CRITICAL ITEMS LIST (CIL)

SYSTEM:	Pressure Vessels	FUNCTIONAL CRIT:	1
SUBSYSTEM:	LO2 Tank	PHASE(S):	a, b
REV & DATE:	J, 12-19-97	HAZARD REF:	S.02, S.07, S.08
DCN & DATE:			
ANALYSTS:	M. Quiggle/R. Lauto		

FAILURE MODE: Leakage

FAILURE EFFECT: a,b) Loss of mission and vehicle/crew due to fire/explosion.

TIME TO EFFECT: Seconds

FAILURE CAUSE(S):
- A: Structural Failure of Plates
- B: Structural Failure of Forgings
- C: Structural Failure of Extrusions
- D: Structural Failure of Welds

REDUNDANCY SCREENS: Not Applicable

FUNCTIONAL DESCRIPTION: Contains the LO2 Oxidizer for the SSME's.

FMEA ITEM CODE(S)	PART NO.	PART NAME	QTY	EFFECTIVITY
6.1.1.1	80902000000-029	LO2 Tank Complete	1	LWT-54 thru 88

REMARKS: Retention rationale for FMEA Item Codes 6.1.1.1 and 6.1.1.2 is the same.

CRITICAL ITEMS LIST (CIL)

SYSTEM:	Pressure Vessels	FUNCTIONAL CRIT:	1
SUBSYSTEM:	LO2 Tank	PHASE(S):	a, b, c
REV & DATE:	J, 12-19-97	HAZARD REF:	S.02, S.08
DCN & DATE:			
ANALYSTS:	M. Quiggle/R. Lauto		

FAILURE MODE: Burst

FAILURE EFFECT: a,b) Loss of mission and vehicle/crew due to structural failure or fire/explosion.
c) Loss of mission and vehicle/crew due to Orbiter/ET collision.
Loss of life due to ET impacting outside designated footprint.

TIME TO EFFECT: Seconds

FAILURE CAUSE(S): A: Structural Failure of Plates
B: Structural Failure of Forgings
C: Structural Failure of Extrusions
D: Structural Failure of Welds

REDUNDANCY SCREENS: Not Applicable

FUNCTIONAL DESCRIPTION: Contains the LO2 Oxidizer for the SSME's.

FMEA ITEM CODE(S)	PART NO.	PART NAME	QTY	EFFECTIVITY
6.1.1.2	809020000000-029	LO2 Tank Complete	1	LWT-54 thru 88

REMARKS: Retention rationale for FMEA Item Codes 6.1.1.1 and 6.1.1.2 is the same.

SYSTEM:	Pressure Vessels	REV & DATE:	J, 12-19-97
SUBSYSTEM:	LO2 Tank	DCN & DATE:	
FMEA ITEM CODE(S):	6.1.1.1, 6.1.1.2		

RATIONALE FOR RETENTION

DESIGN:

The Liquid Oxygen (LO2) tank is a thin-wall fusion welded aluminum monocoque shell and is designed as a safe life structure. Structural integrity is assured by the fracture control plan (MMC-ET-SE13). Materials and processes are selected in accordance with MMC-ET-SE16, which assures repetitive conformance of composition and properties. The LO2 tank is designed to a required yield safety factor of 1.10 for all loads and ultimate safety factor of 1.25 for well-defined loads (i.e. thrust, inertia from thrust, dead weight, and ullage pressure) and 1.40 for other loads (i.e. thermal, aerodynamic, and dynamic transients). However, from External Tank (ET)/Orbiter separation through Main Engine Cut-Off (MECO) +225 seconds, the assembly is designed to a required ultimate safety factor of 1.00 for all loads. Tank strength analysis is based on minimum drawing thicknesses. (Reference ET Stress Report 826-2188).

