INDEPENDENT ORBITER ASSESSMENT

ANALYSIS
OF THE
REACTION CONTROL
SYSTEM
Vol. 2 of 3

19 JANUARY 1987

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 815

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

ITEM: MANIFOLD 3, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, OX & FU ISOL VLVS
5) MANIFOLD 3, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S32
PART NUMBER: 33V73A8S32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM CLOSE COMMANDS. IF THE CLOSE CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CAN BE OPENED BY SWITCH OR MDM COMMAND, BUT CANNOT BE CLOSED BY SWITCH COMMAND, ONLY BY MDM COMMAND. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO CLOSE THE VALVE.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	816	ABORT:	2/1R

ITEM: MANIFOLD 3, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, OX & FU ISOL VLVS
5) MANIFOLD 3, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S32
PART NUMBER: 33V73A8S32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE CLOSED OR GPC POSITION, THE VALVE WILL CLOSE AND CANNOT BE OPENED BY SWITCH OR MDM COMMAND. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE OPEN POSITION, THE VALVE WILL REMAIN OPEN AND CAN BE CLOSED WITH THE SWITCH, BUT CANNOT BE OPENED AGAIN BY SWITCH OR MDM COMMAND. TO OPEN THE VALVE, THE CREW MUST REMOVE CONTROL BUS POWER FROM THE CLOSE CONTACTS, AND THEN USE GPC READ/WRITE PROCEDURES. FAILURE OF THE MDM COMMAND PATH WILL AFFECT ONORBIT OPERATIONS, PROPELLANT DUMP LENGTHS DURING ABORTS, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING RTLS ABORTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 817

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

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH
FAILURE MODE: SWITCH FAILS IN THE OPEN POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY MDM CLOSE COMMANDS. IF THE SWITCH FAILS IN THE OPEN POSITION, THE VALVE WILL OPEN AND CANNOT BE CLOSED BY SWITCH OR MDM COMMAND. TO CLOSE THE VALVE, THE CREW MUST REMOVE CONTROL BUS POWER FROM THE OPEN CONTACTS, AND THEN USE THE GPC READ/WRITE PROCEDURES. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO CLOSE THE VALVE.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	818	ABORT:	2/1R

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH
FAILURE MODE: SWITCH FAILS IN THE CLOSED POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS. IF THE SWITCH FAILS IN THE CLOSED POSITION, THE VALVE WILL CLOSE AND CANNOT BE OPENED BY SWITCH OR MDM COMMAND. TO OPEN THE VALVE, THE CREW MUST REMOVE CONTROL BUS POWER FROM THE SWITCH'S CLOSE CONTACTS AND THEN USE THE GPC READ/WRITE PROCEDURES. FAILURE OF THE MDM COMMAND PATH WILL AFFECT ONORBIT OPERATIONS, PROPELLANT DUMP LENGTHS DURING ABORTS, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING RTLS ABORTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 819

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH
FAILURE MODE: SWITCH FAILS IN THE GPC POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
VALVE CAN NOT BE CONTROLLED BY SWITCH, ONLY BY MDM OPEN OR CLOSE COMMANDS. TO OPERATE THE VALVE, THE CREW MUST USE THE GPC READ/WRITE PROCEDURES. FAILURE OF THE MDM COMMAND PATH WHILE THE VALVE IS IN THE CLOSED POSITION WILL AFFECT ONORBIT OPERATIONS, PROPELLANT DUMP LENGTH DURING ABORTS AND ENTRY, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING RTLS ABORTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 820 ABORT: 2/1R

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH OPEN CONTACTS 1, 2
FAILURE MODE: SWITCH OPEN CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH OPEN CONTACTS 1, 2
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7)
8)
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CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS. IF THE OPEN CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CANNOT BE OPENED BY SWITCH COMMAND, ONLY BY MDM COMMAND, AND CAN CLOSED BY THE SWITCH OR THE MDM. FAILURE OF THE MDM COMMAND PATH WILL AFFECT ONORBIT OPERATIONS, PROPELLANT DUMP LENGTHS DURING ABORTS, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING RTLS ABORTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 821

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

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH OPEN CONTACTS 1, 2
FAILURE MODE: SWITCH OPEN CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH OPEN CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY MDM CLOSE COMMANDS. IF THE OPEN CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE OPEN OR GPC POSITION, THE VALVE WILL OPEN AND CANNOT BE CLOSED BY SWITCH OR MDM COMMAND. IF THE OPEN CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE CLOSED POSITION, THE VALVE WILL REMAIN CLOSED AND CAN BE OPENED WITH THE SWITCH, BUT CANNOT BE CLOSED AGAIN BY SWITCH OR MDM COMMAND. TO CLOSE THE VALVE, THE CREW MUST REMOVE CONTROL BUS POWER FROM THE CONTACTS, AND THEN USE GPC READ/WRITE PROCEDURES. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO CLOSE THE VALVE.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	822	ABORT:	3/3

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH GPC CONTACTS 3, 4
FAILURE MODE: SWITCH GPC CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH GPC CONTACTS 3, 4
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7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 823 ABORT: 3/3

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH GPC CONTACTS 3, 4
FAILURE MODE: SWITCH GPC CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH GPC CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	824	ABORT:	3/3

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM CLOSE COMMANDS. IF THE CLOSE CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CAN BE OPENED BY SWITCH OR MDM COMMAND, BUT CANNOT BE CLOSED BY SWITCH COMMAND, ONLY BY MDM COMMAND. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO CLOSE THE VALVE.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 825 ABORT: 2/1R

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE CLOSED OR GPC POSITION, THE VALVE WILL CLOSE AND CANNOT BE OPENED BY SWITCH OR MDM COMMAND. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE OPEN POSITION, THE VALVE WILL REMAIN OPEN AND CAN BE CLOSED WITH THE SWITCH, BUT CANNOT BE OPENED AGAIN BY SWITCH OR MDM COMMAND. TO OPEN THE VALVE, THE CREW MUST REMOVE CONTROL BUS POWER FROM THE CLOSE CONTACTS, AND THEN USE GPC READ/WRITE PROCEDURES. FAILURE OF THE MDM COMMAND PATH WILL AFFECT ONORBIT OPERATIONS, PROPELLANT DUMP LENGTHS DURING ABORTS, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING RTLS ABORTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	826	ABORT:	3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH
FAILURE MODE: SWITCH FAILS IN THE OPEN POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO REDUNDANCY PROVIDED TO CLOSE THE VALVE. IF THE SWITCH FAILS IN THE OPEN POSITION WHILE THE VALVE IS IN ANY POSITION, THE VALVE WILL OPEN. FAILURE WILL CAUSE THE INABILITY TO CLOSE THE VALVE.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 827

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

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH
FAILURE MODE: SWITCH FAILS IN THE CLOSED POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMAND. IF THE SWITCH FAILS IN THE CLOSED POSITION WHILE THE VALVE IS IN ANY POSITION, THE VALVE WILL CLOSE. IF THE MDM OPEN COMMAND IS ALSO PRESENT, OR THE SWITCH OPEN COMMAND IS ALSO PRESENT THE VALVE WILL CYCLE OPEN AND CLOSED UNTIL THE MDM OR SWITCH OPEN COMMAND IS REMOVED, OR UNTIL THE CONTROL BUS POWER IS REMOVED FROM EITHER OF THE SWITCH'S CLOSE CONTACTS. TO OPEN THE VALVE, CREW MUST REMOVE POWER FROM EITHER OF THE SWITCH'S CLOSE CONTACTS, AND USE THE GPC READ/WRITE PROCEDURES. FAILURE OF ALL REDUNDANCY WILL AFFECT ONORBIT OPERATIONS, AND WILL CAUSE THE LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 828 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH
FAILURE MODE: SWITCH FAILS IN THE GPC POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS. TO OPERATE THE VALVE, THE CREW MUST USE THE GPC READ/WRITE PROCEDURES. IF THE VALVE IS CLOSED AND THE MDM OPEN COMMAND PATH FAILS, THE VALVE CANNOT BE OPENED BY THE MDM SWITCH COMMANDS, CAUSING THE LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 829

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

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH OPEN CONTACTS 1, 2
FAILURE MODE: SWITCH OPEN CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH OPEN CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 830 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH OPEN CONTACTS 1, 2
FAILURE MODE: SWITCH OPEN CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH OPEN CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 831 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH GPC CONTACTS 3, 4
FAILURE MODE: SWITCH GPC CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH GPC CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	832	ABORT:	3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH GPC CONTACTS 3, 4
FAILURE MODE: SWITCH GPC CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH GPC CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 833 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM CLOSE COMMAND. IF THE CLOSE CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CAN BE OPENED BY THE SWITCH OR BY THE MDM COMMAND, AND CANNOT BE CLOSED BY THE SWITCH COMMAND, ONLY BY THE MDM COMMAND. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO CLOSE THE VALVE.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	834	ABORT:	3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 5, 6
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: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS AND THE OTHER SWITCH CLOSE CONTACTS. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE GPC OR CLOSED POSITION, THE VALVE WILL CLOSE, AND CANNOT BE OPENED BY MDM COMMAND, ONLY BY THE SWITCH COMMAND. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE OPEN POSITION, THE VALVE WILL REMAIN OPEN, AND CANNOT BE CLOSED BY MDM COMMAND, ONLY BY SWITCH COMMAND. TO OPEN THE VALVE WITH THE MDM COMMAND, THE CREW MUST REMOVE CONTROL BUS POWER FROM THE CLOSE CONTACT SET 5,6 THEN USE THE GPC READ/WRITE PROCEDURES. FAILURE OF ALL REDUNDANCY WILL CAUSE THE LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 835 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH OPEN CONTACTS 7, 8
FAILURE MODE: SWITCH OPEN CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH OPEN CONTACTS 7, 8
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: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMAND. IF THE OPEN CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CAN BE CLOSED BY SWITCH OR MDM COMMAND, BUT CANNOT BE OPENED BY SWITCH COMMAND, ONLY BY MDM COMMAND. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO OPEN THE VALVE, AND WILL CAUSE LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 836 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH OPEN CONTACTS 7, 8
FAILURE MODE: SWITCH OPEN CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH OPEN CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO REDUNDANCY PROVIDED TO CLOSE THE VALVE. IF THE OPEN CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE OPEN OR GPC POSITION, THE VALVE WILL OPEN. IF THE OPEN CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE CLOSED POSITION, OR IF THE MDM CLOSE COMMAND IS ALSO PRESENT, THE VALVE WILL CYCLE OPEN AND CLOSED UNTIL CONTROL BUS POWER TO THE OPEN OR CLOSE CONTACTS IS REMOVED, OR UNTIL THE MDM CLOSE COMMAND IS REMOVED.
FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO CLOSE THE VALVE.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 837 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH GPC CONTACTS 9, 10
FAILURE MODE: SWITCH GPC CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH GPC CONTACTS 9, 10
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMAND AND THE MANUAL SWITCH COMMAND. IF THE GPC CONTACTS FAIL OPEN, THE VALVE CAN BE OPENED BY SWITCH OR MDM COMMAND, CAN BE CLOSED BY SWITCH COMMAND, AND CANNOT BE CLOSED BY MDM COMMAND UNLESS THE SWITCH IS IN THE CLOSED POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 838 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH GPC CONTACTS 9, 10
FAILURE MODE: SWITCH GPC CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH GPC CONTACTS 9, 10
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 [3] B [F] C [P]

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE OTHER CLOSE CONTACTS AND THE SWITCH AND MDM OPEN COMMANDS. FIRST FAILURE WILL HAVE NO EFFECT. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO OPEN THE VALVE AMD LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 839

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

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 11, 12
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 11, 12
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO REDUNDANCY. IF THE CLOSE CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CAN BE OPENED BY THE SWITCH OR BY MDM COMMAND,
BUT CANNOT BE CLOSED BY THE SWITCH OR MDM COMMAND. FAILURE WILL CAUSE THE INABILITY TO CLOSE THE VALVE.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 840 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 11, 12
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH CLOSE CONTACTS 11, 12
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 [3] B [F] C [P]

LOCATION: PNL O8 S34
PART NUMBER: 33V73A8S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE OTHER SWITCH CLOSE CONTACTS. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, AND CAN BE CLOSED AND OPENED BY SWITCH OR MDM COMMAND. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO OPEN THE VALVE, AND LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CA, DA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 841 ABORT: 3/3

ITEM: FU TK ULLAGE PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) FU TK ULLAGE PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	842	ABORT:	3/3

ITEM: FU TK ULLAGE PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) FU TK ULLAGE PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 843

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

ITEM: FU TK OUT PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) FU TK OUT PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 844

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

ITEM: FU TK OUT PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) FU TK OUT PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 845 ABORT: 3/3

ITEM: OX TK ULLAGE PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX TK ULLAGE PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 846 ABORT: 3/3

ITEM: OX TK ULLAGE PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX TK ULLAGE PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 847 ABORT: 3/3

ITEM: OX TK OUT PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX TK OUT PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 848 ABORT: 3/3

ITEM: OX TK OUT PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX TK OUT PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 849 ABORT: 3/3

ITEM: FU PRESS LINE (NEAR THERMOSTAT) TEMP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) FU PRESS LINE (NEAR THERMOSTAT) TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	850	ABORT:	3/3

ITEM: FU PRESS LINE (NEAR THERMOSTAT) TEMP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) FU PRESS LINE (NEAR THERMOSTAT) TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 851

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

ITEM: FU FILL LINE TEMP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) FU FILL LINE TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 852

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

ITEM: FU FILL LINE TEMP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) FU FILL LINE TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 853

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

ITEM: L FUEL PRESS LINE BACKUP TEMP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) L FUEL PRESS LINE BACKUP TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT605

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 854

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

ITEM: L FUEL PRESS LINE BACKUP TEMP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) FU TK
5) L FUEL PRESS LINE BACKUP TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT605

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 855 ABORT: 3/3

ITEM: OX FILL LINE TEMP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX FILL LINE TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	856	ABORT:	3/3

ITEM: OX FILL LINE TEMP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX FILL LINE TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 857

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

ITEM: OX PRESS LINE (NEAR THERMOSTAT) TEMP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX PRESS LINE (NEAR THERMOSTAT) TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 858

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

ITEM: OX PRESS LINE (NEAR THERMOSTAT) TEMP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX PRESS LINE (NEAR THERMOSTAT) TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 859 ABORT: 3/3

ITEM: OX PRESS LINE TEMP BACKUP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX PRESS LINE TEMP BACKUP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	860	ABORT:	3/3

ITEM: OX PRESS LINE TEMP BACKUP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX PRESS LINE TEMP BACKUP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING VALVE. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 861 ABORT: 3/3

ITEM: OX TK TEMP-1 TEMP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX TK TEMP-1 TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE AND REDUNDANT PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 862

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

ITEM: OX TK TEMP-1 TEMP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX TK
5) OX TK TEMP-1 TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE AND REDUNDANT PRESSURE SENSORS WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 863

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

ITEM: FU MANIF PRESS-1 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, FU
5) FU MANIF PRESS-1 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	864	ABORT:	3/3

ITEM: FU MANIF PRESS-1 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, FU
5) FU MANIF PRESS-1 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	865	ABORT:	3/3

ITEM: OX MANIF PRESS-1 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, OX
5) OX MANIF PRESS-1 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	866	ABORT:	3/3

ITEM: OX MANIF PRESS-1 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, OX
5) OX MANIF PRESS-1 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 867 ABORT: 3/3

ITEM: FU MANIF PRESS-2 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, FU
5) FU MANIF PRESS-2 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT26

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	868	ABORT:	3/3

ITEM: FU MANIF PRESS-2 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, FU
5) FU MANIF PRESS-2 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT26

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 869

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

ITEM: OX MANIF PRESS-2 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, OX
5) OX MANIF PRESS-2 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 870

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

ITEM: OX MANIF PRESS-2 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, OX
5) OX MANIF PRESS-2 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 871

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

ITEM: FU MANIF PRESS-3 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, FU
5) FU MANIF PRESS-3 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	872	ABORT:	3/3

ITEM: FU MANIF PRESS-3 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, FU
5) FU MANIF PRESS-3 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 873 ABORT: 3/3

ITEM: OX MANIF PRESS-3 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, OX
5) OX MANIF PRESS-3 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	874	ABORT:	3/3

ITEM: OX MANIF PRESS-3 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, OX
5) OX MANIF PRESS-3 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 875 ABORT: 3/3

ITEM: FU MANIF PRESS-4 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, FU
5) FU MANIF PRESS-4 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 876 ABORT: 3/3

ITEM: FU MANIF PRESS-4 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, FU
5) FU MANIF PRESS-4 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 877

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

ITEM: OX MANIF PRESS-4 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX
5) OX MANIF PRESS-4 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	878	ABORT:	3/3

ITEM: OX MANIF PRESS-4 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX
5) OX MANIF PRESS-4 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42MT25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL CAUSE GROUND AND FLIGHT CREW DIFFICULTY IN DETERMINING A LEAKING MANIFOLD. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/1R
MDAC ID: 879 ABORT: 2/1R

ITEM: OX & FU TK ISOL VLV 1/2 & 3/4/5 SWITCH TALKBACK
FAILURE MODE: ERRONEOUS INDICATION (FAILS HIGH, FAILS LOW, FAILS MIDTRAVEL)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) OX & FU TK ISOL VLV 1/2 & 3/4/5
5) OX & FU TK ISOL VLV 1/2 & 3/4/5 SWITCH TALKBACK
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 DS9, DS10
PART NUMBER: 33V73A8DS9; DS10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FWD RCS TK ISOL 1/2 & 3/4/5 POSITION INDICATION WOULD FALSELY SHOW A BARBERPOLE INDICATING EITHER THE FU OR OX A OR B VALVES ARE STUCK PARTIALLY OPEN/CLOSED OR THERE IS A POSITION MISMATCH BETWEEN THE TWO VALVES. LOSS OF ALL REDUNDANCY WOULD RESULT IN LOSS OF DIRECT VALVE TALKBACK TO CREW. WORST CASE WOULD BE FALSELY FAILING THE VALVE CLOSED RESULTING IN LOSS OF MISSION DUE TO SAFETY CONSIDERATIONS (ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE).

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/1R
MDAC ID: 880 ABORT: 2/1R

ITEM: MANIFOLD 1, OX & FU ISOL VLV SWITCH TALKBACK
FAILURE MODE: ERRONEOUS INDICATION (FAILS HIGH, FAILS LOW, FAILS MIDTRAVEL)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, OX & FU ISOL VLVS
5) MANIFOLD 1, OX & FU ISOL VLV SWITCH TALKBACK
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 DS16
PART NUMBER: 33V73A8DS16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FWD RCS MANIF ISOL 1 POSITION INDICATION WOULD FALSELY SHOW A BARBERPOLE INDICATING EITHER THE FU OR OX A OR B VALVES ARE STUCK PARTIALLY OPEN/CLOSED OR THERE IS A POSITION MISMATCH BETWEEN THE TWO VALVES. LOSS OF ALL REDUNDANCY WOULD RESULT
IN LOSS OF DIRECT VALVE TALKBACK TO CREW. WORST CASE WOULD BE FALSELY FAILING THE VALVE CLOSED RESULTING IN LOSS OF MISSION DUE TO SAFETY CONSIDERATIONS (ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE).

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 881

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 2/1R

ITEM: MANIFOLD 2, OX & FU ISOL VLV SWITCH TALKBACK
FAILURE MODE: ERRONEOUS INDICATION (FAILS HIGH, FAILS LOW, FAILS MIDTRAVEL)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, OX & FU ISOL VLVS
5) MANIFOLD 2, OX & FU ISOL VLV SWITCH TALKBACK
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 DS17
PART NUMBER: 33V73A8DS17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FWD RCS MANIF ISOL 2 POSITION INDICATION WOULD FALSELY SHOW A BARBERPOLE INDICATING EITHER THE FU OR OX A OR B VALVES ARE STUCK PARTIALLY OPEN/CLOSED OR THERE IS A POSITION MISMATCH BETWEEN THE TWO VALVES. LOSS OF ALL REDUNDANCY WOULD RESULT
IN LOSS OF DIRECT VALVE TALKBACK TO CREW. WORST CASE WOULD BE FALSELY FAILING THE VALVE CLOSED RESULTING IN LOSS OF MISSION DUE TO SAFETY CONSIDERATIONS (ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE).

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/1R
MDAC ID:	882	ABORT:	2/1R

ITEM: MANIFOLD 3, OX & FU ISOL VLV SWITCH TALKBACK
FAILURE MODE: ERRONEOUS INDICATION (FAILS HIGH, FAILS LOW, FAILS MIDTRAVEL)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, OX & FU ISOL VLVS
5) MANIFOLD 3, OX & FU ISOL VLV SWITCH TALKBACK
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 DS18
PART NUMBER: 33V73A8DS18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FWD RCS MANIF ISOL 3 POSITION INDICATION WOULD FALSELY SHOW A BARBERPOLE INDICATING EITHER THE FU OR OX A OR B VALVES ARE STUCK PARTIALLY OPEN/CLOSED OR THERE IS A POSITION MISMATCH BETWEEN THE TWO VALVES. LOSS OF ALL REDUNDANCY WOULD RESULT
IN LOSS OF DIRECT VALVE TALKBACK TO CREW. WORST CASE WOULD BE FALSELY FAILING THE VALVE CLOSED RESULTING IN LOSS OF MISSION DUE TO SAFETY CONSIDERATIONS (ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE).

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 883

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 2/1R

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH TALKBACK
FAILURE MODE: ERRONEOUS INDICATION (FAILS HIGH, FAILS LOW, FAILS MIDTRAVEL)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, OX & FU ISOL VLVS
5) MANIFOLD 4, OX & FU ISOL VLV SWITCH TALKBACK
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 DS19
PART NUMBER: 33V73A8DS19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FWD RCS MANIF ISOL 4 POSITION INDICATION WOULD FALSELY SHOW A BARBERPOLE INDICATING EITHER THE FU OR OX A OR B VALVES ARE STUCK PARTIALLY OPEN/CLOSED OR THERE IS A POSITION MISMATCH BETWEEN THE TWO VALVES. LOSS OF ALL REDUNDANCY WOULD RESULT
IN LOSS OF DIRECT VALVE TALKBACK TO CREW. WORST CASE WOULD BE FALSELY FAILING THE VALVE CLOSED RESULTING IN LOSS OF MISSION DUE TO SAFETY CONSIDERATIONS (ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE).

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 884 ABORT: 3/3

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH TALKBACK
FAILURE MODE: ERRONEOUS INDICATION (FAILS HIGH, FAILS LOW, FAILS MIDTRAVEL)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, OX & FU ISOL VLVS
5) MANIFOLD 5, OX & FU ISOL VLV SWITCH TALKBACK
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O8 DS20
PART NUMBER: 33V73A8DS20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FWD RCS MANIF ISOL 5 POSITION INDICATION WOULD FALSELY SHOW A BARBERPOLE INDICATING EITHER THE FU OR OX A OR B VALVES ARE STUCK PARTIALLY OPEN/CLOSED OR THERE IS A POSITION MISMATCH BETWEEN THE TWO VALVES. LOSS OF ALL REDUNDANCY WOULD RESULT
IN LOSS OF DIRECT VALVE TALKBACK TO CREW. WORST CASE WOULD BE FALSELY FAILING THE VALVE CLOSED RESULTING IN LOSS OF MISSION DUE TO SAFETY CONSIDERATIONS (ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE).

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 885

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

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22RPC39

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 886 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) CONTROLLER, REMOTE POWER
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22RPC39

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 887

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

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22RPC38

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO MANIFOLD DRIVER & LOGIC CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED DURING DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 888

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

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22RPC38

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. FORWARD JETS NOT USED DURING DEORBIT. IF MANIFOLD LOGIC OR DRIVER POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 889 ABORT: 1/1

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23RPC36

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 890 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) CONTROLLER, REMOTE POWER
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23RPC36

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS ARE NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 891 ABORT: 1/1

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23RPC37

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO MANIFOLD DRIVER & LOGIC CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED DURING DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	892	ABORT:	3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23RPC37

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. FORWARD JETS NOT USED DURING DEORBIT. IF MANIFOLD LOGIC OR DRIVER POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 893 ABORT: 2/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC40

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD DRIVERS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	2/2
MDAC ID:	894	ABORT:	3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) CONTROLLER, REMOTE POWER
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC40

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 895 ABORT: 2/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC38

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD LOGIC AND DRIVER CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED DURING DEORBIT FLIGHT PHASE. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	896	ABORT:	3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC38

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. FORWARD JETS NOT USED DURING DEORBIT. IF MANIFOLD LOGIC OR DRIVER POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 897 ABORT: 2/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22RPC52

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD DRIVERS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 898

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

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) CONTROLLER, REMOTE POWER
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22RPC52

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THEAPPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 899

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22RPC50

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD LOGIC AND DRIVER CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED DURING DEORBIT FLIGHT PHASE. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 900

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

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22RPC50

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. FORWARD JETS NOT USED DURING DEORBIT. IF MANIFOLD LOGIC OR DRIVER POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 901 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) CONTROLLER, REMOTE POWER
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC39

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 902 ABORT: 1/1

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC37

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO MANIFOLD DRIVER & LOGIC CIRCUITS. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED DURING DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. LOSS OF VERNIER MANIFOLD F5 (F5R AND F5L JETS) WILL RESULT IN LOSS OF VERNIER RCS ATTITUDE CONTROL. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 903

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

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC37

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. FORWARD JETS NOT USED DURING DEORBIT. IF MANIFOLD LOGIC OR DRIVER POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 904

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

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC39

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 905 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) CONTROLLER, REMOTE POWER
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC51

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO VERNIER JET MANIFOLD F5 DRIVER POWER CIRCUIT. LOSS OF F5R AND F5L VERNIER JETS WILL RESULT IN LOSS OF VERNIER RCS ATTITUDE CONTROL.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	906	ABORT:	3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC51

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO VERNIER JET MANIFOLD F5 (JETS F5R AND F5L) DRIVER POWER CIRCUIT. FAILURE MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 907

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

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) CONTROLLER, REMOTE POWER
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC47

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO VERNIER JET MANIFOLD F5 DRIVER POWER CIRCUIT. LOSS OF F5R AND F5L VERNIER JETS WILL RESULT IN LOSS OF VERNIER RCS ATTITUDE CONTROL.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 908 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, PCA 3
PART NUMBER: 83V76A24RPC47

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO VERNIER JET MANIFOLD F5 (JETS F5R AND F5L) DRIVER POWER CIRCUIT. FAILURE MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE.

