1	APU-364	3/3	NA	NA	NA	/				5	
	APU-365	3/3	NA	NA	NA	/				5	
	APU-366	3/3	NA	NA	NA	/				5	
	APU-367	3/3	NA	NA	NA	/				5	
	APU-368	3/3	NA	NA	NA	/				5	
	APU-369	3/3	NA	NA	NA	/				5	
	APU-370	3/3	NA	NA	NA	/				5	
	APU-371	3/3	NA	NA	NA	/				5	
05-6N-201000-1	APU-312	3/3	NA	NA	NA	/				5	
05-6N-201000-2	APU-313	3/1R	P	P	P	/				5	
05-6N-2013-1	APU-314	2/1R	P	P	P	/				5	
	APU-315	2/1R	P	P	P	/				5	
05-6N-2013-2	APU-316	2/1R	P	F	P	/				5	
	APU-317	2/1R	P	F	P	/				5	
05-6N-2014-1	APU-318	3/1R	P	P	P	/				5	
	APU-408X	3/1R	NA	NA	NA	/	P	P	P	5	
05-6N-2014-2	APU-319	3/1R	P	F	P	/				5	
	APU-409X	3/1R	P	F	P	/				5	
05-6N-2015-2	APU-421X	2/1R	P	F	P	/				5	
05-6N-2016-1	APU-288	2/1R	P	P	P	/				5	
	APU-289	2/1R	P	P	P	/				5	

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05-6N-2016-2	APU-290	2/1R	P	P	P	/				5	
	APU-291	2/1R	P	P	P	/				5	
05-6N-2017-1	APU-292	3/1R	P	P	P	/				5	
05-6N-2017-2	APU-293	2/1R	P	P	P	/				5	
05-6N-2018-1	APU-294	3/1R	P	F	P	/				5	
	APU-296	3/1R	P	NA	P	/				5	
05-6N-2018-2	APU-422X	3/1R	F	F	P	/				5	
05-6N-2019-1	APU-295	3/1R	P	P	P	/				5	
05-6N-2022-1	APU-323	3/1R	P	F	P	/				5	
05-6N-2022-2	APU-423X	3/1R	P	F	P	/				5	
05-6N-2024-1	APU-362	3/3	NA	NA	NA	/				5	
05-6N-2024-2	APU-363	3/3	NA	NA	NA	/				5	
05-6N-2025-2	APU-424X	3/1R	P	F	P	/				5	
05-6N-2026-1	APU-425X	3/1R	P	F	P	/				5	
05-6N-2027-1	APU-322	3/1R	P	P	P	/				5	
05-6N-2029-1	APU-320	3/1R	P	F	P	/				5	
05-6N-2029-2	APU-321	3/1R	P	P	P	/				5	
05-6N-2030-1	APU-426X	3/1R	P	F	P	/				5	
05-6N-2030A-1	APU-427X	3/1R	P	F	P	/				5	
05-6N-2031-2	APU-407X	3/3	NA	NA	NA	/				5	
05-6N-2032-1	APU-297	3/3	NA	NA	NA	/				5	
05-6N-2033-2	APU-428X	3/1R	P	F	P	/				5	
05-6N-2034-1	APU-286	3/1R	P	F	P	/				5	
05-6N-2035-1	APU-280	2/1R	P	P	P	/				5	
	APU-281	2/1R	P	P	P	/				5	
05-6N-2035-2	APU-282	1/1	NA	NA	NA	/				5	
	APU-283	1/1	NA	NA	NA	/				5	
	APU-406X	1/1	NA	NA	NA	/				5	
05-6N-2036-2	APU-429X	3/1R	P	F	P	/				5	
05-6N-2037-2	APU-430X	1/1	NA	NA	NA	/				5	
05-6N-2038-1	APU-284	3/3	NA	NA	NA	/				5	
05-6N-2038-2	APU-285	3/1R	P	P	P	/				5	
05-6N-2040-1	APU-309	3/1R	P	F	P	/				5	
05-6N-2042-1	APU-305	3/1R	P	F	P	/				5	
	APU-306	3/1R	P	F	P	/				5	
05-6N-2042-2	APU-307	3/1R	P	F	P	/				5	
	APU-308	3/1R	P	F	P	/				5	
05-6N-2043-1	APU-420X	3/2R	P	F	P	/				5	
05-6N-2044-2	APU-442X	3/2R	P	F	P	/				5	
05-6N-2045-1	APU-431X	3/2R	P	F	P	/				5	
05-6N-2045-2	APU-441X	3/2R	P	F	P	/				5	
05-6N-2047-1	APU-357	2/2	NA	NA	NA	/				5	
05-6N-2047-2	APU-358	3/1R	P	P	P	/				5	
	APU-359	3/1R	P	P	P	/				5	
05-6N-2048-2	APU-432X	3/1R	P	F	P	/				5	
05-6N-2050-2	APU-433X	3/1R	P	F	P	/				5	
05-6N-2051-2	APU-361	3/1R	P	F	P	/				5	
05-6N-2055-1	APU-348	2/1R	P	P	P	/				5	
05-6N-2055-2	APU-349	2/1R	P	P	P	/				5	
05-6N-2056-2	APU-434X	3/1R	F	F	P	/				5	

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05-6N-2057-2	APU-435X	3/1R	F	F	P	/				5	
05-6N-2059-2	APU-351	3/1R	P	P	P	/				5	
05-6N-2059-A2	APU-352	2/1R	P	F	P	/				5	
05-6N-2061-2	APU-443X	3/2R	P	F	P	/				5	
05-6N-2063-1	APU-436X	3/2R	P	F	P	/				5	
05-6N-2064-1	APU-353	2/2	NA	NA	NA	/				5	
05-6N-2064-2	APU-354	2/1R	P	P	P	/				5	
05-6N-2065-2	APU-437X	3/1R	P	F	P	/				5	
05-6N-2066-2	APU-438X	3/1R	P	F	P	/				5	
05-6N-2073-2	APU-439X	3/1R	P	F	P	/				5	
05-6N-2074-2	APU-356	2/1R	P	P	P	/				5	
05-6N-2074A-2	APU-440X	3/1R	P	F	P	/				5	
NONE	APU-134	/				/				5	
	APU-179	/				/				5	
	APU-189	/				/				6	
	APU-196	/				/				5	
	APU-208	/				/				5	
	APU-209	/				/				5	
	APU-217	/				/				6	
	APU-218	/				/				5	
	APU-219	/				/				5	
	APU-221	/				/				5	
	APU-223	/				/				5	
	APU-232	/				/				5	
	APU-236	/				/				5	
	APU-249	/				/				5	
	APU-257	/				/				6	
	APU-259	/				/				5	
	APU-261	/				/				5	
	APU-274	/				/				5	
	APU-275	/				/				5	
	APU-287	/				/				6	
	APU-304	/				/				5	
	APU-310	/				/				5	
	APU-311	/				/				5	
	APU-350	/				/				5	
	APU-355	/				/				5	
	APU-360	/				/				5	
	APU-381	/				/				5	
	APU-386	/				/				5	
	APU-387	/				/				5	
	APU-388	/				/				5	
	APU-389	/				/				5	
	APU-391	/				/				5	
	APU-396	/				/				5	
	APU-397	/				/				5	
	APU-399	/				/				5	
	APU-400	/				/				5	
	APU-417X	/				3/2R	P	P	P	2	X