A: There are eight forward and twelve aft ogive gores. The gores are stretch-formed per STP1002 to the required radius of 612.0 inches. Heat-treatment to 2219-T87 condition is followed by chem-milling per STP5014 on both sides to the required thicknesses. One forward and one aft ogive gore have locally thickened skin pads for the attachment of exterior support brackets for the Gaseous Oxygen (GO2) pressurization line and electrical cable tray. The skin pads on the forward ogive gore also provide for attachment of interior supports for the tumble system lance. Primary and secondary weld lands are configured to minimize discontinuity stresses. The ogive gores are edge trimmed during assembly.

The forward ogive cover plate is 2219-T87 aluminum and serves as a removable bulkhead for the LO2 tank. The cover plate incorporates integrally machined stiffeners and provides a location for mounting propulsion/electrical system components. Threaded inserts and bolts are installed in the cover plate per STP2024 and STP2014 respectively.

The four 2219-T87 aluminum barrel panels are formed per STP1002 to the required radius of 165.5 inches. This is followed by chem-milling per STP5014 on both sides to the required thicknesses. One barrel panel has locally thickened skin pads for the attachment of exterior support brackets for the GO2 pressurization line and electrical cable tray. Primary and secondary weld lands are configured to minimize discontinuity stresses. The barrel panels are edge trimmed during assembly.

The twelve dome gores are stretch-formed per STP1002 to the required 0.75 height-to-radius ellipsoidal shape. Heat-treatment to 2219-T87 condition is followed by chem-milling per STP5014 on both sides to the required thicknesses. Primary and secondary weld lands are configured to minimize discontinuity stresses. The dome gores are edge trimmed during assembly.

The spherical dome cap is 140.0 inches in diameter and is spin-formed per STP1005. Heat-treatment to 2219-T87 condition is followed by chem-milling per STP5014 on both sides to the required thicknesses. Cutouts are provided for the suction fitting, manhole fitting, and an electrical feedthru connector. Primary and secondary weld lands are configured to minimize discontinuity stresses. The dome cap is edge trimmed during assembly.

The manhole fitting is 45.0 inches in diameter and is machined from 2219-T87 aluminum plate. The fitting provides a 38.0 inch diameter clear access to the tank interior. The manhole fitting is edge trimmed during assembly. Threaded inserts and bolts are installed in the manhole fitting per STP2024 and STP2014 respectively.

The manhole cover is machined from 2219-T87 aluminum plate. The manhole cover provides a closure for and a sealing surface with the manhole fitting. Both the manhole cover and the manhole fitting have two holes that are diametrically opposite each other. One hole in the manhole cover and the hole diametrically opposite on the manhole fitting each have roll pins installed. This precludes the possibility of interchanging the LO2 and Liquid Hydrogen (LH2) manhole covers. Threaded inserts and bolts are installed in the manhole cover per STP2024 and STP2014 respectively.

SYSTEM:	Pressure Vessels	REV & DATE:	J, 12-19-97
SUBSYSTEM:	LO2 Tank	DCN & DATE:	002, 2-28-99
FMEA ITEM CODE(S):	6.1.1.1, 6.1.1.2		

RATIONALE FOR RETENTION

DESIGN: (cont)

B: The forward ogive ring is a machined 2219-T6 aluminum forging. It provides the cover plate mating and sealing surface and the nose cone mounting surface. The forward ogive ring contains a penetration for an electrical feedthru connector and a penetration and mounting provisions for the tumble valve and lance. The forward ogive ring is edge trimmed during assembly. Threaded inserts and bolts are installed in the forward ogive ring per STP2024 and STP2014 respectively.

The dome suction fitting is a machined 2219-T6 aluminum forging. It has a 64.0 inch overall diameter at the tank wall interface and a 17.0 inch inside diameter at the LO2 feedline interface. The suction fitting provides the internal mounting surface for the vortex baffle and the screen. The suction fitting is edge trimmed during assembly. Threaded inserts and bolts are installed in the dome suction fitting per STP2024 and STP2014 respectively.