REFERENCES: VS70-943099 REV B EO B12

C-2

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 909

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

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22CR35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 910

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22CR35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE HAS NO IMPACT ON POWER TO MANIFOLD DRIVER CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 911

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 912

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 913

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 914

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 915

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

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23CR40

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 916

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23CR40

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE HAS NO IMPACT ON POWER TO MANIFOLD DRIVER CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 917

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1CR7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 918

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1CR7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 919

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1CR6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 920

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1CR6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 921

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR26

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 922

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR26

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. SHORTED DIODE MAY AFFECT CURRENT FLOW BETWEEN THE TWO DIFFERENT BUSES. DUE TO UNEQUAL BUS VOLTAGES AND CURRENT SHARING, ONE OF THE RPC'S IN THE REDUNDANT DRIVER CIRCUIT COULD TRIP OPEN. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 923

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD 3 (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 924 ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 925

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT.
DURING RTLS, LOSS OF MANIFOLD 3 (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 926 ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 927

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR49

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 928

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR49

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. SHORTED DIODE MAY AFFECT CURRENT FLOW BETWEEN THE TWO DIFFERENT BUSES. DUE TO UNEQUAL BUS VOLTAGES AND CURRENT SHARING, ONE OF THE RPC'S IN THE REDUNDANT DRIVER CIRCUIT COULD TRIP OPEN. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 929

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT.
DURING RTLS, LOSS OF MANIFOLD 3 (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	930	ABORT:	3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 931

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT.
DURING RTLS, LOSS OF MANIFOLD 3 (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 932

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1CR20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 933

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22CRA1CR47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD LOGIC CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED DURING DEORBIT FLIGHT PHASE. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 934 ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22CRA1CR47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. SHORTED DIODE MAY AFFECT CURRENT FLOW BETWEEN THE TWO DIFFERENT BUSES. DUE TO UNEQUAL BUS VOLTAGES AND CURRENT SHARING, ONE OF THE RPC'S IN THE REDUNDANT LOGIC CIRCUIT COULD TRIP OPEN. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 935 ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22CRA1CR48

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD LOGIC CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED DURING DEORBIT FLIGHT PHASE. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 936

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22CRA1CR48

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. SHORTED DIODE MAY AFFECT CURRENT FLOW BETWEEN THE TWO DIFFERENT BUSES. DUE TO UNEQUAL BUS VOLTAGES AND CURRENT SHARING, ONE OF THE RPC'S IN THE REDUNDANT LOGIC CIRCUIT COULD TRIP OPEN. DURING RTLS, THE LOSS OF THE MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 937

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD 4 (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. ONORBIT, THE LOSS OF VERNIER RCS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 938 ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 939

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT.
DURING RTLS, LOSS OF MANIFOLD 4 (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. ONORBIT, THE LOSS OF VERNIER RCS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 940

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 941

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD 4 (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. ONORBIT, THE LOSS OF VERNIER RCS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 942

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE ALLOWS REDUNDANT CIRCUIT OPERATION. SHORTED DIODE MAY CAUSE A CHANGE IN CURRENT FLOW BETWEEN TWO DIFFERENT BUSES, DUE TO UNEQUAL BUS VOLTAGE AND CURRENT SHARING. THE 1.2K CURRENT LIMITING RESISTOR WILL MINIMIZE CHANGE IN CONTROL BUS CURRENT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 943

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

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 944

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

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE HAS NO IMPACT ON POWER TO MANIFOLD DRIVER CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 945

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

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) DIODE
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO VERNIER JET MANIFOLD F5 DRIVER POWER CIRCUIT. LOSS OF F5R AND F5L VERNIER JETS WILL RESULT IN LOSS OF VERNIER RCS ATTITUDE CONTROL.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 946 ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) DIODE
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
SHORTED DIODE HAS NO IMPACT ON POWER TO MANIFOLD DRIVER CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 947

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

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16 J4-86 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 948 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) DRIVER, HYBRID
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16 J4-86 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 949

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

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17 J4-87 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 950

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

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) DRIVER, HYBRID
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17 J4-87 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 951

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, LCA 3
PART NUMBER: 83V76A18 J4-87 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD DRIVERS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 952 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, LCA 3
PART NUMBER: 83V76A18 J4-87 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 953

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16J4-114

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF 1 OF 2 POWER SOURCES TO MANIFOLD DRIVERS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 954

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

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) DRIVER, HYBRID
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16J4-114

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 955

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

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & 5, RJDF
5) DRIVER, HYBRID
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 3, LCA 3
PART NUMBER: 83V76A18 J4-86 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO MANIFOLD DRIVER AND LOGIC CIRCUIT. MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. PRI MANIFOLD DRIVER PWR REQUIRED OFF FOR FCS CHECKOUT.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 956

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

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, LCA 3
PART NUMBER: 83V76A18 J4-86 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 957

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

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5F, RJDF
5) DRIVER, HYBRID
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: F BAY 3, LCA 3
PART NUMBER: 83V76A18 J8-111 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO VERNIER JET MANIFOLD F5 DRIVER POWER CIRCUIT. LOSS OF F5R AND F5L VERNIER JETS WILL RESULT IN LOSS OF VERNIER RCS ATTITUDE CONTROL.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 958

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

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5F, RJDF
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3, LCA 3
PART NUMBER: 83V76A18 J8-111 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
POWER SUPPLIED TO VERNIER JET MANIFOLD F5 (JETS F5R AND F5L) DRIVER POWER CIRCUIT. FAILURE MAY CAUSE SOME ADDITIONAL POWER CONSUMPTION. IF MANIFOLD DRIVER OR LOGIC POWER FAILS ON, THE CREW CAN PREVENT JETS FROM FIRING BY INHIBITING THE JETS ON THE MANIFOLD, OR BY CLOSING THE APPROPRIATE ISOLATION VALVE.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 959

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

ITEM: FUSE, 2A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) FUSE, 2A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14F12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FUSE FAILING OPEN WILL INHIBIT PWR TRANSFER FOR F1 MANIFOLD (4 JETS) DRIVER CIRCUITS, AND FOR 1 OF 2 REDUNDANT POWER SOURCES FOR F3 MANIFOLD (4 JETS) DRIVER CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING ABORTS, THE LOSS OF F1 MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. ABORT CRITICALITY FOR FUSE OPEN IS 3/3 SINCE THE POWER LATCHING RELAY IS CLOSED PRIOR TO LIFTOFF (OPS-9). FUSE CRITICALITY WILL BE REFLECTED BY THE LATCHING RELAY FAIL ON OR OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 960

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

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14F11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 961

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14F10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	962	ABORT:	3/3

ITEM: FUSE, 2A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) FUSE, 2A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15F3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FUSE FAILING OPEN WILL INHIBIT PWR TRANSFER FOR F2 MANIFOLD (4 JETS) DRIVER CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT FLIGHT PHASE. DURING ABORTS, THE LOSS OF F2 MANIFOLD (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. ABORT CRITICALITY FOR FUSE OPEN IS 3/3 SINCE THE POWER LATCHING RELAY IS CLOSED PRIOR TO LIFTOFF (OPS-9). FUSE CRITICALITY WILL BE REFLECTED BY THE LATCHING RELAY FAIL ON OR OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 963

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

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15F2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 964

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15F1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 965

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

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3 & 4, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V76A16F9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FUSE FAILING OPEN WILL INHIBIT PWR TRANSFER FOR F4 MANIFOLD (2 JETS) DRIVER CIRCUITS, AND FOR 1 OF 2 REDUNDANT POWER SOURCES FOR F3 MANIFOLD (4 JETS) DRIVER CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING ABORTS, THE LOSS OF F4 MANIFOLD (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. ABORT CRITICALITY FOR FUSE OPEN IS 3/3 SINCE THE POWER LATCHING RELAY IS CLOSED PRIOR TO LIFTOFF (OPS-9). FUSE CRITICALITY WILL BE REFLECTED BY THE LATCHING RELAY FAIL ON OR OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 966

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

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V76A16F8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS ARE NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 967

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S5
PART NUMBER: 33V76A16F6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 968

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

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & 5F, RJDF
5) FUSE, 1A
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S15
PART NUMBER: 33V76A16F15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO VERNIER JET MANIFOLD F5 DRIVER POWER CIRCUIT. LOSS OF F5R AND F5L VERNIER JETS WILL RESULT IN LOSS OF VERNIER RCS ATTITUDE CONTROL.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 969

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S12
PART NUMBER: 33V76A16F7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD 4 (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. ONORBIT, THE LOSS OF VERNIER RCS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 970 ABORT: 1/1

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V76A16F10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER SOURCE TO MANIFOLD DRIVER CIRCUIT. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF THE MANIFOLD (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 971

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

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) FUSE, 1A
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S15
PART NUMBER: 33V76A16F14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER TO VERNIER JET MANIFOLD F5 DRIVER POWER CIRCUIT. LOSS OF F5R AND F5L VERNIER JETS WILL RESULT IN LOSS OF VERNIER RCS ATTITUDE CONTROL.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 972 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1 & 3, RJDF
5) RELAY
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22K11

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LATCHING RELAY FAILING OPEN WILL REMOVE POWER FROM F1 MANIFOLD (4 JETS) DRIVER CIRCUITS, AND REMOVE 1 OF 2 REDUNDANT POWER SOURCES FROM F3 MANIFOLD (4 JETS) DRIVER CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF F1 MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRIMARY JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 973

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

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1 & 3, RJDF
5) RELAY
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22K11

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LATCHING RELAY FAILING CLOSED, WILL APPLY MN-A POWER TO THE RPC'S WHICH CONTROL POWER TO F1 AND F3 MANIFOLD DRIVER CIRCUITS. NO EFFECT, SINCE POWER CAN STILL BE CONTROLLED BY THE CORRESPONDING F1 AND F3 DRIVER SWITCHES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 974 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RELAY
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23K13

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LATCHING RELAY FAILING OPEN WILL REMOVE POWER FROM F2 MANIFOLD (4 JETS) DRIVER CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF F2 MANIFOLD (4 PRIMARY JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWR RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 975

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

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RELAY
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23K13

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LATCHING RELAY FAILING CLOSED, WILL APPLY MN-B POWER TO THE RPC WHICH CONTROLS POWER TO F2 MANIFOLD DRIVER CIRCUITS. NO EFFECT, SINCE POWER CAN STILL BE CONTROLLED BY THE F2 DRIVER SWITCH.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 976

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

ITEM: RELAY, LATCHING
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3 & 4, RJDF
5) RELAY, LATCHING
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24K6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LATCHING RELAY FAILING OPEN WILL REMOVE POWER FROM F4 MANIFOLD (2 JETS) DRIVER CIRCUITS, AND REMOVE 1 OF 2 REDUNDANT POWER SOURCES FROM F3 MANIFOLD (4 JETS) DRIVER CIRCUITS. OTHER MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, THE LOSS OF F4 MANIFOLD (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 977

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

ITEM: RELAY, LATCHING
FAILURE MODE: FAILS HIGH

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3 & 4, RJDF
5) RELAY, LATCHING
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24K6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LATCHING RELAY FAILING CLOSED, WILL APPLY MN-C POWER TO THE RPC'S WHICH CONTROL POWER TO F3 AND F4 MANIFOLD DRIVER CIRCUITS. NO EFFECT, SINCE POWER CAN STILL BE CONTROLLED BY THE CORRESPONDING F3 AND F4 DRIVER SWITCHES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 978 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R72

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 979

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R72

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	980	ABORT:	3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16R J1-107

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 981

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16R J1-107

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 982

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 983

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 984

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 985

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 986

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R82

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 987

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R82

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 988

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R79

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 989

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

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R79

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITING TO RPC. EXPECT NO PROBLEM WITH RPC OPERATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 990

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R73

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 991

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R73

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	992	ABORT:	3/3

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R81

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 993

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R81

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 994 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 995

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 996

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17R J1-106

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 997

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17R J1-106

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 998 ABORT: 3/3

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 999

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1000

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R87

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING DIODE OR RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT. DURING RTLS, LOSS OF MANIFOLD (4 JETS FOR F1, 2, OR 3, AND 2 JETS FOR F4) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1001

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

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R87

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITING TO RPC. EXPECT NO PROBLEM WITH RPC OPERATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1002

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1003

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1004 ABORT: 3/3

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R76

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1005

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R76

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

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INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1006

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R77

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1007

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R77

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1008

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R42

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1009

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23A1R42

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1010 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3 & 4, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1011

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3 & 4, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1012 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, LCA 3
PART NUMBER: 83V76A18R J1-106

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1013

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, LCA 3
PART NUMBER: 83V76A18R J1-106

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1014 ABORT: 3/3

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1015

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1016 ABORT: 3/1R

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R76

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT.
DURING RTLS, LOSS OF MANIFOLD 3 (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1017

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

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R76

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITING TO RPC. EXPECT NO PROBLEM WITH RPC OPERATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1018 ABORT: 3/3

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R72

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1019

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R72

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1020

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R70

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1021

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R70

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1022

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R39

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1023

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R39

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1024 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1025

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1026 ABORT: 3/3

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 81V76A22A1R96

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1027

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 81V76A22A1R96

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1028 ABORT: 3/1R

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R98

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT.
DURING RTLS, LOSS OF MANIFOLD 3 (4 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1029

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

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R98

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITING TO RPC. EXPECT NO PROBLEM WITH RPC OPERATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1030

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R95

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1031

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R95

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1032

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R97

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1033

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R97

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1034

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R89

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT.
DURING RTLS, LOSS OF MANIFOLD 4 (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. ONORBIT, THE LOSS OF VERNIER RCS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1035

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

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R89

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITING TO RPC. EXPECT NO PROBLEM WITH RPC OPERATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1036 ABORT: 3/1R

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R75

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF THE LATCHING RESISTOR FAILS OPEN, AND THE LOGIC POWER INPUT FUSE OR DIODE FAILS OPEN, LOSS OF MANIFOLD LOGIC AND DRIVER POWER WILL RESULT. OTHER PRIMARY MANIFOLD JETS ARE ALSO AVAILABLE FOR ATTITUDE CONTROL. FORWARD JETS NOT USED IN DEORBIT.
DURING RTLS, LOSS OF MANIFOLD 4 (2 JETS) WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT WEIGHT TO MEET THE CG SAFETY BOUNDARIES. MANIFOLD CRITICALITY WILL BE DETERMINED BY 1 OR 2 LATCHING DIODE/RESISTOR CIRCUITS. ONORBIT, THE LOSS OF VERNIER RCS. INCREASE IN ABORT (TAL, AOA, ATO) AND DEORBIT FWD RCS FUEL DUMP TIME. AFFECTS PRI JET ONORBIT OPERATIONS (RNDZ, PROX OPS).

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1037

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

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R75

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITING TO RPC. EXPECT NO PROBLEM WITH RPC OPERATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1038 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, LCA 3
PART NUMBER: 83V76A24A1R7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1039

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, LCA 3
PART NUMBER: 83V76A24A1R7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1040

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R69

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1041

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R69

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1042

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R38

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1043

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4 & F5, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R38

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1044 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, LCA 3
PART NUMBER: 83V76A18R J1-107

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1045

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, LCA 3
PART NUMBER: 83V76A18R J1-107

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1046 ABORT: 3/3

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R40

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1047

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R40

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1048

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R71

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1049

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R71

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1050

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5F, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, LCA 3
PART NUMBER: 83V76A18R J8-82

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1051

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

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5F, RJDF
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, LCA 3
PART NUMBER: 83V76A18R J8-82

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1052 ABORT: 3/3

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R90

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1053

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

ITEM: RESISTOR, 2.2K 1/2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) RESISTOR, 2.2K 1/2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R90

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1054 ABORT: 3/3

ITEM: RESISTOR, 5.1K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) RESISTOR, 5.1K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R88

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1055

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

ITEM: RESISTOR, 5.1K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) RESISTOR, 5.1K 2W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R88

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE MDM (OF) SHOULD RESPOND TO POWER ON/OFF CYCLES.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1056 ABORT: 3/3

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R91

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THE OF MDM WILL SEE AN ERRONEOUS "ON" SIGNAL WHEN RPC IS OFF. THE BLEED RESISTOR NORMALLY SHUNTS LEAKAGE CURRENT TO GROUND AND PREVENTS ERRONEOUS VOLTAGE READING TO OF MDM WITH INPUT CIRCUIT OFF.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1057

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

ITEM: RESISTOR, 1.8K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: R.A. O'DONNELL SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD F5, RJDF
5) RESISTOR, 1.8K 1/4W
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1R91

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSS OF POWER "ON" INDICATION TO OF MDM INSTRUMENTATION.

REFERENCES: VS70-943099 REV B EO B12

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1058

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

ITEM: RJDF1B F1 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
DRIVER POWER CAN BE REMOVED FROM THE MANIFOLD BY PLACING THE F1 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. POWER CAN BE REMOVED FROM RJDF BUS A ONLY BY REMOVING POWER FROM MAIN BUS A. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE MANIFOLD, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS A.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1059

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

ITEM: RJDF1B F1 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THERE IS NO REDUNDANCY LOSS OF DRIVER POWER OR POWER TO RJDF BUS A. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE LOSS OF DRIVER POWER TO THE MANIFOLD AND POWER TO RJDF BUS A, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP. FAILURE DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1060 ABORT: 3/3

ITEM: RJDF1B F1 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER F1 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F1 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE F1 MANIFOLD, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1061

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

ITEM: RJDF1B F1 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THERE IS NO REDUNDANCY LOSS OF DRIVER POWER. FAILURE WILL RESULT IN THE LOSS OF MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS. FAILURE DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:		HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	1062	ABORT:	3/3

ITEM: RJDF1B F1 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1063

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

ITEM: RJDF1B F1 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1064

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

ITEM: RJDF1B F1 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER F1 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F1 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE F1 MANIFOLD, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1065

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

ITEM: RJDF1B F1 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE HAS NO EFFECT UNTIL THE SWITCH IS PLACED IN THE OFF POSITION. THERE IS NO REDUNDANCY LOSS OF POWER TO RJDF BUS A. FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE MANIFOLD AND POWER TO RJDF BUS A, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1066

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

ITEM: RJDF1B F1 MANIFOLD DRIVER OFF SWITCH CONTACTS 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER F1 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F1 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE F1 MANIFOLD, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1067

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

ITEM: RJDF1B F1 MANIFOLD DRIVER OFF SWITCH CONTACTS 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S8
PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE HAS NO EFFECT UNTIL SWITCH IS PLACED IN THE OFF POSITION. THERE IS NO REDUNDANCY LOSS OF POWER TO RJDF BUS A. FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE MANIFOLD AND POWER TO RJDF BUS A, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1068

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

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD LOGIC SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY REMOVING CONTROL BUS POWER FROM THE F1 LOGIC SWITCH ON CONTACTS, BY PLACING THE F1 MANIFOLD DRIVER SWITCH IN THE OFF POSITION, OR BY REMOVING POWER FROM MAIN BUS A. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE F1 MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1069

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

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD LOGIC SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF LOGIC AND DRIVER POWER TO THE F1 MANIFOLD AND MAY AFFECT ONORBIT OPERATIONS, DEORBIT PROPELLANT DUMP, AND ABORT DUMP LENGTHS. FAILURE OF ALL REDUNDANCY DURING RTLS MAY CAUSE LOSS OF VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1070 ABORT: 3/3

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY REMOVING CONTROL BUS POWER FROM THE F1 LOGIC SWITCH ON CONTACTS, BY PLACING THE F1 MANIFOLD DRIVER SWITCH IN THE OFF POSITION, OR BY REMOVING POWER FROM MAIN BUS A. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE F1 MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1071

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

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF LOGIC AND DRIVER POWER TO THE F1 MANIFOLD AND MAY AFFECT ONORBIT OPERATIONS, DEORBIT PROPELLANT DUMP, AND ABORT DUMP LENGTHS. FAILURE OF ALL REDUNDANCY DURING RTLS MAY CAUSE LOSS OF VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1072

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

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THE OFF CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1073

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

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B F1 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O14 S7
PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THE OFF CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1074 ABORT: 3/3

ITEM: RJDF1A F2 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
DRIVER POWER CAN BE REMOVED FROM THE MANIFOLD BY PLACING THE F2 MANIFOLD LOGIC SWITCH IN THE CLOSED POSITION. POWER CAN BE REMOVED FROM RJDF BUS B ONLY BY REMOVING POWER FROM MAIN BUS B. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE MANIFOLD, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS B.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1075

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

ITEM: RJDF1A F2 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THERE IS NO REDUNDANCY LOSS OF DRIVER POWER OR POWER TO RJDF BUS B. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE LOSS OF DRIVER POWER TO THE MANIFOLD AND POWER TO RJDF BUS B, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP FAILURE DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1076

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

ITEM: RJDF1A F2 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER F2 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F2 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE F2 MANIFOLD, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1077

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

ITEM: RJDF1A F2 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THERE IS NO REDUNDANCY LOSS OF DRIVER POWER. FAILURE WILL RESULT IN THE LOSS OF MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS. FAILURE DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:		HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	1078	ABORT:	3/3

ITEM: RJDF1A F2 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1079

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

ITEM: RJDF1A F2 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED) OR OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1080

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

ITEM: RJDF1A F2 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER F2 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F2 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE F2 MANIFOLD, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1081

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

ITEM: RJDF1A F2 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
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:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE HAS NO EFFECT UNTIL THE SWITCH IS PLACED IN THE OFF POSITION. THERE IS NO REDUNDANCY LOSS OF POWER TO RJDF BUS B. FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE MANIFOLD AND POWER TO RJDF BUS B, AND MAY AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1082 ABORT: 3/3

ITEM: RJDF1A F2 MANIFOLD DRIVER OFF SWITCH CONTACTS 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER F2 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F2 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE F2 MANIFOLD, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1083

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

ITEM: RJDF1A F2 MANIFOLD DRIVER OFF SWITCH CONTACTS 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
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:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O15 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE HAS NO EFFECT UNTIL THE SWITCH IS PLACED IN THE OFF POSITION. THERE IS NO REDUNDANCY LOSS OF POWER TO RJDF BUS B. FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE MANIFOLD AND POWER TO RJDF BUS B, AND MAY AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1084

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

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD LOGIC SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY REMOVING CONTROL BUS POWER FROM THE F2 LOGIC SWITCH ON CONTACTS, BY PLACING THE F2 MANIFOLD DRIVER SWITCH IN THE OFF POSITION, OR BY REMOVING POWER FROM MAIN BUS B. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE F2 MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1085

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

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD LOGIC SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF LOGIC AND DRIVER POWER TO THE F2 MANIFOLD AND MAY AFFECT ONORBIT OPERATIONS, ENTRY DTOS AND PTIS, AND ABORT DUMP LENGTHS. FAILURE OF ALL REDUNDANCY DURING RTLS MAY CAUSE LOSS OF VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1086

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

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY REMOVING CONTROL BUS POWER FROM THE F2 LOGIC SWITCH ON CONTACTS, BY PLACING THE F2 MANIFOLD DRIVER SWITCH IN THE OFF POSITION, OR BY REMOVING POWER FROM MAIN BUS B. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE F2 MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1087

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

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF LOGIC AND DRIVER POWER TO THE F2 MANIFOLD AND MAY AFFECT ONORBIT OPERATIONS, ENTRY DTOS AND PTIS, AND ABORT DUMP LENGTHS. FAILURE OF ALL REDUNDANCY DURING RTLS MAY CAUSE LOSS OF VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:		HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	1088	ABORT:	3/3

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THE OFF CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1089

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

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A F2 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O15 S7
PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THE OFF CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1090

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

ITEM: RJDF2A F3 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE POWER FROM THE F3 MANIFOLD DRIVER PROVIDED BY PLACING THE F3 MANIFOLD LOGIC SWITCH IN THE OFF POSITION, OR BY REMOVING POWER TO MAIN BUS C.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE POWER FROM THE F3 MANIFOLD DRIVER, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS C.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1091

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

ITEM: RJDF2A F3 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED FOR POWER TO RJDF BUS C BY THE F4/F5 MANIFOLD DRIVER SWITCH. THERE IS NO REDUNDANCY LOSS OF DRIVER POWER. FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE MANIFOLD AND REDUNDANT POWER TO RJDF BUS C, AND MAY AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMPS LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1092 ABORT: 3/3

