FLIGHT READINESS STATEMENT
STS-87/ET-89
EXTERNAL TANK PROJECT
PRE-FLIGHT REVIEW

EXTERNAL TANK ET-89/STS-87, AS IDENTIFIED IN THE EXTERNAL TANK PROJECT PRE-FLIGHT REVIEW DATED SEPTEMBER 10, 1997, IS CONSIDERED READY TO SUPPORT FLIGHT UPON ACCEPTABLE DISPOSITION OF OPEN/PLANNED WORK AND/OR OPEN ACTIONS.

for E. C. SMITH/EB01

M. A. PESSIN/EE31

A. F. WHITAKER/EH01

For A. O. HARRIS/CR01

for G. R. WALLACE/EL01

W. R. HUMPHRIES/ED01

for S. P. SAUCIER/EP01

M. D. SMILES/CR70

P. V. COUNTS/SA31, CHAIRMAN

September 10, 1997

Space Shuttle
External Tank

STS-87/ET-89
Pre-Flight Review

LOCKHEED MARTIN

Michoud Space Systems

Agenda

• ***Overview***	***Jim Feeley***
• ***Prior Mission Performance Summary***	
• ***Current Mission/External Tank Highlights***	
• ***Changes***	
• Senior Management Review NCDs	Glen Wadge/Wanda Sigur
• SRM&QA Assessment	Terry McKeough
• KSC Processing	Scott Otto
• Verification/Certification	Jim Feeley
• Mission Unique Assessment	
• Readiness Statement	
• Appendices	
- A: Minor Changes	
- B: SRM&QA Assessment	
- C: KSC Processing	
- D: Previously reviewed material	

Overview

- Review covers changes/differences/non-conformances not previously flown and/or reviewed

- This review for STS-87/ET-89 includes:
  - Prior mission performance summary
  - Items specific to mission STS-87
  - Details of previously presented items are included in the Appendix

- **FRR Series**

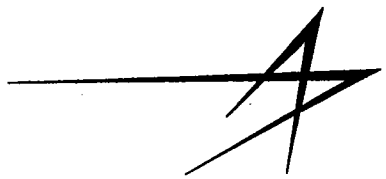
- Pre-flight Review	9/10/97
- ET/SRB Mate	9/16/97
- Space Shuttle Vehicle FRR	11/5/97
- Mission Management Team (L-2 Day)	11/17/97

Prior Mission Performance Summary

STS-85/ET-87, 8/7/97

System	Performance
OMRSD	No violations
LCC	Nominal
Instrumentation	Nominal
MPS	Nominal - First ET flown with 3 baffle configuration on the LO2 tank
ET Hazardous Gas	Nominal
TPS	Nominal
ET disposal	Nominal
Orbiter tile damage	Lower surface, below average • Diameter > 1" = 6 • Total = 37
Post flight photo review	No issues

Mission/External Tank Highlights



Mission

- **Launch**
  - Window
  - Pad
  - Orbiter
  - Orbital inclination
  - ET photo coverage

STS-87
11/19/97
1418 - 1648 EST
B
Columbia (OV-102)
28.45° - Insertion at 150 NM
- Crew photos from cockpit window
- Umbilical well cameras

- **Primary payload**

- USMP-4 (United States Microgravity Payload)
- Spartan 201-4

- **Landing**
  - Time
  - Location

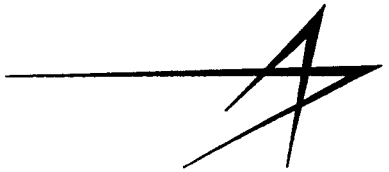
12/6/97
0651 EDT
KSC

External Tank

- DD250 acceptance
- Shipped to launch site

ET-89
6/26/97
7/10/97

Agenda



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Change/Senior Management Review NCDs

Description	Presenter
• **Change**	
- Implement VPPA welds on LH2 tank barrel panels (B01887B/B02005)	Included in Appendix A - Minor Changes
• **Senior Management Review NCDs**	
- LH2 tank forward dome contour deviation (SMR-96-003)	Glen Wadge
- LH2 tank post-proof cracks (SMR-96-006/008)	Wanda Sigur

SMR NCD - LH2 Fwd Dome Contour Deviation

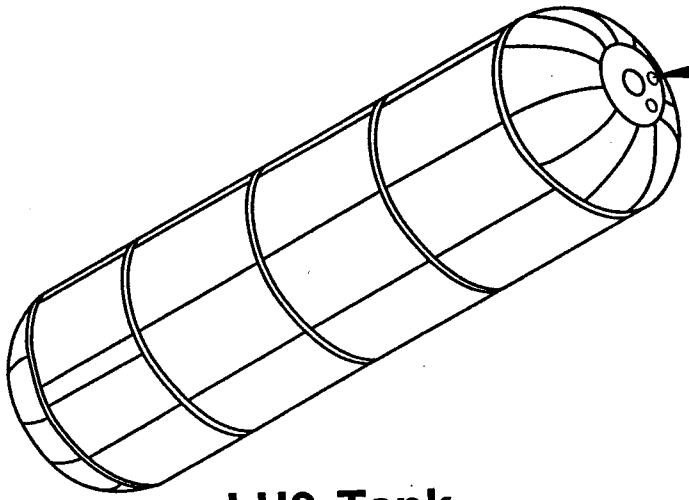
Issue:

- Negative contour deviation exists on LH2 tank forward dome near the intersection of the HFG-5 (Hydrogen Forward Gore) and HFDC (Hydrogen Forward Dome Cap) welds
  - Maximum allowable deviation = ±0.125"
  - Deviation on ET-89 = 0.310"

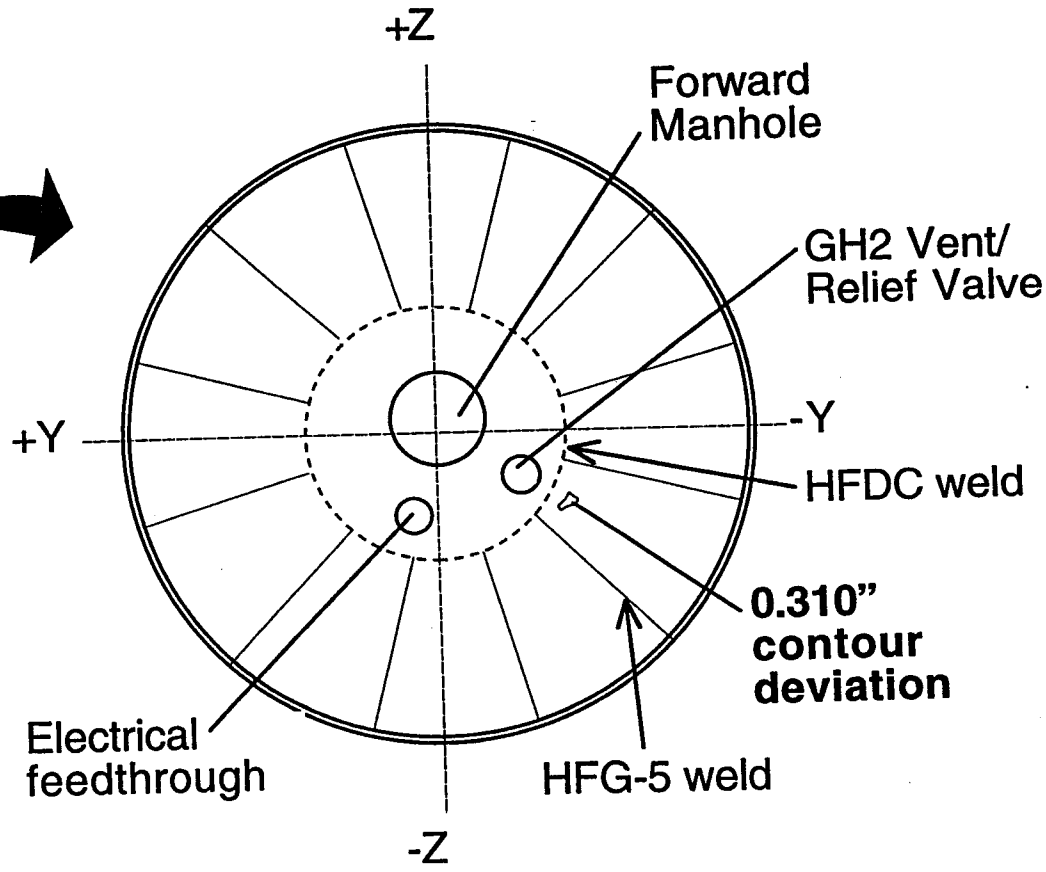
Background:

- During weld of the dome at subassembly level (HFG-5 weld) an unscheduled weld machine tailout resulted in a burn-thru with excessive penetration
  - Multiple heat repairs (R-6) were accomplished
  - Max of 12 planishing passes to improve contour
  - Resulting contour deviation had max depth of 0.250"
    - Contour and weld repairs acceptable by analysis
      - NCD closed
- Dome subsequently welded to LH2 tank
  - Visual observation of dome indicated that contour had changed
  - Re-measurement determined contour deviation increased in size and depth (0.310")
- SMR item because contour was max deviation observed to date

SMR NCD - LH2 Fwd Dome Contour Deviation



LH2 Tank



LH2 Tank Forward Dome

Revised 9/9/9.

SMR NCD - LH2 Fwd Dome Contour Deviation

Cause:

- Initially induced by significant weld repairs to HFG-5 weld
- Contour changed after previous MRB action possibly due to
  - Rounding of dome for mechanical installation
  - Fit up and welding of dome to barrel
  - Orientation of dome from horizontal to vertical

Disposition:

- Use as is

Rationale for Flight:

- Proof test
  - HFG-5 and HFDC welds and membranes are adequately proofed from a fracture basis and proofed to 119% of flight limit load from a strength basis
- Stress analysis
  - Structural: Meets required FS (1.25)
    - Shell
      - Was: 1.46
      - Now: 1.33 (failure mode: ultimate tension)
    - Weld FS
      - Was: 1.79
      - Now: 1.28 (failure mode: ultimate tension)
  - TPS: Meets required FS (1.10)
    - Was: 2.38
    - Now: 1.34 (failure mode: outer fiber strain)
- ET-89 meets all flight requirements