C: The T-ring is made up of four extrusions formed per STP1002 to the required radius of 165.5 inches. For LWT-54 thru 85, there are four 2L2008 extrusions, and for LWT-86 thru 88 there are four 2L2092 extrusions. Heat-treatment to 2219-T8511 condition is followed by machining. The T-ring is located between the aft ogive and the barrel assemblies. It forms both a portion of the LO2 tank wall and the outer chord for the Station 745 frame.

The dome ring is made up of four extrusions formed per STP1002 to the required radius of 165.5 inches. For LWT-54 thru 85, there are four 2L8001 extrusions, and for LWT-86 thru 88 there are four 2L8013 extrusions. Heat-treatment to 2219-T8511 condition is followed by machining. The dome ring is located between the barrel and the dome assemblies. It forms a portion of the LO2 tank wall, the outer chord for the Station 851 frame, and the interface flange to mate the LO2 tank/Intertank.

D: The LO2 tank welds are designed to a safe life criterion. This assures that failure will not occur from flaw propagation in the expected operating environment during the required life of the vehicle. The welds are designed to two criteria: 1) allowable weld grades, and 2) allowable ultimate strength.

1) The leak-burst fracture stress is the stress level above which a flaw reaches critical flaw size prior to stable growth through the weld thickness. Below this stress level, the flaw would propagate in a stable manner through the weld thickness and leak LO2/GO2 prior to catastrophic failure. An objective was to design all welds to leak before burst. All welds met this objective except the OT, OB, and DAF welds, which are classified as burst welds.

2) The allowable weld grades limit the allowable flaw size to one-half of the critical flaw size for a given weld stress, weld land thickness, and operating temperature.

3) The ultimate strength analysis establishes the limitations of combined peaking and mismatch weld land misalignments, so that required weld grades and required ultimate safety factors are maintained.

Four types of welding are utilized on the LO2 tank: Tungsten Inert Gas (TIG) butt welds, TIG fillet welds, Variable Polarity Plasma Arc (VPPA) butt welds, and TIG spot welds. The requirements for these welds are controlled by STP5501, STP5506, and STP5503 respectively. To assure structural integrity, a visual examination and a nondestructive examination (NDE), dye penetrant examination of all welds and radiographic examination of all welds except TIG spot welds, is performed prior to the acceptance test.

CRITICAL ITEMS LIST (CIL)
CONTINUATION SHEET

SYSTEM:	Pressure Vessels	REV & DATE:	J, 12-19-97
SUBSYSTEM:	LO2 Tank	DCN & DATE:	
FMEA ITEM CODE(S):	6.1.1.1, 6.1.1.2		

RATIONALE FOR RETENTION

TEST:

The LO2 Tank Complete is certified. Reference HCS MMC-ET-TM08-L-5146.

Verification:

A-D: "Structural Strength and LO2 Tank Modal Survey STA Major Ground Tests" (Reference ET Test Report MMC-ET-TM03, Vol. IV).

The structural integrity of the Lightweight Tank (LWT) LO2 tank was verified by similarity to the Standard Weight Tank (SWT) LO2 tank and by structural analysis. This approach is a direct result of the Structural Test Article (STA) test program having successfully verified the structural integrity of the SWT LO2 tank as a pressure vessel and having successfully validated the structural analysis techniques.

The STA test program: 1) verified the structural integrity of the SWT LO2 tank as a pressure vessel for the critical design loads and internal pressure loads, 2) verified the validity of the assumptions, methods, and computer modeling techniques utilized for the structural analysis, and 3) provided a database relative to weight optimization and upgraded vehicle performance. The test program was successful in that no detrimental deformation of the LO2 tank at yield load occurred and no collapse or rupture at ultimate load was predicted. The ultimate load capability was conservatively verified by linearly extrapolating the proof/yield test to ultimate.

The SWT LO2 tank STA consisted of four components: LO2 tank, Intertank, LH2 tank simulator, and lower load ring. The SWT LO2 tank was structurally tested in compliance with the Test Requirements Document, MMC-ET-TM07. Volume IV of MMC-ET-TM03 describes the various tests performed and is augmented by Supplements A and B. The tests were conducted at room temperature, which necessitated the reduction of test load and internal pressure load requirements to compensate for the difference in material properties exhibited at -297°F and room temperature.