ITEM: RJDF2A F3 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE POWER FROM THE F3 MANIFOLD DRIVER PROVIDED BY PLACING THE F3 MANIFOLD LOGIC SWITCH IN THE OFF POSITION, OR BY REMOVING POWER TO MAIN BUS C.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE POWER FROM THE F3 MANIFOLD DRIVER, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS C.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1093

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

ITEM: RJDF2A F3 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THERE IS NO REDUNDANCY LOSS OF DRIVER POWER. FAILURE WILL RESULT IN THE LOSS OF MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS. FAILURE DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1094

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

ITEM: RJDF2A F3 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1095

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

ITEM: RJDF2A F3 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED) OR OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1096 ABORT: 3/3

ITEM: RJDF2A F3 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE POWER FROM THE F3 MANIFOLD DRIVER PROVIDED BY PLACING THE F3 MANIFOLD LOGIC SWITCH IN THE OFF POSITION, OR BY REMOVING POWER TO MAIN BUS C.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE POWER FROM THE F3 MANIFOLD DRIVER, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS C.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1097

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

ITEM: RJDF2A F3 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
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:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE HAS NO EFFECT UNTIL THE SWITCH IS PLACED IN THE OFF POSITION. REDUNDANCY TO APPLY POWER TO RJDF BUS C PROVIDED BY THE F4/F5 MANIFOLD DRIVER SWITCH. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE LOSS OF RJDF BUS C POWER AND MAY AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1098 ABORT: 3/3

ITEM: RJDF2A F3 MANIFOLD DRIVER OFF SWITCH CONTACTS 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE POWER FROM THE F3 MANIFOLD DRIVER PROVIDED BY PLACING THE F3 MANIFOLD LOGIC SWITCH IN THE OFF POSITION, OR BY REMOVING POWER TO MAIN BUS C.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE POWER FROM THE F3 MANIFOLD DRIVER, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS C.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1099

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

ITEM: RJDF2A F3 MANIFOLD DRIVER OFF SWITCH CONTACTS 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
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:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE HAS NO EFFECT UNTIL THE SWITCH IS PLACED IN THE OFF POSITION. REDUNDANCY TO APPLY POWER TO RJDF BUS C PROVIDED BY THE F4/F5 MANIFOLD DRIVER SWITCH. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE LOSS OF RJDF BUS C POWER AND MAY AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1100

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

ITEM: RJDF2A F3 MANIFOLD LOGIC SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD LOGIC SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S5
PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY REMOVING CONTROL BUS POWER FROM THE F3 LOGIC SWITCH ON CONTACTS, BY PLACING THE F3 MANIFOLD DRIVER SWITCH IN THE OFF POSITION, OR BY REMOVING POWER FROM MAIN BUS C. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE F3 MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1101

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

ITEM: RJDF2A F3 MANIFOLD LOGIC SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD LOGIC SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S5
PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF LOGIC POWER TO THE F3 MANIFOLD (AND DRIVER POWER IF THE F3 MANIFOLD DRIVER SWITCH IS PLACED IN THE OFF POSITION) AND MAY AFFECT ONORBIT OPERATIONS, DEORBIT PROPELLANT DUMP, AND ABORT DUMP LENGTHS. FAILURE OF ALL REDUNDANCY DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1102

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

ITEM: RJDF2A F3 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S5
PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY REMOVING CONTROL BUS POWER FROM THE F3 LOGIC SWITCH ON CONTACTS, BY PLACING THE F3 MANIFOLD DRIVER SWITCH IN THE OFF POSITION, OR BY REMOVING POWER FROM MAIN BUS C. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE F3 MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1103

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

ITEM: RJDF2A F3 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S5
PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF LOGIC POWER TO THE F3 MANIFOLD (AND DRIVER POWER IF THE F3 MANIFOLD DRIVER SWITCH IS PLACED IN THE OFF POSITION) AND MAY AFFECT ONORBIT OPERATIONS, DEORBIT PROPELLANT DUMP, AND ABORT DUMP LENGTHS. FAILURE OF ALL REDUNDANCY DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1104

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

ITEM: RJDF2A F3 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S5
PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THE OFF CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1105

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

ITEM: RJDF2A F3 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A F3 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S5
PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THE OFF CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1106

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

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE POWER FROM THE F4/F5 MANIFOLD DRIVER PROVIDED BY PLACING THE F4/F5 MANIFOLD LOGIC SWITCH IN THE OFF POSITION, OR BY REMOVING POWER TO MAIN BUS C.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE POWER FROM THE F4/F5 MANIFOLD DRIVER, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS C.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1107

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

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED FOR POWER TO RJDF BUS C BY THE F4/F5 MANIFOLD DRIVER SWITCH. THERE IS NO REDUNDANCY LOSS OF DRIVER POWER. FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE MANIFOLD AND REDUNDANT POWER TO RJDF BUS C, AND MAY AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMPS LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1108

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

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE POWER FROM THE F4/F5 MANIFOLD DRIVER PROVIDED BY PLACING THE F4/F5 MANIFOLD LOGIC SWITCH IN THE OFF POSITION, OR BY REMOVING POWER TO MAIN BUS C.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE POWER FROM THE F4/F5 MANIFOLD DRIVER, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS C.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1109

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

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THERE IS NO REDUNDANCY LOSS OF DRIVER POWER. FAILURE WILL RESULT IN THE LOSS OF MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS. FAILURE DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1110

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

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

		HIGHEST CRITICALITY	HDW/FUNC
DATE:		FLIGHT:	3/3
SUBSYSTEM:	FRCS	ABORT:	3/3
MDAC ID:	1111		

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED) OR OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1112

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

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE POWER FROM THE F4/F5 MANIFOLD DRIVER PROVIDED BY PLACING THE F4/F5 MANIFOLD LOGIC SWITCH IN THE OFF POSITION, OR BY REMOVING POWER TO MAIN BUS C.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE POWER FROM THE F4/F5 MANIFOLD DRIVER, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS C.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1113

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

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
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:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE HAS NO EFFECT UNTIL THE SWITCH IS PLACED IN THE OFF POSITION. REDUNDANCY TO APPLY POWER TO RJDF BUS C PROVIDED BY THE F3 MANIFOLD DRIVER SWITCH. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE LOSS OF RJDF BUS C POWER AND MAY AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1114 ABORT: 3/3

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER OFF SWITCH CONTACTS 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE POWER FROM THE F4/F5 MANIFOLD DRIVER PROVIDED BY PLACING THE F4/F5 MANIFOLD LOGIC SWITCH IN THE OFF POSITION, OR BY REMOVING POWER TO MAIN BUS C.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE POWER FROM THE F4/F5 MANIFOLD DRIVER, WHICH WILL AFFECT ONORBIT OPERATIONS, AND THE INABILITY TO REMOVE POWER TO RJDF BUS C.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1115

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

ITEM: RJDF2B F4/F5 MANIFOLD DRIVER OFF SWITCH CONTACTS 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
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:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S13
PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE HAS NO EFFECT UNTIL THE SWITCH IS PLACED IN THE OFF POSITION. REDUNDANCY TO APPLY POWER TO RJDF BUS C PROVIDED BY THE F3 MANIFOLD DRIVER SWITCH. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE LOSS OF RJDF BUS C POWER AND MAY AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:		HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	1116	ABORT:	3/3

ITEM: RJDF2B F4/F5 MANIFOLD LOGIC SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD LOGIC SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S12
PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY REMOVING CONTROL BUS POWER FROM THE F4/F5 LOGIC SWITCH ON CONTACTS, BY PLACING THE F4/F5 MANIFOLD DRIVER SWITCH IN THE OFF POSITION, OR BY REMOVING POWER FROM MAIN BUS C. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE F4/F5 MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1117

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

ITEM: RJDF2B F4/F5 MANIFOLD LOGIC SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD LOGIC SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S12
PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF LOGIC POWER TO THE F4 MANIFOLD AND DRIVER POWER TO THE F4 AND F5 MANIFOLD, WILL CAUSE LOSS OF THE VERNIER RCS, WILL AFFECT ONORBIT OPERATIONS, AND DEORBIT AND ABORT PROPELLANT DUMP LENGTHS. FAILURE OF ALL REDUNDANCY DURING RTLS MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1118

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

ITEM: RJDF2B F4/F5 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S12
PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY REMOVING CONTROL BUS POWER FROM THE F4/F5 LOGIC SWITCH ON CONTACTS, BY PLACING THE F4/F5 MANIFOLD DRIVER SWITCH IN THE OFF POSITION, OR BY REMOVING POWER FROM MAIN BUS C. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE INABILITY TO REMOVE F4/F5 MANIFOLD DRIVER POWER, AND WILL AFFECT ONORBIT OPERATIONS AND DEORBIT PROPELLANT DUMP LENGTHS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1119

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

ITEM: RJDF2B F4/F5 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD LOGIC SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S12
PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF LOGIC AND DRIVER POWER TO THE F1 MANIFOLD AND MAY AFFECT ONORBIT OPERATIONS, DEORBIT PROPELLANT DUMP, AND ABORT DUMP LENGTHS. FAILURE OF ALL REDUNDANCY DURING RTLS MAY CAUSE LOSS OF VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1120

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

ITEM: RJDF2B F4/F5 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S12
PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THE OFF CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1121

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

ITEM: RJDF2B F4/F5 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B F4/F5 MANIFOLD LOGIC SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S12
PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THE OFF CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1122

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

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE L5/F5/R5, RESULTING IN LOSS OF THE VERNIER RCS, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1123

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

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER L5/F5/R5 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F4/F5 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE MANIFOLD DRIVER, AND WILL AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1124

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

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE L5/F5/R5, RESULTING IN LOSS OF THE VERNIER RCS, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1125

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

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER ON SWITCH CONTACTS 1, 2 OR 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER L5/F5/R5 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F4/F5 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE MANIFOLD DRIVER, AND WILL AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1126

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

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1127

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

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:		HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	2/2
MDAC ID:	1128	ABORT:	3/3

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE L5/F5/R5, RESULTING IN LOSS OF THE VERNIER RCS, AND MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1129

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

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER ON SWITCH CONTACTS 5, 6
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH ON CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY TO REMOVE MANIFOLD DRIVER POWER PROVIDED BY THE OTHER L5/F5/R5 MANIFOLD DRIVER SWITCH ON CONTACTS, OR BY PLACING THE F4/F5 MANIFOLD LOGIC SWITCH IN THE OFF POSITION. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO REMOVE DRIVER POWER FROM THE MANIFOLD DRIVER, AND WILL AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:		HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/3
MDAC ID:	1130	ABORT:	3/3

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4 OR 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1131

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

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER OFF SWITCH CONTACTS 3, 4 OR 7, 8
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED (SHORTED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) THRUSTER SUBSYSTEM
4) MANIFOLD 5, RJDF
5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH OFF CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: PNL O16 S15
PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-942099 REV D EO D01, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1132

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

ITEM: RJDF1B MANIFOLD F1 TRICKLE TEST
FAILURE MODE: TEST DOES NOT OPERATE OR OPERATES ERRATICALLY.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) MANIFOLD 1, RJDF
5) RJDF1B MANIFOLD F1 TRICKLE TEST
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: GPC VIA MDM
PART NUMBER: GPC

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW AND GROUND CANNOT DETERMINE THE OPERATIONAL STATUS OF THE FWD RCS JETS.

REFERENCES: VS70-943099 REV B EO B12, CJ

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1133

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

ITEM: RJDF1A MANIFOLD F2 TRICKLE TEST
FAILURE MODE: TEST DOES NOT OPERATE OR OPERATES ERRATICALLY.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) MANIFOLD 2, RJDF
5) RJDF1A MANIFOLD F2 TRICKLE TEST
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: GPC VIA MDM
PART NUMBER: GPC

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW AND GROUND CANNOT DETERMINE THE OPERATIONAL STATUS OF THE FWD RCS JETS.

REFERENCES: VS70-943099 REV B EO B12, CJ

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1134

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

ITEM: RJDF2A MANIFOLD F3 TRICKLE TEST
FAILURE MODE: TEST DOES NOT OPERATE OR OPERATES ERRATICALLY.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) MANIFOLD 3, RJDF
5) RJDF2A MANIFOLD F3 TRICKLE TEST
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: GPC VIA MDM
PART NUMBER: GPC

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW AND GROUND CANNOT DETERMINE THE OPERATIONAL STATUS OF THE FWD RCS JETS.

REFERENCES: VS70-943099 REV B EO B12, CJ

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: FRCS
MDAC ID: 1135

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

ITEM: RJDF2B MANIFOLD F4, F5 TRICKLE TEST
FAILURE MODE: TEST DOES NOT OPERATE OR OPERATES ERRATICALLY.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) MANIFOLD 4/5, RJDF
5) RJDF2B MANIFOLD F4, F5 TRICKLE TEST
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: GPC VIA MDM
PART NUMBER: GPC

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW AND GROUND CANNOT DETERMINE THE OPERATIONAL STATUS OF THE FWD RCS JETS.

REFERENCES: VS70-943099 REV B EO B12, CJ

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1136

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

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1D, F3D, F2D, F4D
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, DOWN
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1D, F3D, F2D, F4D
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1551A, V42P1553A, V42P1552A, V42P1554A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED OFF. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1137

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

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1D, F3D, F2D, F4D
FAILURE MODE: FAILS ON, INDICATING A PRESSURE HIGHER THAN THE CHAMBER PRESSURE DETECTION LEVEL IN THE RJD.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, DOWN
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1D, F3D, F2D, F4D
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1551A, V42P1553A, V42P1552A, V42P1554A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL ANNOUNCE THE JET AS FAILED ON. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	1138	ABORT:	3/3

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1F, F2F, F3F
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, FWD
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1F, F2F, F3F
6)
7)
8)
9)

CRITICALITIES

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

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

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1541A, V42P1542A, V42P1543A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED OFF. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1139

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

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1F, F2F, F3F
FAILURE MODE: FAILS ON, INDICATING A PRESSURE HIGHER THAN THE CHAMBER PRESSURE DETECTION LEVEL IN THE RJD.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, FWD
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1F, F2F, F3F
6)
7)
8)
9)

CRITICALITIES

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

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1541A, V42P1542A, V42P1543A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL ANNOUNCE THE JET AS FAILED ON. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1140 ABORT: 3/3

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1L, F3L, F2R, F4R
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, L/R
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1L, F3L, F2R, F4R
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1544A, V42P1546A, V42P1545A, V42P1547A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED OFF. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1141

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1L, F3L, F2R, F4R
FAILURE MODE: FAILS ON, INDICATING A PRESSURE HIGHER THAN THE CHAMBER PRESSURE DETECTION LEVEL IN THE RJD.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, L/R
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1L, F3L, F2R, F4R
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1544A, V42P1546A, V42P1545A, V42P1547A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL ANNOUNCE THE JET AS FAILED ON. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	1142	ABORT:	3/3

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1U, F2U, F3U
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, UP
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1U, F2U, F3U
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1548A, V42P1549A, V42P1550A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED OFF. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1143

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1U, F2U, F3U
FAILURE MODE: FAILS ON, INDICATING A PRESSURE HIGHER THAN THE CHAMBER PRESSURE DETECTION LEVEL IN THE RJD.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, UP
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F1U, F2U, F3U
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1548A, V42P1549A, V42P1550A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL ANNOUNCE THE JET AS FAILED ON. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1144 ABORT: 3/3

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F5L, F5R
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, L/R
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F5L, F5R
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1555A, V42P1556A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED OFF. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1145

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F5L, F5R
FAILURE MODE: FAILS ON, INDICATING A PRESSURE HIGHER THAN THE CHAMBER PRESSURE DETECTION LEVEL IN THE RJD.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, L/R
5) CHAMBER PRESSURE (Pc) SENSOR, THRUSTERS F5L, F5R
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/2R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42P1555A, V42P1556A

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL ANNOUNCE THE JET AS FAILED ON. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1146 ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1D, F2D, F3D, F4D
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, DOWN
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1D, F2D, F3D, F4D
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1521C THRU 28C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED LEAKING. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1147

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1D, F2D, F3D, F4D
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, DOWN
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1D, F2D, F3D, F4D
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1521C THRU 28C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1148

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1F, F2F, F3F
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, FWD
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1F, F2F, F3F
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1501C THRU 06C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED LEAKING. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1149

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1F, F2F, F3F
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, FWD
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1F, F2F, F3F
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1501C THRU 06C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1150 ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1L, F3L, F2R, F4R
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, L/R
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1L, F3L, F2R, F4R
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1507C THRU 14C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED LEAKING. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1151

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1L, F3L, F2R, F4R
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, L/R
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1L, F3L, F2R, F4R
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1507C THRU 14C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	1152	ABORT:	3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1U, F2U, F3U
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, UP
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1U, F2U, F3U
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1515C THRU 20C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED LEAKING. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1153

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1U, F2U, F3U
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, UP
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F1U, F2U, F3U
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1515C THRU 20C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1154 ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F5L, F5R
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, L/R
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F5L, F5R
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1529C THRU 32C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY MANAGEMENT WILL DESELECT THE JET AND ANNOUNCE IT AS FAILED LEAKING. CREW MAY MAKE WRONG DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1155

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F5L, F5R
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) THRUSTER SUBSYSTEM
4) THRUSTERS, L/R
5) OX OR FU INJECTOR TEMP SENSOR, THRUSTERS F5L, F5R
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42T1529C THRU 32C

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-942099 REV D EO D01; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.6

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1156 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, FU FWD
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-Q TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1157

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, FU FWD
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-Q TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1158

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, FU LOWER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-N TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1159

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, FU LOWER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-N TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1160 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, FU UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-S TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1161

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, FU UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-S TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1162 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, OX LOWER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-M' TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1163

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, OX LOWER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-M' TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1164

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, OX UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-R TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1165

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, OX UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-R TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1166

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, OX UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-P' TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1167

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, OX UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16AR J5-P' TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1168

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, FU FWD
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-Q TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1169

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, FU FWD
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-Q TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1170

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, FU LOWER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-N TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1171

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, FU LOWER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-N TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1172 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, FU UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-S TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1173

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, FU UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-S TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1174

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, OX FWD
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-P' TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1175

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, OX FWD
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-P' TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1176

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, OX LOWER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-M TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1177

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, OX LOWER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-M TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1178 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, OX UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-R' TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1179

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, OX UPPER
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17AR J5-R' TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN THE ASSOCIATED HTR BEING FAILED "ON" WHICH COULD PRODUCE A HIGHER THAN DESIRED TEMP IN FRCS. CREW SWITCH AVAILABLE TO REMOVE POWER FROM FAILED HTR CIRCUIT AND SELECT REDUNDANT HTR SYSTEM.
LOSS OF ALL REDUNDANCY COULD PRODUCE UPPER TEMP LIMITS EXCEEDING REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1180

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 20A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, FU FWD
5) FUSE, 20A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22F12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1181

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 20A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, FU LOWER
5) FUSE, 20A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22F14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1182 ABORT: 3/3

ITEM: FUSE, 20A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, OX FWD
5) FUSE, 20A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22F13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1183

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 20A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A, OX UPPER
5) FUSE, 20A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22F11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1184

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 20A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, FU FWD
5) FUSE, 20A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23F21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1185

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 20A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, FU LOWER
5) FUSE, 20A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23F23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1186

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 20A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, OX FWD
5) FUSE, 20A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23F22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1187

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 20A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL B, OX UPPER
5) FUSE, 20A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23F20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1188

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S3
PART NUMBER: 36V73A14F11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1189

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER

SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S3
PART NUMBER: 36V73A14F9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO POWER HEATERS FOR ASSOCIATED HTR SYSTEM, REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1190

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S3
PART NUMBER: 36V73A14F10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO POWER HEATERS FOR ASSOCIATED HTR SYSTEM, REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1191

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S3
PART NUMBER: 36V73A14F12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 1192 ABORT: 3/3

ITEM: FUSE, 7.5A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) FUSE, 7.5A
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14F32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 1 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1193

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: FUSE, 7.5A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) FUSE, 7.5A
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14F33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 2 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1194

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: FUSE, 7.5A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) FUSE, 7.5A
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14F34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 3 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1195

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: FUSE, 7.5A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) FUSE, 7.5A
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14F35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 4 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1196

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: FUSE, 7.5A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) FUSE, 7.5A
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14F36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 5 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1197

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 90W, A & B OX LWR HTR PNL 3
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, FU FWD
5) HEATER 90W, A & B OX LWR HTR PNL 3
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT103

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1198 ABORT: 3/3

ITEM: HEATER 90W, A & B OX LWR HTR PNL 3
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, FU FWD
5) HEATER 90W, A & B OX LWR HTR PNL 3
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT103

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1199

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 90W, A & B OX LWR HTR PNL 1
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, FU UPPER
5) HEATER 90W, A & B OX LWR HTR PNL 1
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT101

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

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INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1200 ABORT: 3/3

ITEM: HEATER 90W, A & B OX LWR HTR PNL 1
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, FU UPPER
5) HEATER 90W, A & B OX LWR HTR PNL 1
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT101

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1201

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 90W, A & B OX FWD HTR PNL 4
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, OX FWD
5) HEATER 90W, A & B OX FWD HTR PNL 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT104

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1202 ABORT: 3/3

ITEM: HEATER 90W, A & B OX FWD HTR PNL 4
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, OX FWD
5) HEATER 90W, A & B OX FWD HTR PNL 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT104

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1203

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 90W, A & B OX LWR HTR PNL 2
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, OX UPPER
5) HEATER 90W, A & B OX LWR HTR PNL 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT102

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1204

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 90W, A & B OX LWR HTR PNL 2
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, OX UPPER
5) HEATER 90W, A & B OX LWR HTR PNL 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT102

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1205

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 90W, A & B FU FWD HTR PNL 5
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, FU LOWER
5) HEATER 90W, A & B FU FWD HTR PNL 5
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT105

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1206 ABORT: 3/3

ITEM: HEATER 90W, A & B FU FWD HTR PNL 5
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, FU LOWER
5) HEATER 90W, A & B FU FWD HTR PNL 5
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT105

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1207

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 90W, A & B OX LWR HTR PNL 6
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, OX LOWER
5) HEATER 90W, A & B OX LWR HTR PNL 6
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT106

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	1208	ABORT:	3/3

ITEM: HEATER 90W, A & B OX LWR HTR PNL 6
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR PNL A/B, OX LOWER
5) HEATER 90W, A & B OX LWR HTR PNL 6
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42HT106

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1209

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 20W, THRUSTER, PRIMARY, -X AXIS
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY MANIFOLD JETS
5) HEATER 20W, THRUSTER, PRIMARY, -X AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42HRF1D

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW C&W LIMITS, JETS WILL BE ANNOUNCED AS "FAILED OFF". FAILURE OF ALL REDUNDANCY WILL AFFECT ONORBIT OPERATIONS. THE PROPELLANTS WILL NOT HAVE ENOUGH TIME TO FREEZE DURING ABORTS.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1210

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 20W, THRUSTER, PRIMARY, -X AXIS
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY MANIFOLD JETS
5) HEATER 20W, THRUSTER, PRIMARY, -X AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42HRF1D

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW C&W LIMITS, JETS WILL BE ANNOUNCE AS "FAILED OFF". FAILURE OF ALL REDUNDANCY WILL AFFECT ONORBIT OPERATIONS. THE PROPELLANTS WILL NOT HAVE ENOUGH TIME TO FREEZE DURING ABORTS.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1211

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/3

ITEM: HEATER 20W, THRUSTER, PRIMARY, Y AXIS
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY MANIFOLD JETS
5) HEATER 20W, THRUSTER, PRIMARY, Y AXIS
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:	3/1R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42HRF1F

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW C&W LIMITS, JETS WILL BE ANNOUNCED AS "FAILED OFF". FAILURE MAY AFFECT ONORBIT OPERATIONS. FAILURE OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY TO MEET CG SAFETY BOUNDARIES. THE PROPELLANTS WILL NOT HAVE ENOUGH TIME TO FREEZE DURING ABORTS.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/1R
MDAC ID: 1212 ABORT: 3/3

ITEM: HEATER 20W, THRUSTER, PRIMARY, Y AXIS
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY MANIFOLD JETS
5) HEATER 20W, THRUSTER, PRIMARY, Y AXIS
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:	3/1R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42HRF1F

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW C&W LIMITS, JETS WILL BE ANNOUNCED AS "FAILED OFF". FAILURE MAY AFFECT ONORBIT OPERATIONS. FAILURE OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY TO MEET CG SAFETY BOUNDARIES. THE PROPELLANTS WILL NOT HAVE ENOUGH TIME TO FREEZE DURING ABORTS.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1213

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 20W, THRUSTER, PRIMARY, Z AXIS
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY MANIFOLD JETS
5) HEATER 20W, THRUSTER, PRIMARY, Z AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42HRF1L

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW C&W LIMITS, JETS WILL BE ANNOUNCED AS "FAILED OFF". FAILURE OF ALL REDUNDANCY MAY AFFECT ONORBIT OPERATIONS. THE PROPELLANTS WILL NOT HAVE ENOUGH TIME TO FREEZE DURING ABORTS.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1214

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: HEATER 20W, THRUSTER, PRIMARY, Z AXIS
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY MANIFOLD JETS
5) HEATER 20W, THRUSTER, PRIMARY, Z AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42HRF1L

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW C&W LIMITS, JETS WILL BE ANNOUNCED AS "FAILED OFF". FAILURE OF ALL REDUNDANCY MAY AFFECT ONORBIT OPERATIONS. THE PROPELLANTS WILL NOT HAVE ENOUGH TIME TO FREEZE DURING ABORTS.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1215