09-10-1997 06:34 5042574405 MAF/MSF

SMR NCD - LH2 Tank Post Proof Cracks

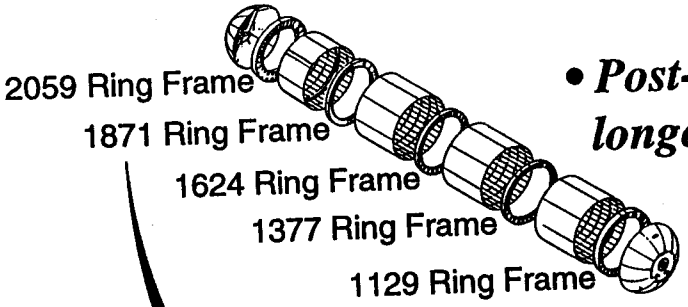
Issue:

- Three cracks were detected by X-ray after initial proof test of the ET-89 LH2 tank
  - Cracks located adjacent to weld in extrusion forward of longerons at Station 1871
  - Crack lengths were 1.0 inch, 0.475 inch and 0.75 inch

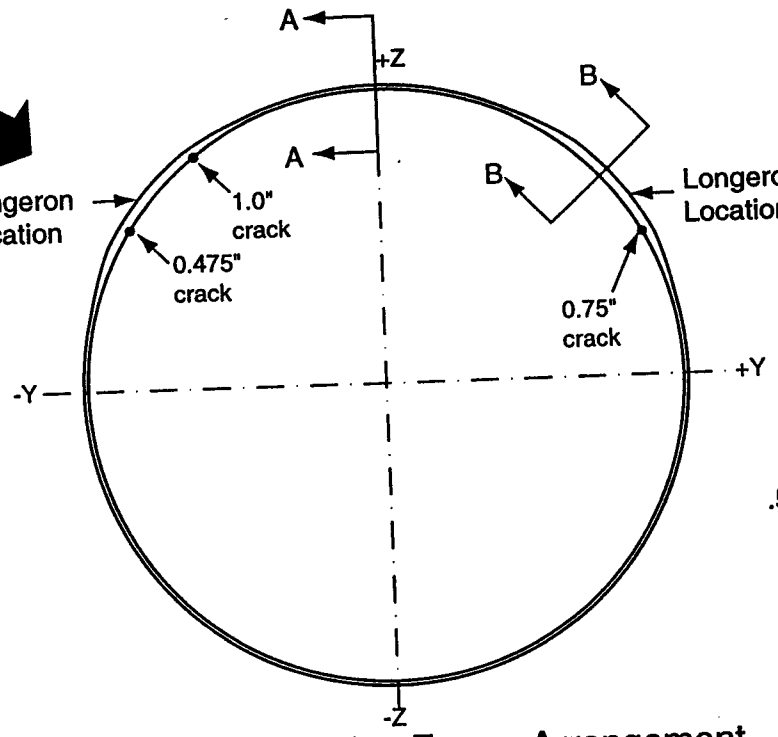
Background:

- Cracks located in extrusion heat affected zone adjacent to initial weld
  - SMR due to first time occurrence
- CAPS/SI initiated fault tree - Investigation indicated root cause of cracking was low material strength due to re-crystallized grain structure
  - Proof test facility integrity verified by instrumentation
  - Parent extrusion strength and integrity verified by test
- Performed complete assessment
  - First use of extrusion "buy" at Station 1871
  - First use of revised tooling for SLWT welding
  - First full use of revised proof test facility
  - First failure of supporting jack stands

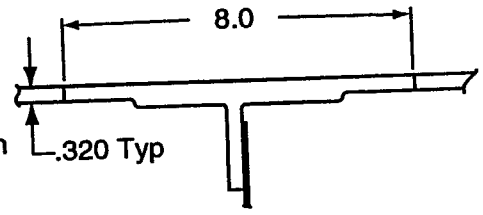
SMR NCD - LH2 Tank Post Proof Cracks



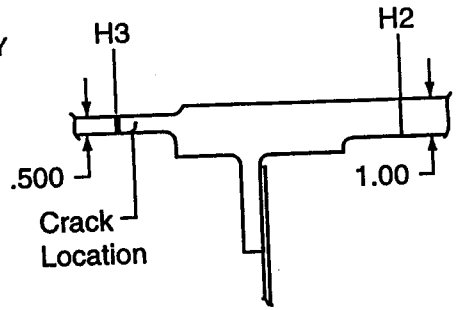
- ***Post-proof cracks were located in the longeron areas of the Station 1871 Chord***



Station 1871 Ring Frame Arrangement



Section A-A
(Typical)



Section B-B
(Longeron Area)

SMR NCD - LH2 Tank Post Proof Cracks

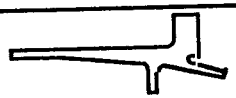
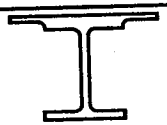
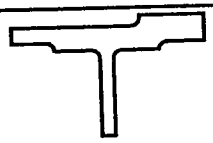
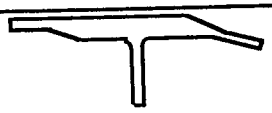
Cause:

- Large re-crystallized grains extended 0.5" to 0.75" from original extruded surface
  - Not completely machined off in manufacture of chord
  - Aggravated by alignment of weld fusion line with natural flow lines of extrusion shape
  - Grains aligned normal to load path
  - Brittle, thickened grain boundary precipitation due to large grain size