Supplement A documents the verification of those areas of the SWT LO2 tank which are tension critical due to design load and internal pressure load requirements. There were three areas: the OAF weld, the OAL weld, and the cable tray pad regions.

Supplement B documents the verification of those areas of the SWT LO2 tank which are tension critical due to proof and design internal pressure load requirements only.

Development:

A: "Evaluation of Cleaning and Conversion Coating of 2219-T87" (Ref. Document No. 826-2130).

This program was undertaken to establish process parameters and acceptance criteria for the chem-film process.

The effects of forming techniques, soiling, aging, cleaning solutions, and high temperature Thermal Protection System (TPS) curing on the corrosion resistance and adhesion properties of the chem-film, Spray On Foam Insulation (SOFI) primer, and the SOFI/Super Light Ablator (SLA) composites were evaluated. The results of this program were incorporated into STP3001 and STP5009.

SYSTEM:	Pressure Vessels	REV & DATE:	J, 12-19-97
SUBSYSTEM:	LO2 Tank	DCN & DATE:	
FMEA ITEM CODE(S):	6.1.1.1, 6.1.1.2		

RATIONALE FOR RETENTION

TEST: (cont)

D: "Evaluation of 2219 Welds" (Ref. Document No. 826-2023).

This program was undertaken to establish design allowables for 2219 TIG welds in 2219-T87 sheet/plate.

The effect of weld repairing and other manufacturing discrepancies were evaluated. This was accomplished by using 3-repair-welded, mismatch, and peaking specimens. Automatic and manual repair methods were evaluated. The effects of mismatch and peaking on tensile strength were evaluated and acceptance criteria and weld allowables were established. The results of this program were incorporated into STP5501 and Engineering drawing 80900000060.

D: "Fracture Mechanics Data on 2219-T87 Aluminum for the Space Shuttle External Tank" (Ref. Document No. 826-2027).

This program was undertaken to establish fracture mechanics data for 2219-T87 aluminum base-metal, as-welded, and repair-welded material.

Fracture toughness, proof cycle flaw growth, and simulated service useful life tests were conducted in this evaluation. The results of this program were incorporated into STP5501 and Engineering drawing 80900000060.

D: "Variable Polarity Plasma Arc Welding Process: Design Allowables Program for Weldment Strengths" (Ref. Document No. 826-2306).

This program was undertaken to establish design allowables for 2219 VPPA welds in 2219-T87 sheet/plate.

The effect of weld repairing and other manufacturing discrepancies were evaluated. This was accomplished by using 3-repair-welded, mismatch, and peaking specimens. Manual repair methods were evaluated. The effects of mismatch and peaking on tensile strength were evaluated and acceptance criteria and weld allowables were established. The results of this program were incorporated into STP5506 and Engineering drawing 80900000060.

D: "Variable Polarity Plasma Arc Welding: Fracture Mechanics Data for 2219-T87 Aluminum Welds" (Ref. Document No. 826-2375).

This program was undertaken to establish fracture mechanics data for 2219-T87 as-welded material.

Fracture toughness tests were conducted in this evaluation. The results of this program were incorporated into STP5506 and Engineering drawing 80900000060.

D: "Investigation into Effect of Peaking and Mismatch Misalignments on 2219 Aluminum TIG and VPPA Strength Properties" (Ref. Document No. 826-2312).

This program was undertaken to extend the limits of the established peaking and mismatch weld land misalignments as established by the "Evaluation of 2219 Welds" (Ref. Document No. 826-2023) and "Variable Polarity Plasma Arc Welding Process: Design Allowables Program for Weldment Strengths" (Ref. Document No. 826-2306). The results of this program were incorporated into STP5501, STP5506, and Engineering drawing 80900000060.