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: HEATER 10W, THRUSTER, VERNIER, ALL AXES
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) VERNIER MANIFOLD JETS
5) HEATER 10W, THRUSTER, VERNIER, ALL AXES
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42HRF5L

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO REDUNDANCY. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW THE C&W LIMITS, JET WILL BE ANNOUNCED AS "FAILED OFF". FAILURE WILL RESULT IN LOSS OF VERNIER RCS.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 1216 ABORT: 3/3

ITEM: HEATER 10W, THRUSTER, VERNIER, ALL AXES
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) VERNIER MANIFOLD JETS
5) HEATER 10W, THRUSTER, VERNIER, ALL AXES
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: V42HRF5L

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO REDUNDANCY. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW THE C&W LIMITS, JET WILL BE ANNOUNCED AS "FAILED OFF". FAILURE WILL RESULT IN LOSS OF VERNIER RCS.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1217

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22K10

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR SYSTEM. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1218

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22K10

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE MAIN BUS POWER FROM THE ASSOCIATED HTR SYSTEM. NO EFFECT, HYBRID DRIVERS AND THERMOSTAT INPUTS PROVIDE PROPER ON/OFF CONTROL OF HTR SYSTEM. LOSS OF ALL REDUNDANCY CAN PRODUCE UPPER TEMP LIMITS EXCEEDING FRCS REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1219

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23K12

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
FAILURE CAUSES LOSS OF POWER FOR ASSOCIATED HTR SYSTEM. LOSS OF ALL REDUNDANCY WOULD RESULT IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1220

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, PCA 2
PART NUMBER: 82V76A23K12

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE MAIN BUS POWER FROM THE ASSOCIATED HTR SYSTEM. NO EFFECT, HYBRID DRIVERS AND THERMOSTAT INPUTS PROVIDE PROPER ON/OFF CONTROL OF HTR SYSTEM. LOSS OF ALL REDUNDANCY CAN PRODUCE UPPER TEMP LIMITS EXCEEDING FRCS REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1221

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16R J4-74

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE FU SYSTEM THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1222

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16R J4-74

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, HEATER SYSTEM STILL FULLY OPERATIONAL.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1223

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16R J4-78

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE OX SYSTEM THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1224

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16R J4-78

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, HEATER SYSTEM STILL FULLY OPERATIONAL.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1225

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R78

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE FRCS HTR SWITCH POSITION TALKBACK. NO EFFECT, SWITCH POSITION CAN BE INDIRECTLY DETERMINED BY MONITORING HTR SYSTEM OPERATION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1226

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22A1R78

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, TALKBACK STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1227

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16R J4-82

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, TALKBACK STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1228

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 1, LCA 1
PART NUMBER: 81V76A16R J4-82

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, TALKBACK STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1229

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17R J4-82

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, TALKBACK STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1230

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17R J4-82

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, TALKBACK STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1231

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17R J4-78

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE OX SYSTEM THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM, REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1232

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17R J4-78

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, HEATER SYSTEM STILL FULLY OPERATIONAL.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1233

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A23A1R18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE FRCS HTR SWITCH POSITION TALKBACK. NO EFFECT, SWITCH POSITION CAN BE INDIRECTLY DETERMINED BY MONITORING HTR SYSTEM OPERATION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1234

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A23A1R18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, TALKBACK STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1235

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17R J4-74

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE FU SYSTEM THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM, REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1236

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM B
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 2, LCA 2
PART NUMBER: 82V76A17R J4-74

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, HEATER SYSTEM STILL FULLY OPERATIONAL.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1237

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14-A2R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE GPC TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 1" SWITCH POSITION. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1238

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14-A2R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT, TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 1" SWITCH POSITION IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1239

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14-A3R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE GPC TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 2" SWITCH POSITION. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1240

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14-A3R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT, TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 2" SWITCH POSITION IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1241

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14-A4R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE GPC TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 3" SWITCH POSITION. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1242

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14-A4R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT, TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 3" SWITCH POSITION IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1243

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14-A5R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE GPC TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 4" SWITCH POSITION. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1244

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14-A5R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT, TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 4" SWITCH POSITION IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1245

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14-A6R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE GPC TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 5" SWITCH POSITION. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1246

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14-A6R1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT, TALKBACK FOR "RCS/OMS HEATERS FWD RCS JET 5" SWITCH POSITION IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1247

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS
FAILURE MODE: FAILS TO SWITCH (STUCK IN A-AUTO POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A/B, OX
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S3
PART NUMBER: 36V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE POWER FROM HEATER SYSTEM. HEATER SYSTEM THERMOSTATS ARE STILL AVAILABLE TO MAINTAIN PROPER THERMAL CONTROL. LOSS OF ALL REDUNDANCY CAN PRODUCE UPPER TEMP LIMITS EXCEEDING FRCS REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1248 ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS
FAILURE MODE: FAILS TO SWITCH (STUCK IN B-AUTO POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A/B, OX
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S3
PART NUMBER: 36V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE POWER FROM HEATER SYSTEM. HEATER SYSTEM THERMOSTATS ARE STILL AVAILABLE TO MAINTAIN PROPER THERMAL CONTROL. LOSS OF ALL REDUNDANCY CAN PRODUCE UPPER TEMP LIMITS EXCEEDING FRCS REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1249

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS
FAILURE MODE: FAILS TO SWITCH (STUCK IN OFF POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A/B, OX
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S3
PART NUMBER: 36V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE THERMOSTAT CONTROL FOR ASSOCIATED HEATER SYSTEM REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1250

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) MANIFOLD 1, JETS HEATER CONTROL SWITCH
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY AND BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS. THIS COULD RESULT IN LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1251

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) MANIFOLD 1, JETS HEATER CONTROL SWITCH
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD. THIS COULD AFFECT ONORBIT OPERATIONS AND PROPELLANT DUMP LENGTHS FOR ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1252

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) MANIFOLD 1, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD. THIS COULD AFFECT ONORBIT OPERATIONS AND PROPELLANT DUMP LENGTHS FOR ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1253

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) MANIFOLD 1, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY AND BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS. THIS COULD CAUSE LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1254

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) MANIFOLD 1, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1255

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) MANIFOLD 1, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1256

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 1
FAILURE MODE: FAILS TO SWITCH (FAILS IN AUTO POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 1
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE POWER FROM THE FRCS JET 1 HTR SYSTEM. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL. LOSS OF ALL REDUNDANCY RESULTS IN JET 1 HEATERS AND REDUNDANT JET HEATERS FAILED "ON" CAUSING LOSS OF ASSOCIATED HEATERS, THEREFORE LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1257

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 1
FAILURE MODE: FAILS TO SWITCH (FAILS IN OFF POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 1 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 1
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14
PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 1 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1258

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) MANIFOLD 2, JETS HEATER CONTROL SWITCH
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY AND BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS. THIS COULD RESULT IN LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1259

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) MANIFOLD 2, JETS HEATER CONTROL SWITCH
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:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD. THIS COULD AFFECT ONORBIT OPERATIONS AND PROPELLANT DUMP LENGTHS FOR ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1260

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) MANIFOLD 2, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
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:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD. THIS COULD AFFECT ONORBIT OPERATIONS AND PROPELLANT DUMP LENGTHS FOR ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1261

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) MANIFOLD 2, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY AND BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS. THIS COULD CAUSE LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1262

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) MANIFOLD 2, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1263

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) MANIFOLD 2, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1264

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 2
FAILURE MODE: FAILS TO SWITCH (FAILS IN AUTO POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE POWER FROM THE FRCS JET 2 HTR SYSTEM. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL. LOSS OF ALL REDUNDANCY RESULTS IN JET 1 HEATERS AND REDUNDANT JET HEATERS FAILED "ON" CAUSING LOSS OF ASSOCIATED HEATERS, THEREFORE LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1265

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 2
FAILURE MODE: FAILS TO SWITCH (FAILS IN OFF POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 2 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 2
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15
PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 2 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1266

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) MANIFOLD 3, JETS HEATER CONTROL SWITCH
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS. THIS COULD RESULT IN LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1267

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) MANIFOLD 3, JETS HEATER CONTROL SWITCH
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:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD. THIS COULD AFFECT ONORBIT OPERATIONS AND PROPELLANT DUMP LENGTHS FOR ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 1268 ABORT: 3/3

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) MANIFOLD 3, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
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:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD. THIS COULD AFFECT ONORBIT OPERATIONS AND PROPELLANT DUMP LENGTHS FOR ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1269

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) MANIFOLD 3, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY AND BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS. THIS COULD CAUSE LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1270

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) MANIFOLD 3, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1271

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) MANIFOLD 3, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1272

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 3
FAILURE MODE: FAILS TO SWITCH (FAILS IN AUTO POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 3
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE POWER FROM THE FRCS JET 3 HTR SYSTEM. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL. LOSS OF ALL REDUNDANCY RESULTS IN JET 1 HEATERS AND REDUNDANT JET HEATERS FAILED "ON" CAUSING LOSS OF ASSOCIATED HEATERS, THEREFORE LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1273

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 3
FAILURE MODE: FAILS TO SWITCH (FAILS IN OFF POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 3 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 3
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 3 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/1R
MDAC ID:	1274	ABORT:	3/1R

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) MANIFOLD 4, JETS HEATER CONTROL SWITCH
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY AND BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS. THIS COULD RESULT IN LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1275

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) MANIFOLD 4, JETS HEATER CONTROL SWITCH
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:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD. THIS COULD AFFECT ONORBIT OPERATIONS AND PROPELLANT DUMP LENGTHS FOR ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	2/2
MDAC ID:	1276	ABORT:	3/3

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) MANIFOLD 4, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
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:	2/2	AOA:	3/3
DEORBIT:	2/2	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD. THIS COULD AFFECT ONORBIT OPERATIONS AND PROPELLANT DUMP LENGTHS FOR ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1277

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) MANIFOLD 4, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY AND BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS. THIS COULD CAUSE LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1278 ABORT: 3/3

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) MANIFOLD 4, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1279

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) MANIFOLD 4, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	1280	ABORT:	3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 4
FAILURE MODE: FAILS TO SWITCH (FAILS IN AUTO POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE POWER FROM THE FRCS JET 4 HTR SYSTEM. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL. LOSS OF ALL REDUNDANCY RESULTS IN JET 1 HEATERS AND REDUNDANT JET HEATERS FAILED "ON" CAUSING LOSS OF ASSOCIATED HEATERS, THEREFORE LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1281

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 4
FAILURE MODE: FAILS TO SWITCH (FAILS IN OFF POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 4 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 4
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17
PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 4 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/1R
MDAC ID:	1282	ABORT:	3/3

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE ON POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) MANIFOLD 5, JETS HEATER CONTROL SWITCH
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:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS AND LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1283

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH
FAILURE MODE: SWITCH FAILS IN THE OFF POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) MANIFOLD 5, JETS HEATER CONTROL SWITCH
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE MANIFOLD, AND WILL CAUSE LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	2/2
MDAC ID:	1284	ABORT:	3/3

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) MANIFOLD 5, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANT IN JETS WILL FREEZE. THIS WILL CAUSE LOSS OF ALL JETS ON THE LEFT AND RIGHT MANIFOLD, AND WILL CAUSE LOSS OF THE VERNIER RCS.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1285

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/3

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
FAILURE MODE: SWITCH ON CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) MANIFOLD 5, JETS HEATER CONTROL SWITCH ON CONTACTS 1, 2
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:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THERMOSTATS IN EACH JET ASSEMBLY AND BY CIRCUIT BREAKERS. FAILURE OF ALL REDUNDANCY COULD CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS AND LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 1286 ABORT: 3/3

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) MANIFOLD 5, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1287

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
FAILURE MODE: SWITCH OFF CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) MANIFOLD 5, JETS HEATER CONTROL SWITCH OFF CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, CL, DL

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1288 ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 5
FAILURE MODE: FAILS TO SWITCH (FAILS IN AUTO POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 5
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ABILITY TO REMOVE POWER FROM THE FRCS JET 5 HTR SYSTEM. NO EFFECT, THERMOSTATS IN SYSTEM WILL MAINTAIN PROPER THERMAL CONTROL. LOSS OF ALL REDUNDANCY RESULTS IN JET 1 HEATERS AND REDUNDANT JET HEATERS FAILED "ON" CAUSING LOSS OF ASSOCIATED HEATERS, THEREFORE LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85; MC467-0029 REV G AMENDMENT SEQ. 2.

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1289

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 5
FAILURE MODE: FAILS TO SWITCH (FAILS IN OFF POSITION)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) MANIFOLD 5 JETS
5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS JET 5
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18
PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE RESULTS IN LOSS OF ALL MANIFOLD 5 HTRS. INABILITY TO MAINTAIN LOWER TEMPERATURE LIMIT WILL TRIGGER A CLASS 2 ALARM AND CAUSE ASSOCIATED ENGINES TO BE DESELECTED THROUGH LEAK DETECTION SOFTWARE. LOSS OF MANIFOLD ENGINES WILL RESULT IN A LOSS OF LOSS OF FULL MISSION CAPABILITIES.

REFERENCES: VS70-942099 REV D EO D01; JSC 18549 15OCT82 LTR 28JUNE85

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	1290	ABORT:	3/3

ITEM: FU SYSTEM A & B THERMOSTAT
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A/B, FU
5) FU SYSTEM A & B THERMOSTAT
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42TS101, 201

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1291

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FU SYSTEM A & B THERMOSTAT
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A/B, FU
5) FU SYSTEM A & B THERMOSTAT
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42TS101, 201

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THERMOSTAT FAILURE CAUSES THREE OUT OF THE SIX HEATERS TO BE CONTINUALLY ON. THE REDUNDANT HTR SYSTEM OR MANUAL CREW CYCLE OF SYSTEM STILL AVAILABLE. LOSS OF ALL REDUNDANCY CAN PRODUCE UPPER TEMP LIMITS EXCEEDING FRCS REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSIONS.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1292 ABORT: 3/3

ITEM: OX SYSTEM A & B THERMOSTAT
FAILURE MODE: FAILS OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A/B, OX
5) OX SYSTEM A & B THERMOSTAT
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42TS201, 202

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE THERMOSTAT CONTROL FOR ASSOCIATED HTR SYSTEM REDUNDANT GROUP AVAILABLE. SECOND FUSE FAILURE RESULTS IN AN INABILITY TO MAINTAIN PROPELLANTS AT DESIRED TEMPERATURE AND WOULD BE CAUSE TO NO-GO FURTHER USE OF FRCS, LOSS OF MISSION.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: FRCS
MDAC ID: 1293

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: OX SYSTEM A & B THERMOSTAT
FAILURE MODE: FAILS SHORT

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) POD
3) THERMAL CONTROL SUBSYSTEM
4) HTR SYSTEM A/B, OX
5) OX SYSTEM A & B THERMOSTAT
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: FWD FUSELAGE AREA 20
PART NUMBER: 22V42TS201, 202

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
THERMOSTAT FAILURE CAUSES THREE OUT OF THE SIX HEATERS TO BE CONTINUALLY ON. THE REDUNDANT HTR SYSTEM OR MANUAL CREW CYCLE OF SYSTEM STILL AVAILABLE. LOSS OF ALL REDUNDANCY CAN PRODUCE UPPER TEMP LIMITS EXCEEDING FRCS REDLINES CAUSING NO-GO FURTHER USE OF FRCS, LOSS OF MISSIONS.

REFERENCES: VS70-942099 REV D EO D01; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 3/2R
MDAC ID: 1294 ABORT: 3/3

ITEM: THERMOSTAT, PRIMARY THRUSTERS, - X AXIS
FAILURE MODE: FAILS TO CLOSE (FAILS OPEN).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY THRUSTERS, - X AXIS
5) THERMOSTAT, PRIMARY THRUSTERS, - X AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: JET ASSEMBLY
PART NUMBER: V42TSF1F, F2F, F3F

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF TENPERATURE FALLS BELOW C&W LIMITS, JETS WILL BE ANNOUNCED AS "FAILED OFF". FAILURE MAY AFFECT ONORBIT OPERATIONS.

REFERENCES: VS70-942099 REV D EO D01; FLIGHT RULE 6-95

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1295

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: THERMOSTAT, PRIMARY THRUSTERS, - X AXIS
FAILURE MODE: FAILS TO OPEN (FAILS CLOSED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY THRUSTERS, - X AXIS
5) THERMOSTAT, PRIMARY THRUSTERS, - X AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: JET ASSEMBLY
PART NUMBER: V42TSF1F, F2F, F3F

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
CREW CAN REMOVE POWER FROM THE HEATER SWITCHES OR CAN INHIBIT THE JET FROM FIRING WITH THE DPS. HOWEVER, THE C&W DOES NOT ANNUNCIATE THIS HIGH TEMPERATURE CONDITION. FAILURE OF ALL REDUNDANCY WILL CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS AND POSSIBLE LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-942099 REV D EO D01; FLIGHT RULE 6-95

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/1R
MDAC ID:	1296	ABORT:	3/3

ITEM: THERMOSTAT, PRIMARY THRUSTERS, Y AXIS
FAILURE MODE: FAILS TO CLOSE (FAILS OPEN).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY THRUSTERS, Y AXIS
5) THERMOSTAT, PRIMARY THRUSTERS, Y AXIS
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:	3/1R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: JET ASSEMBLY
PART NUMBER: V42TSF1L, F3L, F2R, F4R

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROP WILL FREEZE IN JET. FAILURE DETECTABLE VIA JET TEMP TRANSDUCER. IF TEMP DROPS BELOW C&W LIMITS, JET WILL BE ANNOUNCED AS "FAILED OFF".
FAILURE MAY AFFECT ONORBIT OPS. FAILURE OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROP TO MEET CG SAFETY BOUNDARIES DURING ENTRY. PROP WILL NOT HAVE TIME TO FREEZE DURING ABORTS.

REFERENCES: VS70-942099 REV D EO D01; FLIGHT RULE 6-95

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1297

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: THERMOSTAT, PRIMARY THRUSTERS, Y AXIS
FAILURE MODE: FAILS TO OPEN (FAILS CLOSED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY THRUSTERS, Y AXIS
5) THERMOSTAT, PRIMARY THRUSTERS, Y AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: JET ASSEMBLY
PART NUMBER: V42TSF1L, F3L, F2R, F4R

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
CREW CAN REMOVE POWER FROM THE HEATER SWITCHES OR CAN INHIBIT THE JET FROM FIRING WITH THE DPS. HOWEVER, THE C&W DOES NOT ANNUNCIATE THIS HIGH TEMPERATURE CONDITION. FAILURE OF ALL REDUNDANCY WILL CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS AND POSSIBLE LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-942099 REV D EO D01; FLIGHT RULE 6-95

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	FRCS	FLIGHT:	3/2R
MDAC ID:	1298	ABORT:	3/3

ITEM: THERMOSTAT, PRIMARY THRUSTERS, Z AXIS
FAILURE MODE: FAILS TO CLOSE (FAILS OPEN).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY THRUSTERS, Z AXIS
5) THERMOSTAT, PRIMARY THRUSTERS, Z AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: JET ASSEMBLY
PART NUMBER: V42TSF1U, F2U, F3U, F1D, F2D, F3D, F4D

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION. PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW C&W LIMITS, JETS WILL BE ANNOUNCED AS "FAILED OFF". FAILURE MAY AFFECT ONORBIT OPERATIONS. THE PROPELLANTS WILL NOT HAVE ENOUGH TIME TO FREEZE DURING ABORTS.

REFERENCES: VS70-942099 REV D EO D01; FLIGHT RULE 6-95

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1299

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: THERMOSTAT, PRIMARY THRUSTERS, Z AXIS
FAILURE MODE: FAILS TO OPEN (FAILS CLOSED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) PRIMARY THRUSTERS, Z AXIS
5) THERMOSTAT, PRIMARY THRUSTERS, Z AXIS
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: JET ASSEMBLY
PART NUMBER: V42TSF1U, F2U, F3U, F1D, F2D, F3D, F4D

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
CREW CAN REMOVE POWER FROM THE HEATER SWITCHES OR CAN INHIBIT THE JET FROM FIRING WITH THE DPS. HOWEVER, THE C&W DOES NOT ANNUNCIATE THIS HIGH TEMPERATURE CONDITION. FAILURE OF ALL REDUNDANCY WILL CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS AND POSSIBLE LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-942099 REV D EO D01; FLIGHT RULE 6-95

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 1300 ABORT: 3/3

ITEM: THERMOSTAT, VERNIER THRUSTERS, ALL AXES
FAILURE MODE: FAILS TO CLOSE (FAILS OPEN).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) VERNIER THRUSTERS, ALL AXES
5) THERMOSTAT, VERNIER THRUSTERS, ALL AXES
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: JET ASSEMBLY
PART NUMBER: V42TSF5L, F5R

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
PROPELLANTS WILL FREEZE IN THE JET. FAILURE IS DETECTABLE VIA JET TEMPERATURE TRANSDUCER. IF THE TEMPERATURE DROPS BELOW THE C&W LIMITS, JET WILL BE ANNOUNCED AS "FAILED OFF". FAILURE WILL RESULT IN LOSS OF VERNIER RCS.

REFERENCES: VS70-942099 REV D EO D01; FLIGHT RULE 6-95

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: FRCS
MDAC ID: 1301

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 3/3

ITEM: THERMOSTAT, VERNIER THRUSTERS, ALL AXES
FAILURE MODE: FAILS TO OPEN (FAILS CLOSED).

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) THRUSTER
3) THERMAL CONTROL SUBSYSTEM
4) VERNIER THRUSTERS, ALL AXES
5) THERMOSTAT, VERNIER THRUSTERS, ALL AXES
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:	2/1R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: JET ASSEMBLY
PART NUMBER: V42TSF5L, F5R

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE

EFFECTS/RATIONALE:
CREW CAN REMOVE POWER FROM THE HEATER SWITCHES OR CAN INHIBIT THE JET FROM FIRING WITH THE DPS. HOWEVER, THE C&W DOES NOT ANNUNCIATE THIS HIGH TEMPERATURE CONDITION. FAILURE OF ALL REDUNDANCY WILL CAUSE OVERHEATING OF PROPELLANTS, RESULTING IN ZOTS AND POSSIBLE LOSS OF VEHICLE IN ANY FLIGHT PHASE IN WHICH THE JETS ARE USED.