Disposition:

- Crack-susceptible microstructure ground out and replaced with weld wire
  - Process fully replaced the extrusion weld heat affected zone
  - Resulting mechanical and fracture properties were typical of allowables established for plate-plate welds
  - Process returned hardware integrity to acceptable levels for proof and flight
- Extensive test program on other extrusions indicated adequate strength at other weld stations
  - Large vertical grain structure not noted
  - Additional post-proof inspections successfully performed to verify integrity

SMR NCD - LH2 Tank Post Proof Cracks

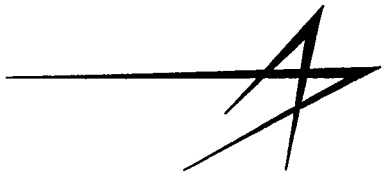
			Ultimate Stress (ksi)			Factor of Safety		
Location	Shape	Weld Code	Flight	Proof	Allowable Stress (ksi)	Required	Actual	Proof Test Demonstrated
744 T-ring		O3 O4	32.75 30.40	24.22 20.03	36.40 36.40	1.32 1.32	1.47 1.58	1.08 1.08
851 Dome Chord		O5 OAF	21.56 30.99	13.60 28.51	36.40 37.70	1.34 1.35	2.26 1.65	1.12 1.31
1129 Dome Chord		HFF H8	30.60 29.56	29.01 24.00	38.00 33.70	1.25 1.27	1.55 1.45	1.18 1.16
1377 & 1624 Frames		H7 H6 H5 H4	31.74 30.98 26.21 28.47	28.08 27.51 20.95 23.01	39.80 39.80 39.80 33.70	1.26 1.26 1.30 1.30	1.58 1.61 1.98 1.53	1.32 1.32 1.22 1.23
1871 Frame Chord		H3 H2	38.10 42.10	28.40 36.70	38.10 42.40	1.26 1.26	1.26 1.27	1.08 1.14
2058 Dome Chord		H1 HAF	36.84 35.81	29.09 29.25	39.80 45.60	1.26 1.29	1.36 1.64	1.14 1.26

SMR NCD - LH2 Tank Post Proof Cracks

Rationale for Flight:

- All extrusion welds have positive margins of safety using
  - "As-built" peaking and mismatch
  - Reduced weld strength from recent test program
  - Allowable methodology 99% reliability/95% confidence per Mil-Hdbk-5F
  - "Enhanced extrusion" weld properties from test program
- Successful proof test of ET-89
  - Post proof x-ray of entire H2 and H3 welds indicated no cracks
  - All penetrant indications greater than 0.2" removed by sanding or heat repair
    - Post proof penetrant inspection of enhanced area indicated no changes resulted
- All MRB actions re-reviewed - Positive margins are shown
- All x-rays (pre and post proof test) have been re-reviewed - No indication changes resulted
- All welds are demonstrated to 100% of limit flight loads or greater by proof test
  - Includes effect of reduced cryogenic enhancement of strength
  - Approximately 70% of entire weld length is demonstrated to ultimate design load (limit x SF) by proof test

Agenda



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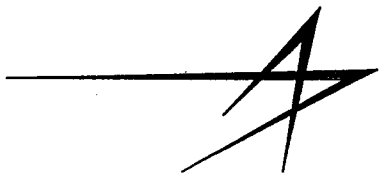
SRM&QA Assessment

as of 9/5/97

Item	Status
• **Alerts**	None open
• **MRB Assessment**	Complete - No issues/no impact to hazard controls
• **Hazard Assessment**	Complete - All hazard reports were re-assessed and hazard controls verified
• **Corrective Action Problem Summaries (CAPS)**	None open

Agenda



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KSC Processing - Status

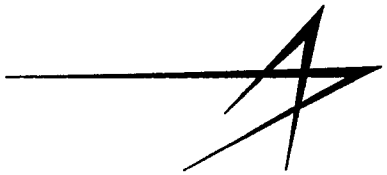
as of 9/5/97

- **Discrepancy Reports (DRs)/Problem Reports (PRs) Review**
  - All PR/MRB * discrepancies/dispositions similar to previously flown vehicles
  - All MRBs have been reviewed by MAF Reliability for potential SMR
- **Limited Life Component/ET Status ***
  - All within required life through scheduled launch date plus 90 days
- **OMRSD Exceptions/Waivers:** None
- **Changes**

- ET modifications	None
- OMRSD	0
- Software	None
• SIM Load	11/6/97
• SIM Launch	10/20/97

* Included in Appendix C

Agenda



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Verification/Certification

as of 9/5/97

Item	Status
• **NSTS 07700, Volume X Baseline** - Revision L, Change 234	No constraints
• **Certification documentation** - Hardware Certification Sheets (HCS) - Certificates of Qualification (COQ)	Approved - No issues
• **Waivers/Deviations** *	Approved - No issues

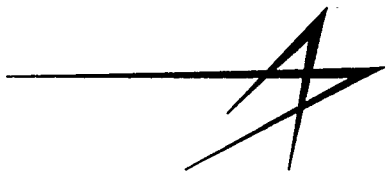
* Included in Appendix D

Mission Unique Assessment

as of 9/5/97

Category/Item	STS-87
• Review of MRB actions using updated loads	ECD 9/17/97
• MPS Preflight Prediction Package	ECD 11/3/97