SYSTEM:	Pressure Vessels	REV & DATE:	J, 12-19-97
SUBSYSTEM:	LO2 Tank	DCN & DATE:	
FMEA ITEM CODE(S):	6.1.1.1, 6.1.1.2		

RATIONALE FOR RETENTION

TEST: (cont)

Acceptance:

MAF:

A-D: Perform LO2 tank proof test to verify structural integrity and ultimate cycle life (MMC-ET-TM04k).

The required proof stress is equal to the flight limit stress multiplied by the proof factor at the proof test temperature. This proof factor is equal to the fracture toughness of the material at the proof test temperature divided by the fracture toughness of the material at the use temperature times the proof factor at the use temperature.

The result of enveloping the required proof stresses establishes that the proof pressure requirements are dictated by the required pressures at Station 852.55 and Station 963.175. Water, plus an external vacuum on the dome are used to pressurize the tank. The proof pressure requirements do not result in detrimental yielding of the LO2 tank.

Test covers for both the forward ogive cover plate and manhole cover are substituted for the flight covers for the proof test. The test covers have the same elastic properties and the same equivalent stiffness as the flight covers. The flight covers are proof tested separately to facilitate manufacturing.

A: A forward ogive gore, an aft ogive gore, and a barrel panel (Ref. Engineering drawings 80912100006, 80912200001, and 80912400002 respectively) are inadequately proofed in the vicinity of the cable tray pad regions, since the mechanical loads are not applied. Also, the barrel panels (Ref. Engineering drawings 80912400001 and 80912400002) and dome gores (Ref. Engineering drawing 80912660001) are inadequately proofed in the vicinity of Station 852.55 due to the difference in LO2 tank support configuration for proof test and flight. To assure structural integrity, a NDE (penetrant evaluation) is performed on these plates.

D: The Bracket (OFL) and Clip (OAC) welds are unproofed, since the mechanical loads are not applied. Structural integrity is assured by radiographic and penetrant examinations for the OFL welds and by penetrant examination for the OAC welds (STP5501 and STP5503).

The O8 welds in the vicinity of Station 852.55, (LWT-54 thru 58 Only), the O5 weld in the vicinity of the ±Z, (all effectivities), and the OAF welds (LWT-54 thru 58 Only) are inadequately proofed due to the difference in LO2 tank support configuration for proof test and flight. To assure structural integrity an additional NDE (radiographic evaluation) is performed on the inadequately proofed welds of LWT-54 thru 88 after proof testing.

D: Perform the LO2 Leak Test to verify structural integrity (MMC-ET-TM04k).

A laminated tape system is applied to the fusion butt welds to detect leaks during the hydrostatic proof test. The system is controlled by STP3502. The laminated system is composed of three layers consisting of a water soluble paper, aluminum foil, and tape. Any leaks would dissolve the water soluble paper, complete an electrical circuit, and produce a voltage indication on the electrical leak detection system.

All detection circuits are continuously monitored during fill, proof, and drain operations. No leaks are permitted.

CRITICAL ITEMS LIST (CIL)
CONTINUATION SHEET

SYSTEM:	Pressure Vessels	REV & DATE:	J, 12-19-97
SUBSYSTEM:	LO2 Tank	DCN & DATE:	
FMEA ITEM CODE(S):	6.1.1.1, 6.1.1.2		

RATIONALE FOR RETENTION

INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

A: Verify material selection and verification controls (MMC-ET-SE16, QQ-A-250/30 and STM1701).

A: Verify heat-treatment of the following parts to 2219-T87 (MIL-H-6088).

Forward Ogive Gores	Aft Ogive Gores	Dome Gore
80912100003	80912200001	80912660001
80912100004	80912200002	
80912100005	80912200003	Dome Cap
80912100006		80912650001

Cover Plate - Tumble Valve (LWT-58 thru 67)
80921021068

A: Inspect part number applied to the following parts (Engineering drawing).

Forward Ogive Gores	Aft Ogive Gores	Barrel Panels
80912100003	80912200001	80912400001
80912100004	80912200002	80912400002
80912100005	80912200003	
80912100006		

A-C: Inspect penetrant examination of the following parts (STP2501, Type 1, Method A).