REFERENCES: VS70-942099 REV D EO D01; FLIGHT RULE 6-95

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1302	ABORT:	3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131RPC8; RPC13

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS HE PRESS A SWITCH" TO CLOSE "OX & FU HE ISOL A VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1303

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131RPC8; RPC13

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL A VALVES", SINCE THIS FAILURE CONSTANTLY POWERS THE VALVE CLOSE SOLENOIDS, UNLESS THE "AFT L/R RCS HE PRESS A SWITCH" IS IN OPEN POSITION. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL AFFECT ONORBIT OPERATIONS, AND MAY CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1304	ABORT:	3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131RPC9; RPC14

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS HE PRESS A SWITCH" TO CLOSE "OX & FU HE ISOL A VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1305

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131RPC9; RPC14

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO AUTOMATICALLY INHIBIT CLOSING THE "OX & FU HE ISOL A" VALVES WHEN THEY BECOME FULLY CLOSED. HOWEVER, THE VALVES CAN STILL BE OPENED VIA GPC OR SWITCH. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY, WHICH WILL AFFECT ONORBIT OPERATIONS, AND MAY CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND THE CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1306 ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131RPC10; RPC15

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL A VALVES". VALVES CAN STILL BE OPERATED BY "AFT L RCS HE PRESS A SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1307

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131RPC10; RPC15

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU HE ISOL A VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1308 ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 5, PCA 2
PART NUMBER: 55V76A132RPC10; RPC11

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS A SWITCH" TO OPEN THE "OX & FU HE ISOL A VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANK AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1309

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 5, PCA 2
PART NUMBER: 55V76A132RPC10; RPC11

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU HE ISOL A VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANK AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1310 ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133RPC8; 55V76A132RPC13

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS HE PRESS B SWITCH" TO CLOSE "OX & FU HE ISOL B VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1311

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133RPC8; 55V76A132RPC13

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO OPEN THE "OX & FU HE ISOL B VALVES", SINCE THIS FAILURE CONSTANTLY POWERS THE VALVE CLOSE SOLENOIDS, UNLESS THE "AFT L/R RCS HE PRESS B SWITCH" IS IN OPEN POSITION. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1312

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133RPC9; 55V76A132RPC14

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS HE PRESS B SWITCH" TO CLOSE "OX & FU HE ISOL B VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1313

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133RPC9; 55V76A132RPC14

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO AUTOMATICALLY INHIBIT CLOSING THE "OX & FU HE ISOL B VALVES" WHEN THEY BECOME FULLY CLOSED. HOWEVER, THE VALVES CAN STILL BE OPENED VIA GPC OR SWITCH. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1314	ABORT:	3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133RPC13; 55V76A132RPC12

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL B VALVES". VALVES CAN STILL BE OPERATED BY "AFT L/R RCS HE PRESS B SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1315

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133RPC13; 55V76A132RPC12

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU HE ISOL B VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION OR COMMANDED TO CLOSE. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1316

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, PCA 1; AV BAY 6, PCA3
PART NUMBER: 54V76A131RPC16; 56V76A133RPC11

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS B SWITCH" TO OPEN THE "OX & FU HE ISOL B VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1317 ABORT: 3/1R

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) CONTROLLER, REMOTE POWER
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, PCA 1; AV BAY 6, PCA3
PART NUMBER: 54V76A131RPC16; 56V76A133RPC11

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU HE ISOL B VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1318 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
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:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121CR J2-34; J2-24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY FOR GPC TO CLOSE THE "OX & FU HE ISOL A VALVES". VALVES CAN STILL BE OPERATED BY "AFT L/R RCS HE PRESS A SWITCH". FOR LOSS OF ALL REDUNDANCY, THE EFFECT WOULD BE THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1319

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121CR J2-34; J2-24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. MDM HAS INTERNAL PROTECTION FROM REVERSE CURRENT - HIGH OUTPUT RESISTANCE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1320 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
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:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121CR J4-25; J4-16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS A SWITCH" TO CLOSE THE "OX & FU HE ISOL A VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1321

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121CR J4-25; J4-16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. CAUSES TALKBACK TO INDICATE THE PRESENCE OF EITHER GPC OR SWITCH COMMAND TO CLOSE THE "OX & FU HE ISOL A VALVES", INSTEAD OF ONLY THE SWITCH COMMAND.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1322 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131A2CR5; A3CR4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL A VALVES". VALVES CAN STILL BE OPERATED BY "AFT L RCS HE PRESS A SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1323

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131A2CR5; A3CR4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. LOSE SOME ISOLATION BETWEEN BUSES MN A AND MN B. MDM HAS INTERNAL PROTECTION FROM REVERSE CURRENT - HIGH OUTPUT RESISTANCE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1324

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
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:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A131A2CR6; A3CR5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS A SWITCH" TO OPEN THE "OX & FU HE ISOL A VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1325

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A131A2CR6; A3CR5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. LOSE SOME ISOLATION BETWEEN BUSES MN A AND MN B. MDM HAS INTERNAL PROTECTION FROM REVERSE CURRENT - HIGH OUTPUT RESISTANCE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1326

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS1; DS4
PART NUMBER: 33V73A7A2CR1, A2CR2; 33V73A7A3CR1, A3CR2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE OPEN OR CLOSE POSITION OF BARBERPOLE INDICATOR "AFT L/R RCS HE PRESS A" TO INDICATE WHEN BOTH "OX & FU HE ISOL A VALVES" ARE FULLY OPEN OR CLOSED - INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1327

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS1; DS4
PART NUMBER: 33V73A7A2CR1, A2CR2; 33V73A7A3CR1, A3CR2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1328 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
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:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123CR J2-24 (180); 55V76A122CR J2-24 (180)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY FOR GPC TO CLOSE THE "OX & FU HE ISOL B VALVES". VALVES CAN STILL BE OPERATED BY "AFT L RCS HE PRESS B SWITCH". FOR LOSS OF ALL REDUNDANCY, THE EFFECT WOULD BE THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1329

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123CR J2-24 (180); 55V76A122CR J2-24 (180)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. MDM HAS INTERNAL PROTECTION FROM REVERSE CURRENT - HIGH OUTPUT RESISTANCE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1330 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
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:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123CR J4-16 (181); 55V76A122CR J4-16 (181)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS B SWITCH" TO CLOSE THE "OX & FU HE ISOL B VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1331

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123CR J4-16 (181); 55V76A122CR J4-16 (181)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. CAUSES TALKBACK TO INDICATE THE PRESENCE OF EITHER GPC OR SWITCH COMMAND TO CLOSE THE "OX & FU HE ISOL B VALVES", INSTEAD OF ONLY THE SWITCH COMMAND.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1332	ABORT:	3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133A2CR16; 55V76A132A3CR22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL B VALVES". VALVES CAN STILL BE OPERATED BY "AFT L/R RCS HE PRESS B SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1333

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133A2CR16; 55V76A132A3CR22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. LOSE SOME ISOLATION BETWEEN BUSES MN A AND MN B. MDM HAS INTERNAL PROTECTION FROM REVERSE CURRENT - HIGH OUTPUT RESISTANCE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1334 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
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:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133A2CR15; 55V76A132A3CR23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS B SWITCH" TO OPEN THE "OX & FU HE ISOL B VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1335

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2
PART NUMBER: 56V76A133A2CR15; 55V76A132A3CR23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. LOSE SOME ISOLATION BETWEEN BUSES MN A AND MN B. MDM HAS INTERNAL PROTECTION FROM REVERSE CURRENT - HIGH OUTPUT RESISTANCE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1336

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS2; DS5
PART NUMBER: 33V73A7A2CR3, A2CR4; 33V73A7A3CR3, A3CR4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE OPEN OR CLOSE POSITION OF BARBERPOLE INDICATOR "AFT L/R RCS HE PRESS B" TO INDICATE WHEN BOTH "OX & FU HE ISOL B VALVES" ARE FULLY OPEN OR CLOSED - INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1337

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS2; DS5
PART NUMBER: 33V73A7A2CR3, A2CR4; 33V73A7A3CR3, A3CR4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1338

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-63 TYPE I; J6-54 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS HE PRESS A SWITCH" TO CLOSE "OX & FU HE ISOL A VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1339

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-63 TYPE I; J6-54 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL A VALVES", SINCE THIS FAILURE CONSTANTLY POWERS THE VALVE CLOSE SOLENOIDS, UNLESS THE "AFT L/R RCS HE PRESS A SWITCH" IS IN THE OPEN POSITION. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL AFFECT ONORBIT OPERATIONS, AND MAY CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1340 ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-62 TYPE I; J6-53 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS HE PRESS A SWITCH" TO CLOSE "OX & FU HE ISOL A VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1341

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-62 TYPE I; J6-53 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO AUTOMATICALLY INHIBIT CLOSING THE "OX & FU HE ISOL A" VALVES WHEN THEY BECOME FULLY CLOSED. HOWEVER, VALVE CAN STILL BE OPENED VIA SWITCH OR GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE.
THIS CASE RESULTS IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL AFFECT ONORBIT OPERATIONS, AND MAY CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1342

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-64 TYPE I; J6-55 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL A VALVES". VALVES CAN STILL BE OPERATED BY "AFT L RCS HE PRESS A SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1343

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-64 TYPE I; J6-55 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU HE ISOL A VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANK AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1344

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 5, LCA 2
PART NUMBER: 55V76A122AR J8-65 TYPE I; J8-64 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS A SWITCH" TO OPEN THE "OX & FU HE ISOL A VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANK AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1345

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 5, LCA 2
PART NUMBER: 55V76A122AR J8-65 TYPE I; J8-64 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU HE ISOL A VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANK AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1346

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-59 TYPE II; J8-50 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE OPEN POSITION OF BARBERPOLE INDICATOR "AFT L/R RCS HE PRESS A" TO INDICATE WHEN BOTH "OX & FU HE ISOL A VALVES" ARE FULLY OPEN - INDICATES BARBERPOLE INSTEAD. ALSO LOSE CAPABILITY OF INHIBITING THE OPENING OF THE VALVES VIA THE SWITCH WHEN VALVES BECOME OR ARE ALREADY FULLY OPEN, BUT WILL NOT DAMAGE VALVE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1347

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-59 TYPE II; J8-50 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
INHIBITS THE OPENING OF THE VALVES VIA THE "AFT L/R RCS HE PRESS A SWITCH". VALVES CAN STILL BE OPERATED BY GPC. LOSE CAPABILITY OF BARBERPOLE TALKBACK "AFT L RCS HE PRESS A" TO PROPERLY INDICATE WHEN BOTH "OX & FU HE ISOL A VALVES" ARE FULLY CLOSED. INDICATES BARBERPOLE INSTEAD. ALSO INDICATES OPEN WHEN IT SHOULD INDICATE BARBERPOLE. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVE FAILS TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1348	ABORT:	3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-57 TYPE II; J8-48 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CLOSE POSITION OF BARBERPOLE INDICATOR "AFT L/R RCS HE PRESS A" TO INDICATE WHEN BOTH "OX & FU HE ISOL A VALVES" ARE FULLY CLOSED - INDICATES BARBERPOLE INSTEAD.
ALSO LOSE CAPABILITY OF INHIBITING THE CLOSING OF THE VALVES VIA THE SWITCH WHEN VALVES BECOME OR ARE ALREADY FULLY CLOSED, BUT WILL NOT DAMAGE VALVE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1349

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-57 TYPE II; J8-48 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
INHIBITS THE CLOSING OF THE VALVES VIA THE "AFT L/R RCS HE PRESS A SWITCH". VALVES CAN STILL BE OPERATED BY GPC. LOSE CAPABILITY OF BARBERPOLE TALKBACK ASSOCIATED TO PROPERLY INDICATE WHEN BOTH "OX & FU HE ISOL A VALVES" ARE FULLY OPENED. INDICATES BARBERPOLE INSTEAD. ALSO INDICATES CLOSED WHEN IT SHOULD INDICATE BARBERPOLE. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1350

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123AR J8-54 (168) TYPE I; 55V76A122AR J8-54 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS HE PRESS B SWITCH" TO CLOSE "OX & FU HE ISOL B VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1351

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123AR J8-54 (168) TYPE I; 55V76A122AR J8-54 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL B VALVES", SINCE THIS FAILURE CONSTANTLY POWERS THE VALVE CLOSE SOLENOIDS, UNLESS THE "AFT L/R RCS HE PRESS B" SWITCH IS IN OPEN POSITION. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1352 ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123AR167 TYPE I; 55V76A122AR J8-53 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS HE PRESS B SWITCH" TO CLOSE "OX & FU HE ISOL B VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1353

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123AR167 TYPE I; 55V76A122AR J8-53 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO AUTOMATICALLY INHIBIT CLOSING THE "OX & FU HE ISOL B" VALVES WHEN THEY BECOME FULLY CLOSED. HOWEVER, VALVE CAN STILL BE OPENED VIA SWITCH OR GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE.
THIS CASE RESULTS IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1354	ABORT:	3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123AR J8-55 (169) TYPE I; 55V76A122AR J8-55 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU HE ISOL B VALVES". VALVES CAN STILL BE OPERATED BY "AFT L/R RCS HE PRESS B SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1355

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123AR J8-55 (169) TYPE I; 55V76A122AR J8-55 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU HE ISOL B VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1356	ABORT:	3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, LCA 1; AV BAY 6, LCA 3
PART NUMBER: 54V76A121AR J8-65 TYPE I; 56V76A123AR J8-64 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS B SWITCH" TO OPEN THE "OX & FU HE ISOL B VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1357

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, LCA 1; AV BAY 6, LCA 3
PART NUMBER: 54V76A121AR J8-65 TYPE I; 56V76A123AR J8-64 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU HE ISOL B VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1358

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123ARJ8-59 (165) TYPE II; 55V76A122AR J8-50 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE OPEN POSITION OF BARBERPOLE INDICATOR "AFT L/R RCS HE PRESS B" TO INDICATE WHEN BOTH "OX & FU HE ISOL B VALVES" ARE FULLY OPEN - INDICATES BARBERPOLE INSTEAD. ALSO LOSE CAPABILITY OF INHIBITING THE OPENING OF THE VALVES VIA THE SWITCH WHEN VALVES BECOME OR ARE ALREADY FULLY OPEN, BUT WILL NOT DAMAGE VALVE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1359

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123ARJ8-59 (165) TYPE II; 55V76A122AR J8-50 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
INHIBITS THE OPENING OF THE VALVES VIA THE "AFT L/R RCS HE PRESS B SWITCH". VALVES CAN STILL BE OPERATED BY GPC. LOSE CAPABILITY OF BARBERPOLE TALKBACK "AFT L RCS HE PRESS B" TO PROPERLY INDICATE WHEN BOTH "OX & FU HE ISOL B VALVES" ARE FULLY CLOSED. INDICATES BARBERPOLE INSTEAD. ALSO INDICATES OPEN WHEN IT SHOULD INDICATE BARBERPOLE. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVE FAILS TO OPEN CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1360

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123AR J8-57 (164) TYPE II; 55V76A122AR J8-48 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CLOSE POSITION OF BARBERPOLE INDICATOR "AFT L/R RCS HE PRESS B" TO INDICATE WHEN BOTH "OX & FU HE ISOL B VALVES" ARE FULLY CLOSED - INDICATES BARBERPOLE INSTEAD. ALSO LOSE CAPABILITY OF INHIBITING THE CLOSING OF THE VALVES VIA THE SWITCH WHEN VALVES BECOME OR ARE ALREADY FULLY CLOSED, BUT WILL NOT DAMAGE VALVE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1361

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123AR J8-57 (164) TYPE II; 55V76A122AR J8-48 TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
INHIBITS THE CLOSING OF THE VALVES VIA THE "AFT L/R RCS HE PRESS B SWITCH". VALVES CAN STILL BE OPERATED BY GPC. LOSE CAPABILITY OF BARBERPOLE TALKBACK "AFT L RCS HE PRESS B" TO PROPERLY INDICATE WHEN BOTH "OX & FU HE ISOL B VALVES" ARE FULLY OPENED. INDICATES BARBERPOLE INSTEAD. ALSO INDICATES CLOSED WHEN IT SHOULD INDICATE BARBERPOLE. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN NEXT ASSOCIATED FAILURE (OTHER VALVE A OR B) AFFECTING ONORBIT OPERATIONS, AND POSSIBLY CAUSING LOSS OF HELIUM PRESSURIZATION CAPABILITY. THIS LOSS WILL CAUSE THE TANK LANDING WEIGHT CONSTRAINTS AND CG SAFETY BOUNDARIES TO BE EXCEEDED DURING ENTRY OR ABORTS DUE TO TRAPPED PROPELLANT'S WEIGHT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1362 ABORT: 3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) FUSE, 1A
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL 07 S10; PNL 07 S13
PART NUMBER: 33V73A7F1; F7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS A SWITCH" TO CLOSE THE "OX & FU HE ISOL A VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1363

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) FUSE, 1A
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL 07 S10; PNL 07 S13
PART NUMBER: 33V73A7F2; F8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS A SWITCH" TO CLOSE THE "OX & FU HE ISOL A VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1364	ABORT:	3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) FUSE, 1A
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL 07 S11; PNL 07 S14
PART NUMBER: 33V73A7F3; F9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS B SWITCH" TO CLOSE THE "OX & FU HE ISOL B VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1365

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) FUSE, 1A
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL 07 S11; PNL 07 S14
PART NUMBER: 33V73A7F4; F10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS HE PRESS B SWITCH" TO CLOSE THE "OX & FU HE ISOL B VALVES". OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS THE VALVES FAIL TO CLOSE CASE, RESULTING IN OVERPRESSURIZATION OF TANKS AND/OR LINES, AND MAY CAUSE ZOTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1366 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-35; J2-25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "AFT L/R RCS HE PRESS A" SWITCH IN CLOSE POSITION. SWITCH OPERATION CAN BE DETERMINED FROM FOUR "HE ISOL VLV" TALKBACKS AND FROM THE BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1367

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-35; J2-25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFFECT TALKBACK FOR THE "AFT L/R RCS HE PRESS A" SWITCH IN CLOSE POSITION. LOSE VOLTAGE DIVISION TO MDM OA1, SO PROVIDES FULL (0 TO 28 VDC) INSTEAD OF HALF (0 TO 14 VDC) VOLTAGE RANGE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1368 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-35; J2-25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFFECT TALKBACK FOR THE "AFT L/R RCS HE PRESS A" SWITCH IN CLOSE POSITION. LOSE VOLTAGE DIVISION TO MDM OA1, SO PROVIDES FULL (0 TO 28 VDC) INSTEAD OF HALF (0 TO 14 VDC) VOLTAGE RANGE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1369

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-35; J2-25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "AFT L/R RCS HE PRESS A" SWITCH IN CLOSE POSITION. SWITCH OPERATION CAN BE DETERMINED FROM FOUR "HE ISOL VLV" TALKBACKS AND FROM THE BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1370 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, LCA 2
PART NUMBER: 55V76A122R J2-37; J2-36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "AFT L/R RCS HE PRESS A" SWITCH IN OPEN POSITION. SWITCH OPERATION CAN BE DETERMINED FROM FOUR "HE ISOL VLV" TALKBACKS AND FROM THE BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1371

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, LCA 2
PART NUMBER: 55V76A122R J2-37; J2-36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1372 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-33; J2-23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR "OX HE ISOL A VALVE" IN OPEN POSITION. VALVE OPERATION CAN BE DETERMINED FROM OTHER TALKBACKS AND BARBERPOLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1373

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-33; J2-23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1374 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-31; J2-21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR "OX HE ISOL A VALVE" IN CLOSED POSITION. VALVE OPERATION CAN BE DETERMINED FROM OTHER TALKBACKS AND BARBERPOLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1375

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-31; J2-21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1376	ABORT:	3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J8-60, 61; J8-51, 52

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE THE FOUR TALKBACKS FOR OPEN AND CLOSED POSITIONS OF BOTH "OX & FU HE ISOL A VALVES". ALSO LOSE INHIBITS TO STOP OPENING OR CLOSING VALVES WHEN THEY ARE FULLY OPENED OR CLOSED, RESPECTIVELY, BUT THIS WILL NOT DAMAGE VALVES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1377

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J8-60, 61; J8-51, 52

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1378	ABORT:	3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-32; J2-22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR "FU HE ISOL A VALVE" IN OPENED POSITION. VALVE OPERATION CAN BE DETERMINED FROM OTHER TALKBACKS AND BARBERPOLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1379

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-32; J2-22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1380 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-30; J2-20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK "FU HE ISOL A VALVE" IN CLOSED POSITION. VALVE OPERATION CAN BE DETERMINED FROM OTHER TALKBACKS AND BARBERPOLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1381

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121R J2-30; J2-20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1382 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-25; 55V76A122R J2-25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "AFT L/R RCS HE PRESS B" SWITCH IN CLOSE POSITION. SWITCH OPERATION CAN BE DETERMINED FROM FOUR "HE ISOL VLV" TALKBACKS AND FROM BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1383

HIGHEST CRITICALITY	HDW/FUNC
FLIGHT:	3/3
ABORT:	3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-25; 55V76A122R J2-25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFFECT TALKBACK FOR THE "AFT L/R RCS HE PRESS B" SWITCH IN CLOSE POSITION. LOSE VOLTAGE DIVISION TO MDM OA1, SO PROVIDES FULL (0 TO 28 VDC) INSTEAD OF HALF (0 TO 14 VDC) VOLTAGE RANGE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1384 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-25 (134); 55V76A122R J2-25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFFECT TALKBACK FOR THE "AFT L/R RCS HE PRESS B" SWITCH IN CLOSE POSITION. LOSE VOLTAGE DIVISION TO MDM OA1, SO PROVIDES FULL (0 TO 28 VDC) INSTEAD OF HALF (0 TO 14 VDC) VOLTAGE RANGE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1385

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-25 (134); 55V76A122R J2-25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "AFT L/R RCS HE PRESS B" SWITCH IN CLOSE POSITION. SWITCH OPERATION CAN BE DETERMINED FROM FOUR "HE ISOL VLV" TALKBACKS AND FROM THE BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1386

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1; AV BAY 6, LCA 3
PART NUMBER: 54V76A121R J2-37; 56V76A123R J2-36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "AFT L/R RCS HE PRESS B" SWITCH IN OPEN POSITION. SWITCH OPERATION CAN BE DETERMINED FROM FOUR "HE ISOL VLV" TALKBACKS AND FROM THE BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1387

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1; AV BAY 6, LCA 3
PART NUMBER: 54V76A121R J2-37; 56V76A123R J2-36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1388	ABORT:	3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-33 (129); 55V76A122R J2-23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR "OX HE ISOL B VALVE" IN OPEN POSITION. VALVE OPERATION CAN BE DETERMINED FROM OTHER TALKBACKS AND BARBERPOLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1389

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-33 (129); 55V76A122R J2-23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1390 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-31 (126); 55V76A122R J2-21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR "OX HE ISOL B VALVE" IN CLOSED POSITION. VALVE OPERATION CAN BE DETERMINED FROM OTHER TALKBACKS AND BARBERPOLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1391

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-31 (126); 55V76A122R J2-21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1392 ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J8-60, 61 (131); 55V76A122R J8-51, 52

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE THE FOUR TALKBACKS FOR OPEN AND CLOSED POSITIONS OF BOTH "OX & FU HE ISOL B VALVES". ALSO LOSE INHIBITS TO STOP OPENING OR CLOSING VALVES WHEN THEY ARE FULLY OPENED OR CLOSED, RESPECTIVELY, BUT THIS WILL NOT DAMAGE VALVES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1393

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J8-60, 61 (131); 55V76A122R J8-51, 52

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1394 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-32 (130); 55V76A122R J2-22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR "FU HE ISOL B VALVE" IN OPENED POSITION. VALVE OPERATION CAN BE DETERMINED FROM OTHER TALKBACKS AND BARBERPOLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1395

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-32 (130); 55V76A122R J2-22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1396	ABORT:	3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-30 (127); 55V76A122R J2-20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK "FU HE ISOL B VALVE" IN CLOSED POSITION. VALVE OPERATION CAN BE DETERMINED FROM OTHER TALKBACKS AND BARBERPOLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1397

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV B
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3; AV BAY 5, LCA 2
PART NUMBER: 56V76A123R J2-30 (127); 55V76A122R J2-20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1398

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH
FAILURE MODE: SWITCH FAILS IN THE OPEN POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH
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 [P] C [P]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE PRESSURE REGULATOR AND THE PRESSURE RELIEF VALVE. IF THE SWITCH FAILS IN THE OPEN POSITION WHILE THE VALVE IS IN ANY POSITION, THE VALVE WILL OPEN AND CANNOT BE CLOSED BY MDM COMMAND.
FAILURE OF ALL REDUNDANCY WILL RESULT IN THE OVERPRESSURIZATION AND RUPTURE OF THE PROPELLANT TANKS AND/OR LINES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1399

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH
FAILURE MODE: SWITCH FAILS IN THE CLOSED POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS AND THE PARALLEL ISOL VALVE. IF THE SWITCH FAILS IN THE CLOSED POSITION WHILE THE VALVE IS IN ANY POSITION, THE VALVE WILL CLOSE. IF THE MDM OPEN COMMAND IS ALSO PRESENT, OR THE SWITCH OPEN COMMAND IS ALSO PRESENT, THE VALVE WILL CYCLE OPEN AND CLOSED UNTIL THE MDM OR SWITCH OPEN COMMAND IS REMOVED, OR UNTIL THE CONTROL BUS POWER IS REMOVED FROM EITHER OF THE SWITCH'S CLOSE CONTACTS. TO OPEN THE VALVE, CREW MUST REMOVE POWER FROM EITHER OF THE SWITCH'S CLOSE CONTACTS AND THEN USE THE GPC READ/WRITE PROCEDURES. FAILURE OF ALL REDUNDANCY WILL AFFECT ONORBIT OPERATIONS, AND WILL CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ABORTS TO MEET TANK LANDING WEIGHT CONSTRAINTS OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1400	ABORT:	3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH
FAILURE MODE: SWITCH FAILS IN THE GPC POSITION

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH
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:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE PRESSURE REGULATOR AND THE PRESSURE RELIEF VALVE. TO OPERATE THE VALVE, THE CREW MUST USE THE GPC READ/WRITE PROCEDURES. IF THE VALVE IS CLOSED AND THE MDM OPEN COMMAND PATH FAILS, THE VALVE CANNOT BE OPENED BY THE MDM SWITCH COMMANDS. IF THE VALVE IS OPEN WHEN THE SWITCH FAILS, AND ALL REDUNDANCY FAILS, THE RESULT WILL BE OVERPRESSURIZATION AND RUPTURE OF THE PROPELLANT TANKS AND/OR LINES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1401

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN
CONTACTS 1, 2
FAILURE MODE: SWITCH OPEN CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1402

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN
CONTACTS 1, 2
FAILURE MODE: SWITCH OPEN CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN CONTACTS 1, 2
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1403

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN
CONTACTS 3, 4
FAILURE MODE: SWITCH OPEN CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1404	ABORT:	3/3

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN CONTACTS 3, 4
FAILURE MODE: SWITCH OPEN CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN CONTACTS 3, 4
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NONE, THESE CONTACTS ARE NOT IN A CIRCUIT.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1405 ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH CLOSE CONTACTS 5, 6
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH CLOSE CONTACTS 5, 6
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: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM CLOSE COMMAND, THE PRESSURE REGULATOR, AND THE PRESSURE RELIEF VALVE. IF THE CLOSE CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CAN BE OPENED BY THE SWITCH OR BY THE MDM COMMAND, AND CANNOT BE CLOSED BY THE SWITCH COMMAND, ONLY BY THE MDM COMMAND. FAILURE OF ALL REDUNDANCY WILL RESULT IN OVERPRESSURIZATION AND RUPTURE OF THE PROPELLANT TANKS AND/OR LINES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1406 ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH CLOSE CONTACTS 5, 6
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH CLOSE CONTACTS 5, 6
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS, THE OTHER SWITCH CLOSE CONTACTS, AND THE PARALLEL ISOL VALVE. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE GPC OR CLOSED POSITION, THE VALVE WILL CLOSE, AND CANNOT BE OPENED BY MDM COMMAND, ONLY BY SWITCH COMMAND. IF THE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE OPEN POSITION, THE VALVE WILL REMAIN OPEN, AND CANNOT BE CLOSE BY MDM COMMAND, ONLY BY SWITCH COMMAND. TO OPEN THE VALVE WITH THE MDM COMMAND, THE CREW MUST REMOVE CONTROL BUS POWER FROM THE CLOSE CONTACTS 5,6, AND USE THE GPC READ/WRITE PROCEDURES. FAILURE OF ALL REDUNDANCY WILL AFFECT ONORBIT OPERATIONS, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY AND ABORTS TO MEET THE CG SAFETY BOUNDARIES.
REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1407