Readiness Statement



The External Tank, ET-89 is hereby certified and ready for STS-87 flight pending completion/closure of open and planned work

Terry L. Hibbard
Vice President, External Tank Project
Lockheed Martin Michoud Space Systems

Appendices

- **A: Minor Changes**
- **B: SRM&QA Assessment**
  - NCD Assessment Criteria
- **C: KSC Processing**
  - Limited Life Components
  - Modification Summaries/Status
  - Alternate Blowing Agent Usage at KSC
  - Software Changes: None
  - OMRSD Exceptions/Waivers: None
  - OMRSD Changes (RCNs): None
- **D: Previously presented items**
  - Level II Waivers
  - Level III Deviations

VPPA Welding on LH2 Tank Barrel Panels

Description:

- Repaced TIG weld process with VPPA process on LH2 tank barrel panels 2, 3 and 4

Reason:

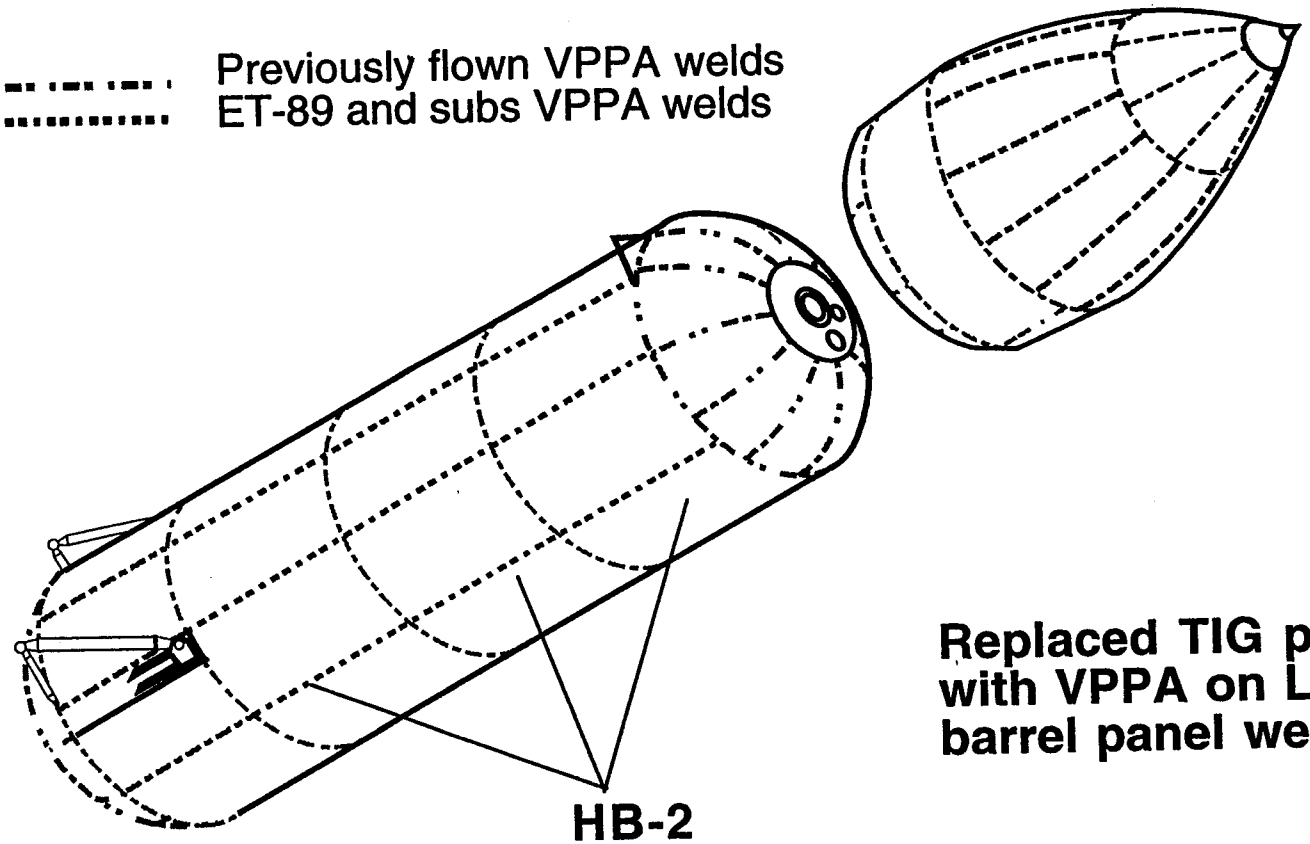
- Productivity - Reduce weld preparation, rework activity, cost and schedule

Basis for Certification:

- Test
  - Certification/confidence panels
  - Proof
- Inspection
  - X-ray
  - Penetrant
  - Leak
  - Visual

VPPA Welding on LH2 Tank Barrel Panels

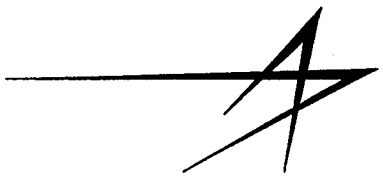
Previously flown VPPA welds
ET-89 and subs VPPA welds