Forward Ogive Gore	Aft Ogive Gore	T-Ring Segment
80912100006	80912200001	80912300001
Barrel Panels	**Dome Gore**	**Dome Ring Segment**
80912400001	80912660001	80912640001
80912400002		
Feedthru Plate	**Manhole Fitting**	**Suction Fitting**
80934003726	80912650002	80912630001

Cover Plate - Tumble Valve (LWT-58 thru 67)
80921021068

A-C: Inspect dimensions of the following parts (Engineering drawing).

Forward Ogive Gores	Aft Ogive Gores	Barrel Panels
80912100003	80912200001	80912400001
80912100004	80912200002	80912400002
80912100005	80912200003	
80912100006		
Manhole Fitting	**Feedthru Plate**	**T-Ring Segment**
80912650002	80934003726	80912300001
Dome Gore	**Dome Cap**	**Dome Ring Segment**
80912660001	80912650001	80912640001
Suction Fitting	**Cover Plate - Tumble Valve (LWT-58 thru 67)**	
80912630001	80921021068	

B: Verify material selections and verification controls (MMC-ET-SE16, STH-0-250 and STM5163).

SYSTEM: Pressure Vessels
SUBSYSTEM: LO2 Tank
FMEA ITEM CODE(S): 6.1.1.1, 6.1.1.2

REV & DATE: J, 12-19-97
DCN & DATE:

RATIONALE FOR RETENTION

INSPECTION: (cont)

C: Verify material selections and verification controls (MMC-ET-SE16 and STM3120, Class 1).

A-C: Verify ultrasonic examination of the following parts (STP2505, Class B).

T-Ring Segment	Suction Fitting	Cover Plate - Tumble Valve (LWT-58 thru 67)
80912300001 (2L2008 only)	82612210010	80921021068

C: Verify heat-treatment of the following parts to 2219-T8511 (MIL-H-6088).

T-Ring Segment	Dome Ring Segment
80912300001	80912640001

A: Verify epoxy primer applied to the following parts (STP3003, Type 1 and Engineering drawing).

Feedthru Plate	Cover Plate - Tumble Valve (LWT-58 thru 67)
80934003726	80921021068

A: Verify chemical film applied to the following parts (STP3001, Class 1A and Engineering drawing).

Feedthru Plate	Cover Plate - Tumble Valve (LWT-58 thru 67)
80934003726	80921021068

B: Inspect hole dimensions for inserts on the following parts (STP2024 and Engineering drawing).

Suction Fitting
80912630001

Lockheed Martin Procurement Quality Representative:

A: Witness proof test of the following part (Engineering drawing).

Feedthru Plate	Cover Plate - Tumble Valve (LWT-58 thru 67)
80934003726	80921021068

A: Inspect axis orientation markings and/or direction orientation markings applied to the following assembly (Engineering drawing)

Barrel Panel
80912400002

MAF Quality Inspection:

A: Verify material selection and verification controls (MMC-ET-SE16, QQ-A-250/30 and STM1701).

Forward Ogive Cover Plate	Manhole Cover
80911001207	80911001205

A: Inspect axis orientation markings and/or direction orientation markings applied to the following assemblies (Engineering drawing).

Forward Ogive Assy	Aft Ogive Assy	T-Ring Assy
80912100000	80912200001	80912300000

Dome Assy
80912651100

A: Inspect orientation of welded parts in the following assemblies (Engineering drawing).

Forward Ogive Assy	Aft Ogive Assy	Barrel Assy
80912001100 80912100000	80912200000	80912400000

Ogive and Barrel Assy	LO2 Tank Assy
80912090000	80912000100

SYSTEM:	Pressure Vessels	REV & DATE:	J, 12-19-97
SUBSYSTEM:	LO2 Tank	DCN & DATE:	001, 6-15-98
FMEA ITEM CODE(S):	6.1.1.1, 6.1.1.2		

RATIONALE FOR RETENTION

INSPECTION: (cont)

A: Verify cleaning of the following parts (STP5008 and Engineering drawing).