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN
CONTACTS 7, 8
FAILURE MODE: SWITCH OPEN CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN CONTACTS 7, 8
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMANDS AND THE PARALLEL ISOL VALVE. IF THE OPEN CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CAN BE CLOSED BY SWITCH OR MDM COMMAND, BUT CANNOT BE OPENED BY SWITCH COMMAND, ONLY BY MDM COMMAND. FAILURE OF ALL REDUNDANCY WILL AFFECT ONORBIT OPERATIONS, AND MAY RESULT IN THE INABILITY TO EXPEL ENOUGH PROPELLANT DURING ENTRY AND ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1408	ABORT:	3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN CONTACTS 7, 8
FAILURE MODE: SWITCH OPEN CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH OPEN CONTACTS 7, 8
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 [P] C [P]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE PRESSURE REGULATOR AND THE PRESSURE RELIEF VALVE . IF THE OPEN CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE OPEN OR GPC POSITION, THE VALVE WILL OPEN. IF THE OPEN CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN THE CLOSED POSITION, OR IF THE MDM CLOSE COMMAND IS ALSO PRESENT, THE VALVE WILL CYCLE OPEN AND CLOSED UNTIL CONTROL BUS POWER TO THE OPEN OR CLOSE CONTACTS IS REMOVED, OR UNTIL THE MDM CLOSE COMMAND IS REMOVED. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE OVERPRESSURIZATION AND RUPTURE OF THE PROPELLANT TANKS AND/OR LINES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1409

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH GPC CONTACTS 9, 10
FAILURE MODE: SWITCH GPC CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH GPC CONTACTS 9, 10
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE MDM OPEN COMMAND AND THE PARALLEL ISOLATION VALVE. IF THE GPC CONTACTS FAIL OPEN, THE VALVE CAN BE OPENED BY SWITCH OR MDM COMMAND, CAN BE CLOSED BY SWITCH COMMAND, AND CANNOT BE CLOSED BY MDM COMMAND UNLESS THE SWITCH IS IN THE CLOSED POSITION. FAILURE OF ALL REDUNDANCY WILL RESULT IN LOSS OF GPC CONTROL OF THE HELIUM PRESSURE.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/1R
MDAC ID:	1410	ABORT:	3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH GPC CONTACTS 9, 10
FAILURE MODE: SWITCH GPC CONTACTS FAIL CLOSED.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH GPC CONTACTS 9, 10
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE OTHER CLOSE CONTACTS AND THE SWITCH AND MDM OPEN COMMAND. FIRST FAILURE WILL HAVE NO EFFECT. FAILURE OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO OPEN THE VALVE, WHICH WILL AFFECT ONORBIT OPERATIONS AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1411

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH CLOSE CONTACTS 11, 12
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL OPEN

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH CLOSE CONTACTS 11, 12
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: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE SWITCH GPC CONTACTS AND THE MDM CLOSE COMMAND, AND BY THE PRESSURE REGULATORS AND THE PRESSURE RELIEF VALVE. IF THE CLOSE CONTACTS FAIL OPEN WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, CAN BE OPENED BY THE SWITCH OR MDM COMMAND, BUT CANNOT BE CLOSED BY THE SWITCH OR MDM CLOSE COMMAND. THE VALVE CAN BE CLOSED BY PLACING THE SWITCH IN THE GPC POSITION, AND THEN USING THE GPC READ/WRITE PROCEDURES. FAILURE OF ALL REDUNDANCY WILL RESULT IN THE OVERPRESSURIZATION AND RUPTURE OF THE PROPELLANT TANKS AND/OR LINES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1412 ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH CLOSE CONTACTS 11, 12
FAILURE MODE: SWITCH CLOSE CONTACTS FAIL CLOSED

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH CLOSE CONTACTS 11, 12
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [F] C [P]

LOCATION: PNL O7 S10
PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
REDUNDANCY PROVIDED BY THE OTHER SWITCH CLOSE CONTACTS AND THE PARALLEL ISOL VALVE. IF THE CLOSE CONTACTS FAIL CLOSED WHILE THE SWITCH IS IN ANY POSITION, THE VALVE WILL REMAIN IN THAT POSITION, AND CAN BE CLOSED AND OPENED BY SWITCH OR MDM COMMAND. FAILURE OF ALL REDUNDANCY WILL AFFECT ONORBIT OPERATIONS, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1413

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH TALKBACK
FAILURE MODE: ERRONEOUS INDICATION (FAILS HIGH, FAILS LOW, FAILS MIDTRAVEL)

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) L/R HE OX & FU ISOL VLV A OR B
5) L/R HE OX & FU ISOL VLV A OR B SWITCH TALKBACK
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 DS1, DS2; PNL O7 DS4, DS5
PART NUMBER: 33V73A7DS1, DS2; DS4, DS5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFT L/R RCS HE PRESS A/B POSITION INDICATION WOULD FALSELY SHOW A BARBERPOLE INDICATING EITHER THE FU OR OX A OR B VALVES ARE STUCK PARTIALLY OPEN/CLOSED OR THERE IS A POSITION MISMATCH BETWEEN THE TWO VALVES. LOSS OF ALL REDUNDANCY WOULD RESULT IN LOSS OF DIRECT VALVE TALKBACK TO CREW. WORST CASE WOULD BE FALSELY FAILING THE A OR B VALVE CLOSED RESULTING IN LOSS OF MISSION DUE TO SAFETY CONSIDERATIONS (ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE).

REFERENCES: VS70-943099 REV B EO B12, DA, CA

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/20/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1414	ABORT:	3/3

ITEM: L/R HE OX TANK PRESS-1 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE OX TANK PRESS-1 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42PT202; 52V42PT302

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE SENSOR AND REDUNDANT PRESSURE SENSOR WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1415

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE OX TANK PRESS-1 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE OX TANK PRESS-1 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42PT202; 52V42PT302

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE SENSOR AND REDUNDANT PRESSURE SENSOR WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1416 ABORT: 3/3

ITEM: L/R HE FU TANK PRESS-1 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE FU TANK PRESS-1 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42PT201; 52V42PT301

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE SENSOR AND REDUNDANT PRESSURE SENSOR WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1417

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE FU TANK PRESS-1 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE FU TANK PRESS-1 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42PT201; 52V42PT301

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE SENSOR AND REDUNDANT PRESSURE SENSOR WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1418 ABORT: 3/3

ITEM: L/R HE OX TANK PRESS-2 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE OX TANK PRESS-2 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42PT204; 52V42PT304

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE SENSOR AND REDUNDANT PRESSURE SENSOR WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1419

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE OX TANK PRESS-2 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE OX TANK PRESS-2 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42PT204; 52V42PT304

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE SENSOR AND REDUNDANT PRESSURE SENSOR WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/20/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1420	ABORT:	3/3

ITEM: L/R HE FU TANK PRESS-2 PRESS SENSOR
FAILURE MODE: INDICATES HIGHER PRESSURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE FU TANK PRESS-2 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42PT203; 52V42PT303

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE SENSOR AND REDUNDANT PRESSURE SENSOR WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1421 ABORT: 3/3

ITEM: L/R HE FU TANK PRESS-2 PRESS SENSOR
FAILURE MODE: INDICATES LOWER PRESSURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE FU TANK PRESS-2 PRESS SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42PT203; 52V42PT303

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK TEMPERATURE SENSOR AND REDUNDANT PRESSURE SENSOR WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1422 ABORT: 3/3

ITEM: L/R HE OX TANK TEMP-1 TEMP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE OX TANK TEMP-1 TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42TT202; 52V42TT302

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1423

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE OX TANK TEMP-1 TEMP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE OX TANK TEMP-1 TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42TT202; 52V42TT302

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1424

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE FU TANK TEMP-1 TEMP SENSOR
FAILURE MODE: INDICATES HIGHER TEMPERATURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE FU TANK TEMP-1 TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42TT201; 52V42TT301

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1425

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: L/R HE FU TANK TEMP-1 TEMP SENSOR
FAILURE MODE: INDICATES LOWER TEMPERATURE THAN ACTUAL.

LEAD ANALYST: V.J. BURKEMPER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) INSTRUMENTATION
3) HE PRESS SUBSYSTEM
4) HE TK
5) L/R HE FU TANK TEMP-1 TEMP SENSOR
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: L/R OMS POD, RCS MANIFOLDS AND THRUSTERS
PART NUMBER: 51V42TT201; 52V42TT301

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
FAILURE OF TANK PRESSURE SENSORS WILL CAUSE CREW AND GROUND DIFFICULTY IN DETECTING A TANK LEAK. CREW MAY MAKE BAD DECISION BASED ON ERRONEOUS DATA.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1426 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133RPC15; RPC10

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO CLOSE "OX & FU MANIFOLD 5 ISOL VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS THE VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1427

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) CONTROLLER, REMOTE POWER
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: AV BAY 6, PCA 3
PART NUMBER: 56V76A133RPC15; RPC10

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU MANIF 5 ISOL VALVES" SINCE THIS FAILURE CONSTANTLY POWERS THE VALVE CLOSE SOLENOIDS, UNLESS "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" IS IN OPEN POSITION. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN LOSS OF VRC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1428 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133RPC14; RPC12

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU MANIFOLD 5 ISOL VALVES". VALVES CAN STILL BE OPERATED BY "AFT L RCS MANIFOLD 5 ISOL SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN LOSS OF VRCS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1429

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133RPC14; RPC12

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU MANIFOLD 5 ISOL VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1430 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) CONTROLLER, REMOTE POWER
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: AV BAY 6, PCA 3
PART NUMBER: 54V76A131RPC11; RPC12

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO OPEN THE "OX & FU MANIFOLD 5 ISOL VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE, RESULTING IN LOSS OF VRCS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1431 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) CONTROLLER, REMOTE POWER
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 54V76A131RPC11; RPC12

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU MANIFOLD 5 ISOL A VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1432 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/2R	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116-ALL DIODES; 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 28 DIODES THERE ARE 6 OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF FOUR SIGNAL PATHS TO OPEN THE OX & FU TK ISOL 1/2 VLV. LOSS OF ALL REDUNDANCY CAN CAUSE LOSS OF VEHICLE/LIFE DURING ENTRY OR ABORTS DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION).

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1433

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/2R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116-ALL DIODES; 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 28 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN ONE OF THE TWO OX & FU TK ISOL 1/2 VLVS BEING STUCK PARTIALLY OPEN/CLOSED WHEN COMMANDED OPEN WHICH IS THE WORST CASE. WITH ONE VALVE FAILED MIDTRAVEL, ONE FAILURE (FAILURE TO OPEN OTHER VALVE) AWAY FROM POSSIBLE LOSS OF VEHICLE/LIFE DURING ENTRY DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION). FLOW RATE INSUFFICIENT TO SUPPORT BURN MAKES THIS PROPELLANT IN AFFECTED TANK UNUSABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1434

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS1; DS4
PART NUMBER: 33V73A7A2CR5, A2CR6; 33V73A7A3CR5, A3CR6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 A" TO INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 A VALVES" ARE OPEN OR CLOSED, DEPENDING ON WHICH DIODE FAILED. INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1435

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS1; DS4
PART NUMBER: 33V73A7A2CR5, A2CR6; 33V73A7A3CR5, A3CR6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1436

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/2R	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 28 DIODES THERE ARE 5 OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF TWO SIGNAL PATHS TO OPEN THE OX & FU TK ISOL 3/4/5 A VLV. LOSS OF ALL REDUNDANCY CAN CAUSE LOSS OF VEHICLE/LIFE DURING ENTRY OR ABORTS DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION).

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1437

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/2R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 14 DIODES THERE ARE FOUR OF WHICH A FAILURE WOULD RESULT IN ONE OF THE TWO OX & FU TK ISOL 3/4/5 A VLVS BEING STUCK PARTIALLY OPEN/CLOSED WHEN COMMANDED OPEN WHICH IS THE WORST CASE. WITH ONE VALVE FAILED MIDTRAVEL, ONE FAILURE (FAILURE TO OPEN OTHER VALVE) AWAY FROM POSSIBLE LOSS OF VEHICLE/LIFE DURING ENTRY DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION). FLOW RATE INSUFFICIENT TO SUPPORT BURN. THIS MAKES PROPELLANT IN AFFECTED TANK UNUSABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1438

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS1; DS4
PART NUMBER: 33V73A7A2CR7, A2CR8; 33V73A7A3CR7, A3CR8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 B" TO INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 B VALVES" ARE OPEN OR CLOSED, DEPENDING ON WHICH DIODE FAILED. INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1439

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS1; DS4
PART NUMBER: 33V73A7A2CR7, A2CR8; 33V73A7A3CR7, A3CR8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1440

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/2R	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 14 DIODES THERE ARE 5 OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF TWO SIGNAL PATHS TO OPEN THE OX & FU TK ISOL 3/4/5 B VLV. LOSS OF ALL REDUNDANCY CAN CAUSE LOSS OF VEHICLE/LIFE DURING ENTRY OR ABORTS DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION).

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1441

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/2R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 14 DIODES THERE ARE FOUR OF WHICH A FAILURE WOULD RESULT IN ONE OF THE OX & FU TK ISOL 3/4/5 B VLVS BEING STUCK PARTIALLY OPEN/CLOSED WHEN COMMANDED OPEN WHICH IS THE WORST CASE. WITH ONE VALVE FAILED MIDTRAVEL, ONE FAILURE (FAILURE TO OPEN OTHER VALVE) AWAY FROM POSSIBLE LOSS OF VEHICLE/LIFE DURING ENTRY DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION). FLOW RATE INSUFFICIENT TO SUPPORT BURN MAKES THIS PROPELLANT IN AFFECTED TANK UNUSABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1442 ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 28 DIODES THERE ARE 6 OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF FOUR SIGNAL PATHS TO OPEN THE OX & FU TK FEED 1/2 VLVS. LOSS OF ALL REDUNDANCY IS LOSS OF MISSION DUE TO LOSS OF OMS INTERCONNECT/CROSSFEED CAPABILITY AND LOSS OF ENGINE REDUNDANCY. FIRST FAILURE DURING RTLS OR TAL, ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE DUE TO INABILITY TO DUMP OMS PROP THROUGH RCS JETS RESULTING IN POSSIBLE INABILITY TO COMPLETE TIME CRITICAL DUMP.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1443

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 28 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN ONE OF THE TWO OX & FU TK XFEED 1/2 VLVS BEING STUCK PARTIALLY OPEN/CLOSE WHEN COMMANDED OPEN WHICH IS THE WORST CASE. LOSS OF ALL REDUNDANCY IS LOSS OF MISSION DUE TO LOSS OF OMS INTERCONNECT/CROSSFEED CAPABILITY AND LOSS OF ENGINE REDUNDANCY. FIRST FAILURE DURING RTLS OR TAL, ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE DUE TO INABILITY TO DUMP OMS PROP THROUGH RCS JETS RESULTING IN POSSIBLE INABILITY TO COMPLETE TIME CRITICAL DUMP.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/2R
MDAC ID:	1444	ABORT:	2/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3
PART NUMBER: 54V76A114-ALL DIODES; 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 28 DIODES THERE ARE 6 OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF FOUR SIGNAL PATHS TO OPEN THE OX & FU TK XFEED 3/4/5 VLV. LOSS OF ALL REDUNDANCY IS LOSS OF MISSION DUE TO LOSS OF OMS INTERCONNECT/CROSSFEED CAPABILITY AND LOSS OF ENGINE REDUNDANCY. FIRST FAILURE DURING RTLS OR TAL, ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE DUE TO INABILITY TO DUMP OMS PROP THROUGH RCS JETS RESULTING IN POSSIBLE INABILITY TO COMPLETE TIME CRITICAL DUMP.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1445

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3
PART NUMBER: 54V76A114-ALL DIODES; 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 28 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN ONE OF THE TWO OX & FU TK XFEED 3/4/5 VLVS BEING STUCK PARTIALLY OPEN/CLOSE WHEN COMMANDED OPEN WHICH IS THE WORST CASE. LOSS OF ALL REDUNDANCY IS LOSS OF MISSION DUE TO LOSS OF OMS INTERCONNECT/CROSSFEED CAPABILITY AND LOSS OF ENGINE REDUNDANCY. FIRST FAILURE DURING RTLS OR TAL, ONE FAILURE AWAY FROM LOSS OF VEHICLE/LIFE DUE TO INABILITY TO DUMP OMS PROP THROUGH RCS JETS RESULTING IN POSSIBLE INABILITY TO COMPLETE TIME CRITICAL DUMP.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1446 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/2R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 9 DIODES THERE ARE 2 OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF TWO SIGNAL PATHS TO OPEN THE OX & FU MANIF 1 ISOL VLV. LOSS OF ALL REDUNDANCY CAN CAUSE LOSS OF VEHICLE/LIFE DURING ABORTS DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION).

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1447

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 9 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN FALSE TALKBACK ON THE BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1448

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS13; DS18
PART NUMBER: 33V73A7A2CR9, A2CR10; 33V73A7A3CR9, A3CR10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 1 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 1 ISOL VALVES" ARE OPEN OR CLOSED, DEPENDING ON WHICH DIODE FAILED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1449

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS13; DS18
PART NUMBER: 33V73A7A2CR9, A2CR10; 33V73A7A3CR9, A3CR10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1450

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/2R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 9 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF TWO SIGNAL PATHS TO OPEN THE OX & FU MANIF 2 ISOL VLVS. LOSS OF ALL REDUNDANCY CAN CAUSE LOSS OF VEHICLE/LIFE DURING ABORTS DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION).

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1451

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 9 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN FALSE TALKBACK ON THE "AFT L/R RCS MANIF ISOL 2" BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/21/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1452	ABORT:	3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS14; DS19
PART NUMBER: 33V73A7A2CR11, A2CR12; 33V73A7A3CR11, A3CR12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 2 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 2 ISOL VALVES" ARE OPEN OR CLOSED, DEPENDING ON WHICH DIODE FAILED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1453

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS14; DS19
PART NUMBER: 33V73A7A2CR11, A2CR12; 33V73A7A3CR11, A3CR12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1454 ABORT: 3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/2R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 9 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF TWO SIGNAL PATHS TO OPEN THE OX & FU MANIF 3 ISOL VLVS. LOSS OF ALL REDUNDANCY CAN CAUSE LOSS OF VEHICLE/LIFE DURING ABORTS DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION).

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1455

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 9 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN FALSE TALKBACK ON THE "AFT L/R RCS MANIF ISOL 3" BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1456

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 DS14; DS20
PART NUMBER: 33V73A7A2CR13, A2CR14; 33V73A7A3CR13, A3CR14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 3 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 3 ISOL VALVES" ARE OPEN OR CLOSED, DEPENDING ON WHICH DIODE FAILED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1457

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS14; DS20
PART NUMBER: 33V73A7A2CR13, A2CR14; 33V73A7A3CR13, A3CR14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/13/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/2R
MDAC ID:	1458	ABORT:	3/1R

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/2R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [3] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 9 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN LOSS OF ONE OF TWO SIGNAL PATHS TO OPEN THE OX & FU MANIF 4 ISOL VLVS. LOSS OF ALL REDUNDANCY CAN CAUSE LOSS OF VEHICLE/LIFE DURING ABORTS DUE TO INABILITY TO USE/DEPLETE PROPELLANT (POSSIBLE STRUCTURAL & MASS PROPERTIES VIOLATION).

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/13/87
SUBSYSTEM: ARCS
MDAC ID: 1459

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116-ALL DIODES

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
OUT OF THE 9 DIODES THERE ARE TWO OF WHICH A FAILURE WOULD RESULT IN FALSE TALKBACK ON THE "AFT L/R RCS MANIF ISOL 4" BARBERPOLE INDICATOR.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1460

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS15; DS21
PART NUMBER: 33V73A7A2CR15, A2CR16; 33V73A7A3CR15, A3CR16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 4 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 4 ISOL VALVES" ARE OPEN OR CLOSED, DEPENDING ON WHICH DIODE FAILED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1461

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS15; DS21
PART NUMBER: 33V73A7A2CR15, A2CR16; 33V73A7A3CR15, A3CR16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/22/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1462	ABORT:	3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123CR J2-44 (183); CR J2-28 (178)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO CLOSE THE "OX & FU MANIFOLD 5 ISOL VALVES". VALVES CAN STILL BE OPERATED BY "AFT L RCS MANIFOLD 5 ISOL SWITCH". FOR LOSS OF ALL REDUNDANCY, THE EFFECT WOULD BE THE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1463

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123CR J2-44 (183); CR J2-28 (178)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. MDM HAS INTERNAL PROTECTION FROM REVERSE CURRENT - HIGH OUTPUT RESISTANCE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/22/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1464	ABORT:	3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123CR J4-38 (182); CR J4-19 (179)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO CLOSE THE "OX & FU MANIFOLD 5 ISOL VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECT WOULD BE THE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1465

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123CR J4-38 (182); CR J4-19 (179)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. CAUSES TALKBACK TO INDICATE THE PRESENCE OF EITHER GPC OR SWITCH COMMAND TO CLOSE THE "OX & FU MANIFOLD 5 ISOL VALVES", INSTEAD OF ONLY THE SWITCH COMMAND.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/22/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/2R
MDAC ID:	1466	ABORT:	3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DIODE
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 [3] B [P] C [P]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133A2CR5; A2CR4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU MANIFOLD 5 ISOL VALVES". VALVES CAN STILL BE OPERATED BY "AFT L RCS MANIFOLD 5 ISOL SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN LOSS OF VRCS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1467

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133A2CR5; A2CR4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. LOSE SOME ISOLATION BETWEEN BUSES MN A AND MN B. MDM HAS INTERNAL PROTECTION FROM REVERSE CURRENT - HIGH OUTPUT RESISTANCE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1468 ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133A2CR13; A2CR12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO OPEN THE "OX & FU MANIFOLD 5 ISOL VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECT WOULD BE THE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATE FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1471

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DIODE
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 DS17; DS22
PART NUMBER: 33V73A7A2CR17, A2CR18; 33V73A7A3CR17, A3CR18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1472

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR14 TYPE I; AR16 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO INDICATE WHEN BOTH "OX & FU ISOL 1/2 VALVES" ARE FULLY CLOSED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1473

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR14 TYPE I; AR16 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO PROPERLY INDICATE STATUS OF "OX & FU ISOL 1/2 VALVES". INDICATES BARBERPOLE WHEN VALVES ARE OPEN AND INDICATES CLOSED WHEN VALVES ARE INBETWEEN (SHOULD BE BARBERPOLE).

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1474

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR13 TYPE I; AR15 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO INDICATE WHEN BOTH "OX & FU ISOL 1/2 VALVES" ARE FULLY OPENED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1475

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR13 TYPE I; AR15 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO PROPERLY INDICATE STATUS "OX & FU ISOL 1/2 VALVES". INDICATES BARBERPOLE WHEN VALVES ARE CLOSED AND INDICATES OPEN WHEN VALVES ARE INBETWEEN (SHOULD BE BARBERPOLE).