HB-2
HB-3
HB-4

Replaced TIG process with VPPA on LH2 tank barrel panel welds

Class II or JS/DCN Changes



- All Class I/II JS/DCN changes have been reviewed by MSFC Resident Office
- All Class II STP/STM/Standards changes have been reviewed by MSFC M&P Lab
- These changes are acceptable for flight and summarized in this appendix (presentation not required)
  - Presentation criteria - Selection for presentation based on changes affecting:
    - Processes
    - Configuration
    - Material
    - Alternate Hardware
  - Presentation rejection criteria - All changes that do not affect configuration, material or processes
    - Revise Point of Incorporation
    - Drawing Clarification
    - Non-Flight Hardware Installation/Removal
    - Datum Changes
    - Update Usage/List of Materials (L/M)
    - Drawing Incorporation Errors
    - Manufacturing Aid
    - Drawing Errors
    - Fastener Type/Grip
    - Tolerance Change
    - Productivity
    - Minor changes taken care of by initial release of Class I Change (Same categories as above)

Class Changes - STPs/STMs/STDs/AVL

Change No.	Document	Description
H35809-224	STP 6501	Clarify connector inspection requirements by including applicable paragraphs/requirements of MSFC-DWG-85N93639 in body of STP instead of calling it out as a reference document
H35809-765	AVL 54L10	Revised AVL to correct part number
H35809-766	AVL 25L6	Revised AVL to change Voi-Shan part number to Lockheed Martin part numbers
H35809-770	STP 1532	Changed tolerance requirement for scales for weighing PDL components from ± 1 gram to ± 2 gram to agree with production requirement
H35809-771	STM Y824	Changed maximum allowable pH from 7.5 to 8.0 in LO2 compatible leak test compound
H35809-777	STM Y968	Changed supplier for purified wiping cloth from Hermitage Industries to DeRoyal Textiles and specified product designation

Class Changes - STPs/STMs/STDs/AVL

Change No.	Document	Description
H35809-786	Code sheet K633	Correct K633B material name
H35809-795	Source Appdx L1A1	Revised source appendix to remove UTI and add Hess Polyurethane to allow procurement of material from Hess for qualification tests
H35809-806	Std 45L1 and 45L2	Added AMS3652 as alternate specification for Teflon cushion for 45L1 and 45L2 clamps
H35809-807	Std 32L8 and 32L10	Added silver plated coupling nuts as alternate to lubricated coupling nuts on non-metal flexible hose assemblies
H35809-808	AVL 25L5	Revised AVL to change Voi-Shan part number to Lockheed Martin part numbers
H35809-791	STP 1510	Eliminated requirement to perform gelation test on GX-6300 adhesive

Class II or JS/DCN Changes, Materials

Change No.	Document No.	Description
J31174-002	Code sheet 4250	Revised CRES steel tubing code • Added Eddy current and ultrasonic inspection requirement • Revised code addendum to clarify receiving acceptance requirements • Added source appendix with qualified vendors
J31184-001	STP 1522	• Changed lap shear test requirement a "per adhesive base mix" requirement instead of a "per application" requirement • Eliminated gelation test to be consistent with last change to STP 1510 • Changed cleaning method from STP 5013 Method 12 to STP 5013 Method 3
J31184-002	STP 6005	• Changed lap shear test requirement a "per adhesive base mix" requirement instead of a "per application" requirement • Eliminated gelation test to be consistent with last change to STP 1510 • Changed cleaning method from STP 5013 Method 12 to STP 5013 Method 3 • Add SS-1171 foam to list of applicable specifications

NCD Assessment Criteria

- Assessment of all MRB Items
  - Adequacy of technical dispositions
  - Completeness of required repair/retest
  - First time occurrences/SMR
  - Verification of margin of safety assessment/documented
  - Review of impact to hazards
  - Engineering review for impact to loads
  - Engineering review for reduced extrusion to plate weld allowables

ET-89 DR/PR/OMRSD Waiver/Exceptions

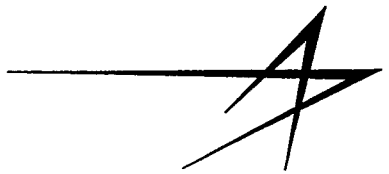
as of 9/5/97

System	Discrepancy	Problem	MRB Items	Exceptions/ Waivers
• Electrical	0	0	0	0
• Propulsion/ Pneumatics	0	2	1	0
• Structures	1	4	1	0
• Thermal (TPS)	0	3	0	0
Total	1	9	2	0

ET-89 PR/MRBs - Summary

PR No./Status	Title/Description	Disposition
Propulsion		
PET-89-FP-0001	Nick on GFP LH2 4" disconnect at 5:30 position approximately 0.25" inboard of outer edge	Use as is • Nick not in sealing surface • Form, fit or function not affected
Structure		
PET-89-ST-0005	GUCP race retainer does not have lubricant as required per drawing	Use as is • Race retainer refurbished after each flight • Use of Krytox in this application has shown no adverse effects on function