Forward Ogive Cover Plate	Manhole Cover	Feedthru Plate
80911001207	80911001205	80934003709

A: Verify epoxy primer applied to the following parts (STP3003, Type 1 and Engineering drawing).

Forward Ogive Cover Plate	Manhole Cover
80911001207	80911001205

A, B: Inspect dimensions of the following parts (Engineering drawing).

Forward Ogive Cover Plate	Manhole Fitting	Manhole Cover
80911001207	80912610000	80911001205

Forward Ogive Fitting
80912100001

A, B: Inspect hole dimensions for inserts on the following parts (STP2024 and Engineering drawing).

Manhole Cover	Manhole Fitting	Forward Ogive Fitting
80911001205	80912610000	80912100001

Forward Ogive Cover Plate
80911001207

A, B: Inspect installation of bolts in the following parts (STP2014 and Engineering drawing).

Forward Ogive Cover Plate	Forward Ogive Fitting	Manhole Fitting
80911001207	80911001200	80911001204
80921021009	80911001206	
80921021039	80911001220	
80921021045	80911041200 (LWT-54 thru 80, 82-84)	
80921061009	80921021009	Suction Fitting
80931003729	80921061009	80912651100
	80931003719	80922011900
	80911041230 (LWT-81, 85-88)	

A-C: Inspect penetrant examination of the following parts (STP2501, Type 1, Method A).

Forward Ogive Cover Plate	Forward Ogive Fitting	Manhole Cover
80911001207	80912100001	80911001205

Dome Ring
80912641100

A: Inspect weld land widths of the following assemblies (Engineering drawing).

Forward Ogive Assy	Aft Ogive Assy	Dome Assy
80912100000	80912200000	80912600000
80912101000	80912201000	80912620000
		80912630000
Barrel Assy		80912640000
80912400000		80912650000
		80912660000
		80912670000

SYSTEM: Pressure Vessels
SUBSYSTEM: LO2 Tank
FMEA ITEM CODE(S): 6.1.1.1, 6.1.1.2

REV & DATE: J, 12-19-97
DCN & DATE:

RATIONALE FOR RETENTION

INSPECTION: (cont)

A-D: Inspect Proof Test and Leak Test (MMC-ET-IM04k).

A-D: Verify cleaning and chemical film applied to the following assembly (STP5009 and Engineering drawing).

LO2 Tank Complete
80912005000
80912015000

A-D: Verify chemical film applied to the following parts (STP3001, Class 1A and Engineering drawing).

Forward Ogive Cover Plate
80911001207

Forward Ogive Fitting
80912100001

Manhole Fitting
80912610000

Manhole Cover
80911001205

A-D: Verify epoxy primer applied to the following assembly (STP3004 and Engineering drawing).

LO2 Tank Complete
80912005000

D: Inspect the 2319 Aluminum Weld Wire/Rod (MMS-Y-469) for conformance to material specification and packaging (MMC-ET-SE16 and STM-Y-469).

D: Inspect the dimensions and conformance to weld grade of the following assemblies (Engineering drawing).

(Reference the following STPs for welding and acceptance requirements: STP5501 for TIG weld, STP5503 for TIG spot weld, and STP5506 for VPPA weld).

Forward Ogive Assy
80912100000
80912101000
80912001100

Aft Ogive Assy
80912200000
80912001100

Dome Assy
80912600000
80912620000
80912630000
80912640000
80912650000
80912660000
80912670000

T-Ring Assy
80912300000

Barrel Assy
80912400000
80912001100

LO2 Tank Assy
80912090000
80912000100

D: Inspect post proof inspection (Engineering drawing):

LO2 Post Proof Inspection -
80912004000

FAILURE HISTORY:

Current data on test failures, unexplained anomalies and other failures experienced during ground processing activity can be found in the PRACA data base.