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1476 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR13 TYPE I; AR11 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 A" TO INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 A VALVES" ARE OPEN - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1477

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR13 TYPE I; AR11 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 A VALVES" TO PROPERLY INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 A" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. ALSO INDICATES OPEN WHEN IT SHOULD INDICATE BARBERPOLE. CREW CAN DETERMINE VALVE POSITION FROM TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1478

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR12 TYPE I; AR10 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 A" TO INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 A VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO OPEN RELAYS TO CUT POWER TO "OX & FU ISOL 3/4/5A VALVE" MOTORS WHEN BOTH VALVES BECOME CLOSED. POWER TO MOTORS CONTINUES UNTIL "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" IS MOVED TO ITS GPC POSITION, IF NOT THERE ALREADY, OR THE GPC CLOSE VALVE COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1479

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 1/1

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/3	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR12 TYPE I; AR10 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
STOPS, AND INDICATES WITH BARBERPOLE TALKBACK, THE CLOSURE OF BOTH "FU & OX TK ISOL 3/4/5 A VALVES" WHEN FUEL VALVE IS CLOSED, IGNORING THE OXID VALVE STATUS. THIS COULD RESULT IN LEAVING OXID LINE PARTIALLY OPENED, SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND POSSIBLE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/21/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1480	ABORT:	3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J4-115 TYPE I; J4-5 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 A" TO INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 A VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO OPEN RELAYS TO CUT POWER TO "OX & FU ISOL 3/4/5 A VALVE" MOTORS WHEN BOTH VALVES BECOME CLOSED. POWER TO MOTORS CONTINUES UNTIL "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" IS MOVED TO ITS GPC POSITION, IF NOT THERE ALREADY, OR THE GPC CLOSE VALVE COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1481

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 1/1

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/3	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J4-115 TYPE I; J4-5 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
STOPS, AND INDICATES WITH BARBERPOLE TALKBACK, THE CLOSURE OF BOTH "FU & OX TK ISOL 3/4/5 A VALVES" WHEN OXID VALVE IS CLOSED, IGNORING FUEL VALVE STATUS. THIS COULD RESULT IN LEAVING THE FUEL LINE PARTIALLY OPENED, SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND POSSIBLE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/21/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1482	ABORT:	3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115AR12 TYPE I; AR14 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 B" TO INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 B VALVES" ARE OPEN - INDICATES BARBERPOLE INSTEAD.
CREW CAN DETERMINE VALVE POSITION FROM TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1483

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115AR12 TYPE I; AR14 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 B" TO PROPERLY INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 B VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. ALSO INDICATES OPEN WHEN IT SHOULD INDICATE BARBERPOLE. CREW CAN DETERMINE VALVE POSITION FROM TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1484 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115AR11 TYPE I; AR13 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 B" TO INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 B VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO OPEN RELAYS TO CUT POWER TO "OX & FU ISOL 3/4/5 A VALVE" MOTORS WHEN BOTH VALVES BECOME CLOSED. POWER TO MOTORS CONTINUES UNTIL "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" IS MOVED TO ITS GPC POSITION, IF NOT THERE ALREADY, OR THE GPC CLOSE VALVE COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1485

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 1/1

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/3	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115AR11 TYPE I; AR13 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
STOPS, AND INDICATES WITH BARBERPOLE TALKBACK, THE CLOSURE OF BOTH "FU & OX TK ISOL 3/4/5 A VALVES" WHEN FUEL VALVE IS CLOSED, IGNORING THE OXID VALVE STATUS. THIS COULD RESULT IN LEAVING OXID LINE PARTIALLY OPENED, SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND POSSIBLE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1486

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A122AR J4-115 TYPE I; J4-5 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS TK ISOL 3/4/5 B" TO INDICATE WHEN BOTH "OX & FU TK ISOL 3/4/5 B VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO OPEN RELAYS TO CUT POWER TO "OX & FU ISOL 3/4/5 A VALVE" MOTORS WHEN BOTH VALVES BECOME CLOSED. POWER TO MOTORS CONTINUES UNTIL "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" IS MOVED TO ITS GPC POSITION, IF NOT THERE ALREADY, OR THE GPC CLOSE VALVE COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1487

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 1/1

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/3	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A122AR J4-115 TYPE I; J4-5 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
STOPS, AND INDICATES WITH BARBERPOLE TALKBACK, THE CLOSURE OF BOTH "FU & OX TK ISOL 3/4/5 A VALVES" WHEN OXID VALVE IS CLOSED, IGNORING THE FUEL VALVE STATUS. THIS COULD RESULT IN LEAVING FUEL LINE PARTIALLY OPENED, SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND POSSIBLE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1488 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR18 TYPE I; AR20 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO INDICATE WHEN BOTH "OX & FU XFEED 1/2 VALVES" ARE FULLY CLOSED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1489

HIGHEST CRITICALITY	HDW/FUNC
FLIGHT:	3/3
ABORT:	3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR18 TYPE I; AR20 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO PROPERLY INDICATE STATUS "OX & FU XFEED 1/2 VALVES". INDICATES BARBERPOLE WHEN VALVES ARE OPEN AND INDICATES CLOSED WHEN VALVES ARE INBETWEEN (SHOULD BE BARBERPOLE).

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1490 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR17 TYPE I; AR19 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO INDICATE WHEN BOTH "OX & FU XFEED 1/2 VALVES" ARE FULLY OPENED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1491

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR17 TYPE I; AR19 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO PROPERLY INDICATE STATUS "OX & FU XFEED 1/2 VALVES". INDICATES BARBERPOLE WHEN VALVES ARE CLOSED AND INDICATES OPEN WHEN VALVES ARE INBETWEEN (SHOULD BE BARBERPOLE).

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1492 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR16 TYPE I; AR14 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO INDICATE WHEN BOTH "OX & FU XFEED 3/4/5 VALVES" ARE FULLY CLOSED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1493

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR16 TYPE I; AR14 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO PROPERLY INDICATE STATUS "OX & FU XFEED 3/4/5 VALVES". INDICATES BARBERPOLE WHEN VALVES ARE OPEN AND INDICATES CLOSED WHEN VALVES ARE INBETWEEN (SHOULD BE BARBERPOLE).

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1494

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR15 TYPE I; AR15 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO INDICATE WHEN BOTH "OX & FU XFEED 3/4/5 VALVES" ARE FULLY OPENED. INDICATES BARBERPOLE INSTEAD.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1495

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR15 TYPE I; AR15 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE TALKBACK TO PROPERLY INDICATE STATUS "OX & FU XFEED 3/4/5 VALVES". INDICATES BARBERPOLE WHEN VALVES ARE CLOSED AND INDICATES OPEN WHEN VALVES ARE INBETWEEN (SHOULD BE BARBERPOLE).

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1496 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115AR10 TYPE I; AR7 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 1 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 1 ISOL VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO CUT POWER TO "OX & FU MANIF 1 ISOL VALVE" MOTORS WHEN BOTH VALVES BECOME CLOSED. POWER TO MOTORS CONTINUES UNTIL SWITCH IS MOVED TO ITS GPC POSITION OR COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1497

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115AR10 TYPE I; AR7 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 1 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 1 ISOL VALVES". THE VALVES WILL REMAIN CLOSED ONLY IF THE VALVES WERE CLOSED AT TIME OF FAILURE AND IF NOT COMMANDED OPENED SINCE FAILURE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 1/2. ALSO CAUSED BARBERPOLE INDICATOR TO SHOW BARBERPOLE WHEN OPEN AND SHOW CLOSED WHEN SHOULD SHOW BARBERPOLE. THE CORRECT VALVE POSITIONS ARE STILL AVAILABLE FROM FOUR VALVE TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1498 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115AR9 TYPE I; AR8 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 1 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 1 ISOL VALVES" ARE OPENED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO CUT POWER TO "OX & FU MANIF 1 ISOL VALVE" MOTORS WHEN BOTH VALVES BECOME OPENED. POWER TO MOTORS CONTINUES UNTIL SWITCH IS MOVED TO ITS GPC POSITION OR COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1499

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 1/1

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115AR9 TYPE I; AR8 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 1 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 1 ISOL VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVES WERE OPEN AT TIME OF FAILURE AND IF THE VALVES ARE NOT COMMANDED CLOSED SINCE FAILURE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1500

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR9 TYPE I; AR7 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 2 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 2 ISOL VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO CUT POWER TO "OX & FU MANIF 2 ISOL VALVE" MOTORS WHEN BOTH VALVES BECOME CLOSED. POWER TO MOTORS CONTINUES UNTIL SWITCH IS MOVED TO ITS GPC POSITION OR COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1501

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR9 TYPE I; AR7 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 2 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 2 ISOL VALVES". THE VALVES WILL REMAIN CLOSED ONLY IF THE VALVES WERE CLOSED AT TIME OF FAILURE AND IF NOT COMMANDED OPENED SINCE FAILURE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 1/2. ALSO CAUSED BARBERPOLE INDICATOR TO SHOW BARBERPOLE WHEN OPEN AND SHOW CLOSED WHEN SHOULD SHOW BARBERPOLE. THE CORRECT VALVE POSITIONS ARE STILL AVAILABLE FROM FOUR VALVE TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1502 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR8 TYPE I; AR6 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 2 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 2 ISOL VALVES" ARE OPENED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO CUT POWER TO "OX & FU MANIF 2 ISOL VALVE" MOTORS WHEN BOTH VALVES BECOME OPENED. POWER TO MOTORS CONTINUES UNTIL SWITCH IS MOVED TO ITS GPC POSITION OR COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1503

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 1/1

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114AR8 TYPE I; AR6 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 2 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 2 ISOL VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVES WERE OPEN AT TIME OF FAILURE AND IF THE VALVES ARE NOT COMMANDED CLOSED SINCE FAILURE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1504

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR6; AR8 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 3 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 3 ISOL VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO CUT POWER TO "OX & FU MANIF 3 ISOL VALVE" MOTORS WHEN BOTH VALVES BECOME CLOSED. POWER TO MOTORS CONTINUES UNTIL SWITCH IS MOVED TO ITS GPC POSITION OR COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1505

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR6; AR8 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 3 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 3 ISOL VALVES". THE VALVES WILL REMAIN CLOSED ONLY IF THE VALVES WERE CLOSED AT TIME OF FAILURE AND IF NOT COMMANDED OPENED SINCE FAILURE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 3/4/5 A OR B. ALSO CAUSED BARBERPOLE INDICATOR TO SHOW BARBERPOLE WHEN OPEN AND SHOW CLOSED WHEN SHOULD SHOW BARBERPOLE. THE CORRECT VALVE POSITIONS ARE STILL AVAILABLE FROM FOUR VALVE TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1506

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR5; AR7 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 3 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 3 ISOL VALVES" ARE OPENED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO CUT POWER TO "OX & FU MANIF 3 ISOL VALVE" MOTORS WHEN BOTH VALVES BECOME OPENED. POWER TO MOTORS CONTINUES UNTIL SWITCH IS MOVED TO ITS GPC POSITION OR COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1507

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 1/1

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR5; AR7 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 3 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 3 ISOL VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVES WERE OPEN AT TIME OF FAILURE AND IF THE VALVES ARE NOT COMMANDED CLOSED SINCE FAILURE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/22/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1508	ABORT:	3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR10; AR12 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 4 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 4 ISOL VALVES" ARE CLOSED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO CUT POWER TO "OX & FU MANIF 4 ISOL VALVE" MOTORS WHEN BOTH VALVES BECOME CLOSED. POWER TO MOTORS CONTINUES UNTIL SWITCH IS MOVED TO ITS GPC POSITION OR COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1509 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR10; AR12 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 4 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 4 ISOL VALVES". THE VALVES WILL REMAIN CLOSED ONLY IF THE VALVES WERE CLOSED AT TIME OF FAILURE AND IF NOT COMMANDED OPENED SINCE FAILURE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 3/4/5 A OR B. ALSO CAUSED BARBERPOLE INDICATOR TO SHOW BARBERPOLE WHEN OPEN AND SHOW CLOSED WHEN SHOULD SHOW BARBERPOLE. THE CORRECT VALVE POSITIONS ARE STILL AVAILABLE FROM FOUR VALVE TALKBACKS VIA GPC DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1510 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR9; AR11 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF BARBERPOLE INDICATOR "AFT L/R RCS MANIF 4 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIF 4 ISOL VALVES" ARE OPENED - INDICATES BARBERPOLE INSTEAD. CREW CAN DETERMINE VALVE POSITION FROM TWO TALKBACKS VIA GPC DISPLAY. ALSO LOSE CAPABILITY TO CUT POWER TO "OX & FU MANIF 4 ISOL VALVE" MOTORS WHEN BOTH VALVES BECOME OPENED. POWER TO MOTORS CONTINUES UNTIL SWITCH IS MOVED TO ITS GPC POSITION OR COMMAND ENDS. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1511

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 1/1

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116AR9; AR11 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 4 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 4 ISOL VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVES WERE OPEN AT TIME OF FAILURE AND IF THE VALVES ARE NOT COMMANDED CLOSED SINCE FAILURE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1512 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J9-51 (180) TYPE I; AR J9-50 (163) TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO CLOSE "OX & FU MANIFOLD 5 ISOL VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECTS SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1513

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
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: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J9-51 (180) TYPE I; AR J9-50 (163) TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU MANIFOLD 5 ISOL VALVES", SINCE THIS FAILURE CONSTANTLY POWERS THE VALVE CLOSE SOLENOIDS, UNLESS "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" IS IN OPEN POSITION. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN LOSS OF VRCS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1514 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J11-Q (178) TYPE III; AR J11-N (161) TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC OR "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO CLOSE "OX & FU MANIFOLD 5 ISOL VALVES". ALL REDUNDANCY IS LOST TO CLOSE THE VALVES. THE EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1515

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
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 [3] B [F] C [P]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J11-Q (178) TYPE III; AR J11-N (161) TYPE III

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO AUTOMATICALLY INHIBIT CLOSING THE VALVES WHEN THEY BECOME FULLY CLOSED. HOWEVER, VALVE CAN STILL BE OPENED VIA SWITCH OR GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN LOSS OF VRCS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1516 ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J8-70 (179) TYPE I; AR J8-56 (162) TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC TO OPEN THE "OX & FU MANIFOLD 5 ISOL VALVES". VALVES CAN STILL BE OPERATED BY "AFT L RCS MANIFOLD 5 ISOL SWITCH". FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN LOSS OF VRCS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1517

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J8-70 (179) TYPE I; AR J8-56 (162) TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU MANIFOLD 5 ISOL VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/22/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1518	ABORT:	3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-70 TYPE I; J8-56 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO OPEN THE "OX & FU MANIFOLD 5 ISOL VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, EFFECT WOULD BE THE SAME AS VALVE FAILS TO CLOSE CASE, RESULTING IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1519

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, LCA 1
PART NUMBER: 54V76A121AR J8-70 TYPE I; J8-56 TYPE I

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
CONSTANTLY COMMANDS "OX & FU MANIFOLD 5 ISOL VALVE" TO OPEN, EVEN WHEN AT FULL OPEN POSITION. WHEN SWITCH OR GPC COMMANDS VALVE TO CLOSE, BOTH OPEN AND CLOSE SOLENOIDS IN THE VALVES ARE POWERED UP. THE EFFECT IS THE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1520

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J8-68 (177) TYPE I; AR J8-50 (160) TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE OPEN POSITION OF BARBERPOLE INDICATOR "AFT L/R RCS MANIFOLD 5 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIFOLD 5 ISOL VALVES" ARE FULLY OPEN - INDICATES BARBERPOLE INSTEAD. ALSO LOSE CAPABILITY OF INHIBITING THE OPENING OF THE VALVES VIA THE SWITCH WHEN VALVES BECOME OR ARE ALREADY FULLY OPEN, BUT WILL NOT DAMAGE VALVE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1521

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J8-68 (177) TYPE I; AR J8-50 (160) TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
INHIBITS OPENING OF THE VALVES VIA "AFT L/R RCS MANIFOLD 5 ISOL SWITCH". VALVES CAN STILL BE OPERATED BY GPC. LOSE CAPABILITY OF BARBERPOLE TALKBACK "AFT L RCS MANIFOLD 5 ISOL" TO PROPERLY INDICATE WHEN BOTH "OX & FU MANIFOLD 5 ISOL VALVES" ARE FULLY CLOSED. INDICATES BARBERPOLE INSTEAD. ALSO INDICATES OPEN WHEN IT SHOULD INDICATE BARBERPOLE. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVE FAILS TO OPEN CASE. THIS CASE RESULTS IN LOSS OF VRCS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/22/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1522	ABORT:	3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J8-71 (176) TYPE II; AR J8-48 (159) TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CLOSE POSITION OF BARBERPOLE INDICATOR "AFT L/R RCS MANIFOLD 5 ISOL" TO INDICATE WHEN BOTH "OX & FU MANIFOLD 5 ISOL VALVES" ARE FULLY CLOSED - INDICATES BARBERPOLE INSTEAD. ALSO LOSE CAPABILITY OF INHIBITING THE CLOSING OF THE VALVES VIA THE SWITCH WHEN VALVES BECOME OR ARE ALREADY FULLY CLOSED, BUT WILL NOT DAMAGE VALVE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1523

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: DRIVER, HYBRID
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) DRIVER, HYBRID
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 56V76A123AR J8-71 (176) TYPE II; AR J8-48 (159) TYPE II

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
INHIBITS CLOSING OF THE VALVES VIA "AFT L/R RCS MANIFOLD 5 ISOL SWITCH". VALVES CAN STILL BE OPERATED BY GPC. LOSE CAPABILITY OF BARBERPOLE TALKBACK "AFT L RCS MANIFOLD 5 ISOL" TO PROPERLY INDICATE WHEN BOTH "OX & FU MANIFOLD 5 ISOL VALVES" ARE FULLY OPENED. INDICATES BARBERPOLE INSTEAD. ALSO INDICATES CLOSED WHEN IT SHOULD INDICATE BARBERPOLE. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN LOSS OF VRCS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1524 ABORT: 3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/2R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL 07 S16; PNL 07 S19
PART NUMBER: 33V73A7F14; F18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS TK ISOL 1/2 SWITCH" TO CLOSE THE "OX & FU TK ISOL 1/2 VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE THE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1525

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/2R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL 07 S16; PNL 07 S19
PART NUMBER: 33V73A7F13; F17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS TK ISOL 1/2 SWITCH" TO CLOSE THE "OX & FU TK ISOL 1/2 VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1526 ABORT: 3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S17; S20
PART NUMBER: 33V73A7F15; F19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" TO OPEN AND CLOSE THE "OX & FU TK ISOL 3/4/5 A VALVES". VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, WORST CASE EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN.
IF THE "TK ISOL 1/2 VALVE" ALSO FAILS, THIS CASE WILL AFFECT CROSSFEED OPERATIONS AND ENTRY DTOs AND PTIs. FAILURE OF ALL REDUNDANCY WILL CAUSE LOSS OF SIX PRIMARY JETS WHICH, DURING RTLS, MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES. SIMILARLY, FAILURE OF ALL REDUNDANCY MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1527

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 3/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S18; S21
PART NUMBER: 33V73A7F16; F20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS TK ISOL 3/4/5 B SWITCH" TO OPEN AND CLOSE THE "OX & FU TK ISOL 3/4/5 B VALVES". VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, WORST CASE EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE.
IF THE "TK ISOL 1/2 VALVE" ALSO FAILS, THIS CASE WILL AFFECT CROSSFEED OPERATIONS AND ENTRY DTOs AND PTIs. FAILURE OF ALL REDUNDANCY WILL CAUSE LOSS OF SIX PRIMARY JETS WHICH, DURING RTLS, MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES. SIMILARLY, FAILURE OF ALL REDUNDANCY MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1528 ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S36
PART NUMBER: 33V73A7F41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ONE OF THREE REDUNDANT SIGNAL PATHS FROM THE "MASTER RCS XFEED" SWITCH TO THE GPCS TO CONTROL WHETHER TO AUTO CROSSFEED FROM THE LEFT OR THE RIGHT OMS POD. NO EFFECT. FOR LOSS OF ALL REDUNDANCY, THE EFFECT WOULD BE SAME AS ANY CROSSFEED VALVE FAILS TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY CAUSE INABILITY TO BALANCE AND/OR EXPEL PROPELLANT, RESULTING IN THE TANK LANDING CONSTRAINT AND CG SAFETY BOUNDARIES BEING EXCEEDED DUE TO THE TRAPPED PROPELLANT'S WEIGHT. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 3/4/5 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1529

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S36
PART NUMBER: 33V73A7F42

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ONE OF THREE REDUNDANT SIGNAL PATHS FROM THE "MASTER RCS XFEED" SWITCH TO THE GPCS TO CONTROL WHETHER TO CROSSFEED FROM THE LEFT OR THE RIGHT OMS POD. NO EFFECT. FOR LOSS OF ALL REDUNDANCY, THE EFFECT WOULD BE SAME AS ANY CROSSFEED VALVE FAILS TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY CAUSE INABILITY TO BALANCE AND/OR EXPELL PROPELLANT, RESULTING IN THE TANK LANDING CONSTRAINT AND CG SAFETY BOUNDARIES BEING EXCEEDED DUE TO THE TRAPPED PROPELLANT'S WEIGHT. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 3/4/5 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1530

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S36
PART NUMBER: 33V73A7F43

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE ONE OF THREE REDUNDANT SIGNAL PATHS FROM THE "MASTER RCS XFEED" SWITCH TO THE GPCS TO CONTROL WHETHER TO CROSSFEED FROM THE LEFT OR THE RIGHT OMS POD. NO EFFECT. FOR LOSS OF ALL REDUNDANCY, THE EFFECT WOULD BE SAME AS ANY CROSSFEED VALVE FAILS TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY CAUSE INABILITY TO BALANCE AND/OR EXPELL PROPELLANT, RESULTING IN THE TANK LANDING CONSTRAINT AND CG SAFETY BOUNDARIES BEING EXCEEDED DUE TO THE TRAPPED PROPELLANT'S WEIGHT. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 3/4/5 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1531

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S32; PNL O7 S34
PART NUMBER: 33V73A7F34; F38

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS XFEED 1/2 SWITCH" TO CLOSE THE "OX & FU XFEED 1/2 VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE THE SAME AS VALVES FAIL TO CLOSE CASE.
THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1532 ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S32; PNL O7 S34
PART NUMBER: 33V73A7F33; F37

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS XFEED 1/2 SWITCH" TO CLOSE THE "OX & FU XFEED 1/2 VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO CLOSE CASE.
THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1533

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S33; PNL O7 S35
PART NUMBER: 33V73A7F36; F40

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS XFEED 3/4/5 SWITCH" TO CLOSE THE "OX & FU XFEED 3/4/5 VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE THE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1534 ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S33; PNL O7 S35
PART NUMBER: 33V73A7F35; F39

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS XFEED 3/4/5 SWITCH" TO CLOSE THE "OX & FU XFEED 3/4/5 VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1535

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S22; S27
PART NUMBER: 33V73A7F21; F27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIF ISOL 1 SWITCH" TO OPEN AND CLOSE THE "OX & FU MANIF ISOL 1 VALVES". VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, WORST CASE EFFECTS WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE THREE PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1536 ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S23; S28
PART NUMBER: 33V73A7F22; F28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIF ISOL 2 SWITCH" TO OPEN AND CLOSE THE "OX & FU MANIF ISOL 2 VALVES". VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, WORST CASE EFFECTS WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE.
DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE THREE PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1537

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S24; S29
PART NUMBER: 33V73A7F23; F29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIF ISOL 3 SWITCH" TO OPEN AND CLOSE THE "OX & FU MANIF ISOL 3 VALVES". VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, WORST CASE EFFECTS WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE THREE PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1538 ABORT: 2/1R

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PNL O7 S25; S30
PART NUMBER: 33V73A7F24; F30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIF ISOL 4 SWITCH" TO OPEN AND CLOSE THE "OX & FU MANIF ISOL 4 VALVES". VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, WORST CASE EFFECTS WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE THREE PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1539

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 S26, S31
PART NUMBER: 33V73A7F25; F31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO CLOSE THE "OX & FU MANIFOLD 5 ISOL VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS THE VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1540 ABORT: 3/3

ITEM: FUSE, 1A
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 5, L/R OX & FU ISOL VLVS
5) FUSE, 1A
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL O7 S26, S31
PART NUMBER: 33V73A7F26; F32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF "AFT L/R RCS MANIFOLD 5 ISOL SWITCH" TO CLOSE THE "OX & FU MANIFOLD 5 ISOL VALVES", OVERRIDING THE GPC COMMANDS. VALVES CAN STILL BE FULLY OPERATED BY GPC. FOR LOSS OF ALL REDUNDANCY, THE EFFECTS WOULD BE THE SAME AS THE VALVES FAIL TO CLOSE CASE. THIS CASE RESULTS IN NO EFFECT SINCE PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVES 3/4/5 A OR B, AND VERNIER THRUSTERS ARE NOT USED DURING ENTRY OR ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1541 ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS OPEN (DE-ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K30, K29; K38, K37

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC COMMAND TO OPEN BOTH "OX & FU TK ISOL 1/2 VALVE", SIMULTANEOUSLY. CAN STILL OPEN BOTH VALVES WITH "AFT L/R RCS TK ISOL 1/2 SWITCH" OR INDIVIDUALLY WITH TWO OTHER GPC COMMANDS. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN LOSS OF MANIFOLDS 1&2. FIRST FAILURE WILL CAUSE LOSS OF SIX PRIMARY JETS WHICH WILL AFFECT ONORBIT CROSSFEED OPERATIONS, ENTRY DTOs AND PTIs, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT DURING RTLS TO MEET LANDING WEIGHT CONSTRAINTS AND/OR CG SAFETY BOUNDARIES. SIMILARLY, NEXT FAILURE ASSOCIATED WITH VALVE FAILURE MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1542 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS HIGH (ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/2R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K30, K29; K38, K37

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 1/2 SWITCH" TO CLOSE "OX OR FU ISOL 1/2 VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS REGARDLESS OF COMMAND SIGNAL, BUT WILL NOT DAMAGE VALVE. THE EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1543 ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS OPEN (DE-ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K31, K27; K39, K35

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF ONE GPC COMMAND TO OPEN ONLY THE "OX (FU) TK ISOL 1/2 VALVE". CAN STILL OPEN VALVE, ALONG WITH THE OTHER VALVE "FU (OX) TK ISOL 1/2 VALVE", WITH ANOTHER GPC COMMAND OR WITH SWITCH "AFT L/R RCS TK ISOL 1/2". FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN LOSS OF SIX PRIMARY JETS WHICH WILL AFFECT ONORBIT CROSSFEED OPERATIONS, ENTRY DTOs AND PTIs, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT DURING RTLS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS, AND/OR CG SAFETY BOUNDARIES. SIMILARLY, NEXT FAILURE ASSOCIATED WITH THE VALVE MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1544 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS HIGH (ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/2R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K31, K27; K39, K35

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 1/2 SWITCH" TO CLOSE THE "OX OR FU ISOL 1/2 VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS REGARDLESS OF COMMAND SIGNAL, BUT WILL NOT DAMAGE VALVE. THE EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1545

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN (DE-ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/2R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K32, K28; K41, K36

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 1/2 SWITCH" TO CLOSE THE "OX OR FU ISOL 1/2 VALVE", OVERRIDING GPC COMMANDS. THIS VALVE WILL REMAIN CLOSED ONLY IF THE VALVE WAS CLOSED AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED OPENED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS, AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1546 ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH (ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K32, K28; K41, K36