ET-89 Limited Life Components



Cycle Sensitive

Description	Part No.	Serial No.	Limit	Required	Remaining
LO2 Fwd Ogive Cover Plate	80911001207-029	000409760	100	1	100
LO2 Tank Mechanical Assy	80912002000-019	000346750	100	1	100
LO2 Manhole Cover Assy	80911001205-010	000465360	100	1	100
LH2 Manhole Cover Assy	80914081488-019	000394590	100	1	100
LH2 Tank Mechanical Assy	80914002000-009	000382240	100	1	100
LH2 Manhole Cover Assy (Aft Dome)	80911001444-010	000381940	100	1	100
		000443160	100	1	100

ET-89 Limited Life Components

Age Sensitive

Description	Part No.	Serial No.	Limit	Initiation	Expiration
External Tank	80901000000-270	00000082	6 Yrs	6/26/97	6/26/2003

Age Sensitive Pyrotechnics - 10 Years Life/Requires Lot Verification Tests After 4 and 7 Years

Description	Part No.	Lot No.	Serial No.	Date of Manufacture	Expiration
Separator Assy GUCP	PD5000020-059	AAG	00001123	12/13/96	12/13/00
Cartridge Assy	PD5000020-030	AAG	00001208 00001209	11/27/96 11/27/96	11/27/00 11/27/00

ET-89 Alternate Blowing Agent Usage at KSC

as of 9/5/97

Foam	Document	Description	Location	Size
SS-1171	T5141	Aft hardpoint closeout	Sta 1973 - 2076, 180°	4410 sq. in.

Level II Waivers

Document/ Requirement	Authority	Paragraph	Waiver No.	Effectivity
NSTS 07700 Vol. V - Information Management Requirements				
Generic part name, type, common designation, and part manufacturer H4 code are not required for EEE parts status printout	S00127B 6/28/88	Table C.5 Item 2SR-10	6	ETs 49 & up
Data required in limited life status report is supplied in acceptance data package	S00127B 6/28/88	Table C.6 Item 2SR-7	8	ETs 49 & up
Requirement to deliver element pressure vessel historical data to EPO will remain at contractor facility	S00127B 6/28/88	Table C.6 Item 2SR-7	10	ETs 49 & up

Level II Waivers

Document/ Requirement	Authority	Paragraph	Waiver No.	Effectivity
NSTS 07700 Vol. X - Space Shuttle Flight and Ground System Specification , Book 1 Requirements				
Electrical wiring of redundant systems NSTS 08080-1, 20A/4B	S40732G 6/18/88	Table 2.0	362	ETs 23, 27-29, 31 & up
Electrical bonding per MIL-B-5087B (2)	S040732M 9/9/88	3.6.14	378	ETs 23, 27-29, 31 & up
Soldering, circuit boards & connectors	S040732M 9/9/88	3.6.15.1.1	379	ETs 23, 27-29, 31 & up
PD7400106 circuit boards	S040732M 9/9/88	3.6.15.2.1	382	ETs 23, 27-29, 31 & up
PCM MUX and pressure transducer circuit boards	S040732M 9/9/88	3.6.15.2.1	383	ETs 23, 27-29, 31 & up

Level II Waivers

Document/ Requirement	Authority	Paragraph	Waiver No.	Effectivity
NSTS 07700 Vol. X - Space Shuttle Flight and Ground System Specification , Book 1 Requirements				
CIL fail safe and redundancy requirements	S040201E 4/3/87	3.5.1.1.1 Thru 3.5.1.1.3	401	ETs 23, 27-29, 31 & up
2058 Frame, Bearing Stress	S40793H, H-R1 11/22/88	3.2.2.1.5.2	452	ETs 23, 27-29, 31 & up
Soldering of electrical connectors	S094779C 2/21/91	3.6.15.1.1	573	ETs 37, 41 & up

Level II Waivers

Document/ Requirement	Authority	Paragraph	Waiver No.	Effectivity
NSTS 08060, Rev. F - System Pyrotechnic Specification				
Use 40M36298 connectors	S040732F 6/24/88	3.4.1	61	ETs 23,27-29, 31 & up
Prevent adverse effects of common mode currents	S040732F 6/24/88	8.2.1	64	ETs 23, 27-29, 31 & up
Fire circuit wiring shall be routed separately	S040732F 6/24/88	8.2.3	65	ETs 23, 27-29, 31 & up
NSTS 07700-10-MVP-01 - Shuttle Master Verification Plan				
Environmental acceptance of ET components	S002130H 3/7/89	3.7.1	13	ETs 23, 27-29, 31 & up
NSTS 08123, Rev. B - Certification of Flexible Hoses and Bellows				
LH2 feedline bellows	S005203G-R1 8/2/91	1.2	3	ETs 42 - 45, 47 & up

Level II Waivers

Document/ Requirement	Authority	Paragraph	Waiver No.	Effectivity
SL-E-0001 - Specification Electromagnetic Compatibility Requirement				
Wire marking is not applicable to the ET	S40732K 9/27/88	3.2.5	3	ETs 23, 27-29, 31 & up
SW-E-0002 - Ground Support Equipment General Design Requirements				
Factor of safety applied to yield for GUCP leg	S87020L 8/17/88	3.4.2.1	21	ETs 23, 27-29, 31 & up
ICD 2-12001 - Orbiter Vehicle/External Tank				
Potential particulate on downstream side of LH2 tank siphon screens could violate cleanliness requirement	S058410 7/24/97	3.3.2	IO-1403	ETs 87-91

Level III Deviations

Document/ Requirement	Authority	Paragraph	Waiver No.	Effectivity
CPTO1M09A, External Tank Contract End Item Specification				
Potential particulate on downstream side of LH2 tank siphon screens could violate cleanliness requirement	CCBD ET3-00-9409 7/31/97	Para 3.3.10 (d)	231R1	ETs 87-91
MMC-ET-TMO4k-B, Space Shuttle ET Flight Acceptance Requirements				
LH2 tank proof pressure test exceeded maximum cumulative time requirement	CCBD ET3-00-9312 5/21/96 CCBD ET3-00-9331 8/16/96	Para 2.3.1.2	226 229	ET-89

Class II or JS/DCN Changes, Electrical

Change No.	Description
H35809-174	Replaced STP 6522 with 6506 to use previously approved material for sealing electrical splices as material in STP 6522 no longer exists
H35809-731	Revised final LO2 forward electrical drawing to clarify use of clamp support plate currently referenced on face of drawing
H35809-790	Corrected effectivity callout on aft interface cable tray harness installation drawing

Class II or JS/DCN Changes, Propulsion

Change No.	Description
H35809-638	Updated propulsion line weld acceptance drawing to reflect latest loads
H35809-759 -760 -772	Increased number and thickness of washers to prevent washer from riding on GO2/GH2 vent casting spotface edge and clarify lockwire usage due to variance in casting thickness

Class II or JS/DCN Changes, Structure

Change No.	Description
H35809-060 -070	Revised ogive detail part to control ogive flatness and add tooling holes to ensure interchangeability of metal and composite nose cones
H35809-589	Relaxed tolerance on the linear calibration devices of the LH2 tank proof test requirements document due to previous device degradation
H35809-701	Revised nose cone spike to show tooling holes perpendicular to spike contoured surface (editorial change only)
H35809-716	Flag note added to allow more than 6.0" length of unsupported safety wire at LO2 feedline elbow support
H35809-724	Revised drawing sheet to eliminate multi-configuration part numbers and reflect applicable revision level
H35809-741	Revised bipod strut installation drawing to allow acceptable damage to extend to 0.75" outside of end fitting periphery
H35809-767	Updated sheet 1 of aft cable tray fairing and cover installation to include drawing sheet inadvertently omitted at previous revision

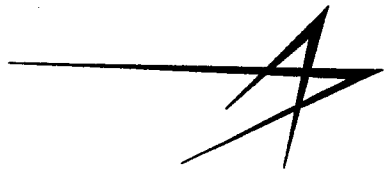
Class II or JS/DCN Changes, Structure

Change No.	Description
H35809-781	Revised LWT LH2 tank proof pressure time requirements to be consistent with SLWT test software
H35809-782	Revised LO2 feedline fairing attachment fitting to delete interchangeability requirements for canceled composite fairing
H50001-758	Added ± 0.001" mismatch tolerance to reduce time spent sanding radius blends on intertank frame chord

Class II or JS/DCN Changes, Systems

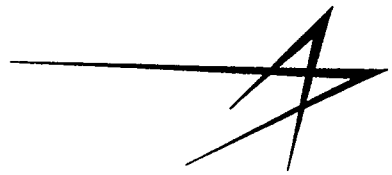
Change No.	Description
H35809-787	Incorporated errata (format/typos) changes into CIL implementation drawing

Class II or JS/DCN Changes, TPS



Change No.	Description
H35809-344	Clarify foam thickness requirements for spray application on LH2 aft dome
H35809-587	Decrease maximum tolerance on bottom half of LO2 feedline TPS to allow installation to the feedline support
H35809-665	Revised drawing note on foam application on LH2 barrel to closeout cryo flex panel flush ±0.10" with adjacent barrel foams due to thick/thin foam application
H35809-666	Add hard callout to show foam trimmed flush with SLA on LO2 feedline support
H35809-672	Deleted "no paint" profile lines and associated dimension that was inadvertently omitted at previous revision on the LH2 cable tray fairing assembly
H35809-677	Eliminated reference to "single source rework" and "discrepant condition after rework" in acceptance criteria document
H35809-679	Deleted "no paint" profile lines and associated dimensions inadvertently omitted at previous revision on the LH2 umbilical cable tray cover

Class II or JS/DCN Changes, TPS



Change No.	Description
H35809-709	Added STP 2003 to provide flushness requirements for 100° fasteners located on LO2 cable tray cover at Station 371
H35809-746	Revised TPS configuration on aft SRB PAL ramps, cable trays and vertical struts to facilitate use of SS-1171 foam
H35809-750	Allow foam acreage in closeout area of LO2 feedline support at Station 1973 to be reduced to 1.15" prior to subsequent feedline support closeout
H35809-768	• Revised MAF ET Post Build document to modify in process rework and acceptance criteria to reflect implementation of new foams and delete obsolete reference • Revised KSC post build acceptance criteria document for foam migration on the LH2 barrel, increase acceptable amount of adhesive exposure, and delete obsolete references
H35809-785	Deleted requirement to apply topcoat on SLA/Metal LO2 feedline fairing