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. NEITHER VALVE WILL CLOSE UNTIL THE OTHER CLOSE RELAY IS ENERGIZED, SINCE THAT RELAY'S SWITCH IS IN SERIES WITH THE FAILED RELAY'S SWITCH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1547

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN (DE-ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/2R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K33, K26; K40, K34

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 1/2 SWITCH" TO CLOSE THE "OX & FU ISOL 1/2 VALVES", OVERRIDING THE GPC COMMANDS. THIS VALVE WILL REMAIN CLOSED ONLY IF THE VALVE WAS CLOSED AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED OPENED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS, AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1548 ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS HIGH (ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K33, K26; K40, K34

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
WHEN GPC ONLY COMMANDS CLOSE THE OTHER VALVE "FU (OX) ISOL 1/2 VALVE", THEN THIS VALVE (ASSOCIATED WITH THE FAILED RELAY) "OX (FU) ISOL 1/2 VALVE" WILL ALSO CLOSE. VALVE CAN STILL BE OPENED. FOR LOSS OF ALL REDUNDANCY THIS UNINTENDED EVENT'S EFFECTS ARE SIMILAR TO VALVE FAILS TO OPEN CASE. THIS CASE WILL CAUSE LOSS OF SIX PRIMARY JETS WHICH WILL AFFECT ONORBIT CROSSFEED OPERATIONS, ENTRY DTOs AND PTIs, AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT DURING RTLS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS, AND/OR THE CG SAFETY BOUNDARIES. SIMILARLY, NEXT FAILURE ASSOCIATED WITH THE VALVE MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1549

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS OPEN (DE-ENERGIZED)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K30, K32; K26, K28

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" TO OPEN THE "OX OR FU TK ISOL 3/4/5 A VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVE WAS OPEN AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED CLOSED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO OPEN, EITHER FUEL OR OXIDIZER LINE IS OPENED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO OPEN CASE. IF THE "TK ISOL 1/2 VALVE" ALSO FAILS, THIS CASE WILL AFFECT CROSSFEED OPERATIONS AND ENTRY DTOs AND PTIs. FAILURE OF ALL REDUNDANCY WILL CAUSE LOSS OF SIX PRIMARY JETS WHICH, DURING RTLS, MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES. SIMILARLY, FAILURE OF ALL REDUNDANCY MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 2/2
MDAC ID: 1550 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS CLOSED (FAILS IN ENERGIZED POSITION)

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/3	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K30, K32; K26, K28

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" TO CLOSE THE "OX OR FU TK ISOL 3/4/5 A VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO CLOSE, BUT WILL NOT DAMAGE VALVE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND POSSIBLE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1551

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/3	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K29, K31; K25, K27

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" TO CLOSE THE "OX OR FU TK ISOL 3/4/5 A VALVE". THIS VALVE WILL REMAIN CLOSED ONLY IF THE VALVE WAS CLOSED AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED OPENED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND POSSIBLE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1552 ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 A
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K29, K31; K25, K27

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 3/4/5 A SWITCH" TO OPEN THE "OX OR FU TK ISOL 3/4/5 A VALVE". ROUTES REVERSE (CLOSING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO OPEN, BUT WILL NOT DAMAGE VALVE. WHEN VALVES ARE COMMANDED TO OPEN, EITHER FUEL OR OXIDIZER LINE IS OPENED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO OPEN CASE. IF THE "TK ISOL 1/2 VALVE" ALSO FAILS, THIS CASE WILL AFFECT CROSSFEED OPERATIONS AND ENTRY DTOs AND PTIs. FAILURE OF ALL REDUNDANCY WILL CAUSE LOSS OF SIX PRIMARY JETS WHICH, DURING RTLS, MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES. SIMILARLY, FAILURE OF ALL REDUNDANCY MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1553

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115K24, K29; K28, K30

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 3/4/5 B SWITCH" TO OPEN THE "OX OR FU TK ISOL 3/4/5 B VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVE WAS OPEN AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED CLOSED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO OPEN, EITHER FUEL OR OXIDIZER LINE IS OPENED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO OPEN CASE. IF THE "TK ISOL 1/2 VALVE" ALSO FAILS, THIS CASE WILL AFFECT CROSSFEED OPERATIONS AND ENTRY DTOs AND PTIs. FAILURE OF ALL REDUNDANCY WILL CAUSE LOSS OF SIX PRIMARY JETS WHICH, DURING RTLS, MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES. SIMILARLY, FAILURE OF ALL REDUNDANCY MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 2/2
MDAC ID: 1554 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/3	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115K24, K29; K28, K30

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 3/4/5 B SWITCH" TO CLOSE THE "OX OR FU TK ISOL 3/4/5 B VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO CLOSE, BUT WILL NOT DAMAGE VALVE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND POSSIBLE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1555

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/3	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115K25, K27; K26, K31

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 3/4/5 B SWITCH" TO CLOSE THE "OX OR FU TK ISOL 3/4/5 B VALVE". THIS VALVE WILL REMAIN CLOSED ONLY IF THE VALVE WAS CLOSED AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED OPENED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND POSSIBLE INABILITY TO EXPEL ENOUGH PROPELLANTS DURING ENTRY OR ABORTS TO MEET THE TANK LANDING CONSTRAINTS AND/OR THE CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1556 ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 3/4/5 B
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115K25, K27; K26, K31

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS TK ISOL 3/4/5 B SWITCH" TO OPEN THE "OX OR FU TK ISOL 3/4/5 B VALVE". ROUTES REVERSE (CLOSING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO OPEN, BUT WILL NOT DAMAGE VALVE. WHEN VALVES ARE COMMANDED TO OPEN, EITHER FUEL OR OXIDIZER LINE IS OPENED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO OPEN CASE. IF THE "TK ISOL 1/2 VALVE" ALSO FAILS, THIS CASE WILL AFFECT CROSSFEED OPERATIONS AND ENTRY DTOs AND PTIs. FAILURE OF ALL REDUNDANCY WILL CAUSE LOSS OF SIX PRIMARY JETS WHICH, DURING RTLS, MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET THE CG SAFETY BOUNDARIES. SIMILARLY, FAILURE OF ALL REDUNDANCY MAY RESULT IN LOSS OF VEHICLE DURING ENTRY AND OTHER ABORTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1557

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K45, K46; K53, K54

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC COMMAND TO OPEN BOTH "OX & FU XFEED 1/2 VALVE", SIMULTANEOUSLY. CAN STILL OPEN BOTH VALVES WITH "AFT L/R RCS XFEED 1/2 SWITCH" OR INDIVIDUALLY WITH TWO OTHER GPC COMMANDS. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY CAUSE INABILITY TO EXPEL NEXT ASSOCIATED FAILURE (VALVE 1/2) CAUSING INABILITY TO BALANCE AND/OR EXPEL PROPELLANT, RESULTING IN THE TANK LANDING CONSTRAINT AND CG SAFETY BOUNDARIES BEING EXCEEDED. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 3/4/5 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/20/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	2/2
MDAC ID:	1558	ABORT:	3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) RELAY
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K45, K46; K53, K54

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS XFEED 1/2 SWITCH" TO CLOSE "OX OR FU XFEED 1/2 VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS REGARDLESS OF COMMAND SIGNAL, BUT WILL NOT DAMAGE VALVE. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1559

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K43, K47; K51, K55

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF ONE GPC COMMAND TO OPEN ONLY THE "OX (FU) XFEED 1/2 VALVE". CAN STILL OPEN VALVE, ALONG WITH THE OTHER VALVE "FU (OX) XFEED 1/2 VALVE", WITH ANOTHER GPC COMMAND OR WITH SWITCH "AFT L/R RCS XFEED 1/2". FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY CAUSE INABILITY TO EXPEL NEXT ASSOCIATED FAILURE (VALVE 3/4/5) CAUSING INABILITY TO BALANCE AND/OR EXPEL PROPELLANT, RESULTING IN THE TANK LANDING CONSTRAINTS AND SAFETY BOUNDARIES BEING EXCEEDED. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 3/4/5 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 2/2
MDAC ID: 1560 ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) RELAY
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K43, K47; K51, K55

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS XFEED 1/2 SWITCH" TO CLOSE THE "OX OR FU XFEED 1/2 VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS REGARDLESS OF COMMAND OR LACK OF COMMAND, BUT WILL NOT DAMAGE VALVE. THE EFFECTS ARE THE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1561

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) RELAY
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K44, K49; K52, K57

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS XFEED 1/2 SWITCH" TO CLOSE THE "OX & FU XFEED 1/2 VALVES", OVERRIDING THE GPC COMMANDS. THIS VALVE WILL REMAIN CLOSED ONLY IF THE VALVE WAS CLOSED AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED OPENED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1562 ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K44, K49; K52, K57

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. NEITHER VALVE WILL CLOSE UNTIL THE OTHER CLOSE RELAY IS ENERGIZED, SINCE THAT RELAY'S SWITCH IS IN SERIES WITH THE FAILED RELAY'S SWITCH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1563

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) RELAY
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K42, K48; K50, K56

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS XFEED 1/2 SWITCH" TO CLOSE THE "OX & FU XFEED 1/2 VALVES", OVERRIDING THE GPC COMMANDS. THIS VALVE WILL REMAIN CLOSED ONLY IF THE VALVE WAS CLOSED AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED OPENED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/20/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/2R
MDAC ID:	1564	ABORT:	2/1R

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 1/2
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K42, K48; K50, K56

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
WHEN GPC COMMANDS CLOSE ONLY THE OTHER VALVE "FU (OX) XFEED 1/2 VALVE", THEN THIS VALVE (ASSOCIATED WITH THE FAILED RELAY) "OX (FU) XFEED 1/2 VALVE" WILL ALSO CLOSE. VALVE CAN STILL BE OPENED. FOR LOSS OF ALL REDUNDANCY THIS UNINTENDED EVENT'S EFFECTS ARE SIMILAR TO THE VALVE FAILS TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY RESULT IN NEXT ASSOCIATED FAILURE (VALVE 3/4/5) CAUSING INABILITY TO BALANCE AND/OR EXPEL PROPELLANT RESULTING IN THE TANK LANDING AND CG SAFETY BOUNDARIES BEING EXCEEDED. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 3/4/5 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1565

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K67, K66; K40, K36

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC COMMAND TO OPEN BOTH "OX & FU XFEED 3/4/5 VALVE", SIMULTANEOUSLY. CAN STILL OPEN BOTH VALVES WITH "AFT L/R RCS XFEED 3/4/5 SWITCH" OR INDIVIDUALLY WITH TWO OTHER GPC COMMANDS. FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND MAY CAUSE INABILITY TO BALANCE AND/OR EXPEL PROPELLANT, RESULTING IN THE TANK LANDING CONSTRAINT AND CG SAFETY BOUNDARIES BEING EXCEEDED DUE TO THE TRAPPED PROPELLANT'S WEIGHT. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 1/2 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1566

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) RELAY
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K67, K66; K40, K36

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS XFEED 3/4/5 SWITCH" TO CLOSE "OX OR FU XFEED 3/4/5 VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS REGARDLESS OF COMMAND SIGNAL, BUT WILL NOT DAMAGE VALVE. THE EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1567

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K65, K68; K39, K35

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF ONE GPC COMMAND TO OPEN ONLY THE "OX (FU) XFEED 3/4/5 VALVE". CAN STILL OPEN VALVE, ALONG WITH THE OTHER VALVE "FU (OX) XFEED 3/4/5 VALVE", WITH ANOTHER GPC COMMAND OR WITH SWITCH "AFT L/R RCS XFEED 3/4/5". FOR LOSS OF ALL REDUNDANCY, EFFECTS WOULD BE SAME AS VALVES FAIL TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS AND MAY CAUSE INABILITY TO BALANCE AND/OR EXPEL PROPELLANT, RESULTING IN THE TANK LANDING CONSTRAINT AND CG SAFETY BOUNDARIES BEING EXCEEDED DUE TO THE TRAPPED PROPELLANT'S WEIGHT. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 1/2 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1568

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) RELAY
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K65, K68; K39, K35

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS XFEED 3/4/5 SWITCH" TO CLOSE THE "OX OR FU XFEED 3/4/5 VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS REGARDLESS OF COMMAND OR LACK OF COMMAND, BUT WILL NOT DAMAGE VALVE. THE EFFECTS ARE THE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/20/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	2/2
MDAC ID:	1569	ABORT:	3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) RELAY
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K69, K70; K38, K34

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS XFEED 3/4/5 SWITCH" TO CLOSE THE "OX & FU XFEED 1/2 VALVES", OVERRIDING THE GPC COMMANDS. THIS VALVE WILL REMAIN CLOSED ONLY IF THE VALVE WAS CLOSED AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED OPENED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1570

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K69, K70; K38, K34

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. NEITHER VALVE WILL CLOSE UNTIL THE OTHER CLOSE RELAY IS ENERGIZED, SINCE THAT RELAY'S SWITCH IS IN SERIES WITH THE FAILED RELAY'S SWITCH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87
SUBSYSTEM: ARCS
MDAC ID: 1571

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) RELAY
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:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K71, K72; K37, K33

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS XFEED 3/4/5 SWITCH" TO CLOSE THE "OX & FU XFEED 3/4/5 VALVES", OVERRIDING THE GPC COMMANDS. THIS VALVE WILL REMAIN CLOSED ONLY IF THE VALVE WAS CLOSED AT TIME OF FAILURE AND IF THE VALVE IS NOT COMMANDED OPENED SINCE FAILURE. WHEN VALVES ARE COMMANDED TO CLOSE, EITHER FUEL OR OXIDIZER LINE IS CLOSED BUT NOT BOTH. EFFECTS ARE SAME AS VALVE FAILS TO CLOSE CASE. THIS CASE MAY RESULT IN AFFECTING CROSSFEED OPERATIONS DURING ONORBIT PHASE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/20/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/2R
MDAC ID: 1572 ABORT: 2/1R

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU CROSSFEED VLV 3/4/5
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/3	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K71, K72; K37, K33

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
WHEN GPC COMMANDS CLOSE ONLY THE OTHER VALVE "FU (OX) XFEED 3/4/5 VALVE", THEN THIS VALVE (ASSOCIATED WITH THE FAILED RELAY) "OX (FU) XFEED 3/4/5 VALVE" WILL ALSO CLOSE. VALVE CAN STILL BE OPENED. FOR LOSS OF ALL REDUNDANCY THIS UNINTENDED EVENT'S EFFECTS ARE SIMILAR TO THE VALVE FAILS TO OPEN CASE. THIS CASE RESULTS IN AFFECTING CROSSFEED OPERATIONS, AND MAY RESULT IN NEXT ASSOCIATED FAILURE (VALVE 1/2) CAUSING INABILITY TO BALANCE AND/OR EXPEL PROPELLANT RESULTING IN THE TANK LANDING CONSTRAINTS AND CG SAFETY BOUNDARIES BEING EXCEEDED. THERE IS NO REDUNDANCY TO CROSSFEED TO THE 1/2 THRUSTERS ONORBIT, AND NO REDUNDANCY DURING RTLS BECAUSE OF THE FIXED DUMP LENGTH.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1573

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115K22; K23

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 1 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 1 ISOL VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVES WERE OPEN AT TIME OF FAILURE AND IF THE VALVES ARE NOT COMMANDED CLOSED SINCE FAILURE.
EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1574 ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115K22; K23

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 1 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 1 ISOL VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO CLOSE, BUT WILL NOT DAMAGE VALVE.
EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 1/2.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1575

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115K20; K21

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 1 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 1 ISOL VALVES". THE VALVES WILL REMAIN CLOSED ONLY IF THE VALVES WERE CLOSED AT TIME OF FAILURE AND IF NOT COMMANDED OPENED SINCE FAILURE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 1/2.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1576 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 1, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 5, MCA 2
PART NUMBER: 55V76A115K20; K21

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 1 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 1 ISOL VALVE". ROUTES REVERSE (CLOSING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO OPEN, BUT WILL NOT DAMAGE VALVE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1577 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K24; K22

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 2 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 2 ISOL VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVES WERE OPEN AT TIME OF FAILURE AND IF THE VALVES ARE NOT COMMANDED CLOSED SINCE FAILURE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1578

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K24; K22

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 2 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 2 ISOL VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO CLOSE, BUT WILL NOT DAMAGE VALVE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 1/2.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87
SUBSYSTEM: ARCS
MDAC ID: 1579

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K23; K21

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 2 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 2 ISOL VALVES". THE VALVES WILL REMAIN CLOSED ONLY IF THE VALVES WERE CLOSED AT TIME OF FAILURE AND IF NOT COMMANDED OPENED SINCE FAILURE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 1/2.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/21/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1580 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 2, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 4, MCA 1
PART NUMBER: 54V76A114K23; K21

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 2 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 2 ISOL VALVE". ROUTES REVERSE (CLOSING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO OPEN, BUT WILL NOT DAMAGE VALVE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1581 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K19; K21

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 3 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 3 ISOL VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVES WERE OPEN AT TIME OF FAILURE AND IF THE VALVES ARE NOT COMMANDED CLOSED SINCE FAILURE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/22/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1582	ABORT:	3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K19; K21

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 3 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 3 ISOL VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO CLOSE, BUT WILL NOT DAMAGE VALVE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 3/4/5 A OR B.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1583

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K18; K20

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 3 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 3 ISOL VALVES". THE VALVES WILL REMAIN CLOSED ONLY IF THE VALVES WERE CLOSED AT TIME OF FAILURE AND IF NOT COMMANDED OPENED SINCE FAILURE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 3/4/5 A OR B.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 1584 ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 3, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K18; K20

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 3 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 3 ISOL VALVE". ROUTES REVERSE (CLOSING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO OPEN, BUT WILL NOT DAMAGE VALVE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1585

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [F] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K23; K25

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 4 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 4 ISOL VALVE". THIS VALVE WILL REMAIN OPEN ONLY IF THE VALVES WERE OPEN AT TIME OF FAILURE AND IF THE VALVES ARE NOT COMMANDED CLOSED SINCE FAILURE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1586

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K23; K25

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 4 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 4 ISOL VALVE". ROUTES FORWARD (OPENING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO CLOSE, BUT WILL NOT DAMAGE VALVE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 3/4/5 A OR B.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/22/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1587	ABORT:	3/3

ITEM: RELAY
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K22; K24

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 4 ISOL SWITCH" TO CLOSE THE "OX & FU MANIF 4 ISOL VALVES". THE VALVES WILL REMAIN CLOSED ONLY IF THE VALVES WERE CLOSED AT TIME OF FAILURE AND IF NOT COMMANDED OPENED SINCE FAILURE. EFFECTS ARE THE SAME AS VALVES FAIL TO CLOSE CASE. HOWEVER, PROPELLANT CAN BE ISOLATED FROM THRUSTERS BY THE TANK ISOLATION VALVE 3/4/5 A OR B.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/22/87
SUBSYSTEM: ARCS
MDAC ID: 1588

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R
ABORT: 1/1

ITEM: RELAY
FAILURE MODE: FAILS HIGH

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) MANIFOLD 4, L/R OX & FU ISOL VLVS
5) RELAY
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	3/2R
ONORBIT:	3/2R	AOA:	3/2R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116K22; K24

CAUSES: CONTAMINATION, VIBRATION, PIECE PART FAILURE, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY OF GPC AND "AFT L/R RCS MANIF 4 ISOL SWITCH" TO OPEN THE "OX & FU MANIF 4 ISOL VALVE". ROUTES REVERSE (CLOSING) POWER TO VALVE MOTORS WHILE UNCOMMANDED, AND NO POWER WHILE COMMANDED TO OPEN, BUT WILL NOT DAMAGE VALVE. EFFECT WOULD BE THE SAME AS VALVES FAIL TO OPEN CASE. DURING ENTRY, THIS CASE MAY RESULT IN AFFECTING ENTRY DTOs AND PTIs. DURING RTLS, JETS ON OTHER MANIFOLDS FIRING IN THE SAME DIRECTION AS THOSE ON THIS MANIFOLD ARE NOT CONSIDERED TO BE REDUNDANT, SINCE LOSS OF THE 3 PRIMARY JETS ON THIS MANIFOLD MAY CAUSE INABILITY TO EXPELL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS AND/OR CG SAFETY BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1589

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 12K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 12K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J3-99; J3-71

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFFECT TALKBACK FOR THE "OX TK ISOL 1/2 VALVE" IN OPEN POSITION. LOSE VOLTAGE DIVISION TO MDM FA1, SO PROVIDES FULL (0 TO 28 VDC) INSTEAD OF HALF (0 TO 14 VDC) VOLTAGE RANGE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

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INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1590	ABORT:	3/3

ITEM: RESISTOR, 12K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 12K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J3-99; J3-71

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "OX TK ISOL 1/2 VALVE" IN OPENED POSITION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1591

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J3-99; J3-71

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "OX TK ISOL 1/2 VALVE" IN OPENED POSITION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1592	ABORT:	3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J3-99; J3-71

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFFECT TALKBACK FOR THE "OX TK ISOL 1/2 VALVE" IN OPEN POSITION. LOSE VOLTAGE DIVISION TO MDM FA1, SO PROVIDES FULL (0 TO 28 VDC) INSTEAD OF HALF (0 TO 14 VDC) VOLTAGE RANGE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1593

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-61; J5-16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO STOP THE "OX & FU ISOL 1/2 VALVE" MOTORS WHEN VALVE REACHES OPEN OR CLOSED POSITION. POWER TO MOTORS CONTINUES UNTIL "AFT L RCS TK ISOL 1/2 SWITCH" IS MOVED TO ITS GPC POSITION, IF NOT THERE ALREADY, OR GPC CLOSE OR OPEN VALVE COMMANDS END. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT. ALSO LOSE THE TWO "OX ISOL VALVE" POSITION TALKBACKS AND BARBERPOLE INDICATOR WILL BE STUCK ON BARBERPOLE INDICATION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1594 ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-61; J5-16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1595 ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-52; J5-17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO STOP THE "OX ISOL 1/2 VALVE" MOTORS WHEN VALVE REACHES OPEN POSITION. POWER TO MOTORS CONTINUES UNTIL "AFT L/R RCS TK ISOL 1/2 SWITCH" IS MOVED TO ITS GPC POSITION, IF NOT THERE ALREADY, OR GPC OPEN OR CLOSE VALVE COMMANDS END. PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT. ALSO BARBERPOLE INDICATOR WILL BE STUCK ON BARBERPOLE INDICATION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1596

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-52; J5-17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1597

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-28; J5-57

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR "AFT L/R RCS TK ISOL 1/2 SWITCH" IN OPEN POSITION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1598

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-28; J5-57

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1599

HIGHEST CRITICALITY	HDW/FUNC
FLIGHT:	3/3
ABORT:	3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-51; J5-18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO STOP THE "FU ISOL 1/2 VALVE" MOTORS WHEN VALVE REACHES OPEN POSITION. POWER TO MOTORS CONTINUES UNTIL "AFT L/R RCS TK ISOL 1/2 SWITCH" IS MOVED TO ITS GPC POSITION, IF NOT THERE ALREADY, OR GPC OPEN VALVE COMMANDS END.
PROLONGED POWER TO VALVE MOTOR WILL NOT DAMAGE IT. ALSO BARBERPOLE INDICATOR WILL BE STUCK ON BARBERPOLE INDICATION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1600 ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 1.2K 2W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-51; J5-18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECT. TALKBACK IS STILL AVAILABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87
SUBSYSTEM: ARCS
MDAC ID: 1601

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-27; J5-13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR "AFT L RCS TK ISOL 1/2 SWITCH" IN CLOSED POSITION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1602 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J2-27; J5-13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
NO EFFECTS. TALKBACK IS STILL AVAILABLE TO GPC.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1603	ABORT:	3/3

ITEM: RESISTOR, 12K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 12K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J3-109; J3-122

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFFECT TALKBACK FOR THE "FU TK ISOL 1/2 VALVE" IN OPEN POSITION. LOSE VOLTAGE DIVISION TO MDM FA1, SO PROVIDES FULL (0 TO 28 VDC) INSTEAD OF HALF (0 TO 14 VDC) VOLTAGE RANGE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1604 ABORT: 3/3

ITEM: RESISTOR, 12K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 12K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J3-109; J3-122

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "FU TK ISOL 1/2 VALVE" IN OPENED POSITION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:	1/19/87	HIGHEST CRITICALITY	HDW/FUNC
SUBSYSTEM:	ARCS	FLIGHT:	3/3
MDAC ID:	1605	ABORT:	3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS OPEN

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J3-109; J3-122

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE TALKBACK FOR THE "FU TK ISOL 1/2 VALVE" IN OPENED POSITION.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 1/19/87 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 1606 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W
FAILURE MODE: FAILS SHORT

LEAD ANALYST: W.A. HAUFLER SUBSYS LEAD: D.J. PAUL

BREAKDOWN HIERARCHY:
1) ELECTRICAL COMPONENTS
2) CONTROLS
3) PROP STOR & DIST SUBSYSTEM
4) L/R OX & FU TK ISOL VLV 1/2
5) RESISTOR, 5.1K 1/4W
6)
7)
8)
9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3
PART NUMBER: 56V76A116R J3-109; J3-122

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
AFFECT TALKBACK FOR THE "FU TK ISOL 1/2 VALVE" IN OPEN POSITION. LOSE VOLTAGE DIVISION TO MDM FA1, SO PROVIDES FULL (0 TO 28 VDC) INSTEAD OF HALF (0 TO 14 VDC) VOLTAGE RANGE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

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