FLIGHT READINESS STATEMENT
STS-100/ET-108
EXTERNAL TANK PROJECT
PRE-FLIGHT REVIEW

EXTERNAL TANK ET-108/STS-100, AS IDENTIFIED IN THE EXTERNAL TANK PROJECT PRE-FLIGHT REVIEW DATED MARCH 19, 2001, IS CONSIDERED READY TO SUPPORT FLIGHT UPON ACCEPTABLE DISPOSITION OF OPEN/PLANNED WORK AND/OR OPEN ACTIONS.

N. E. OTTE/MP31

J. BULLMAN/ED10

for P. M. MUNAFO/ED30

for A. O. GOODSON/QS01

A. A. McCOOL/MP01

for P. K. McCONNAUGHEY/ED20

S. D. ROSE/ED40

for H. V. McCONNAUGHEY/TD60

J. W. SMELSER/MP31, CHAIRMAN

March 19, 2001

Space Shuttle
External Tank

Pre-Flight Review

STS-100/ET-108

LOCKHEED MARTIN

Agenda

Overview — ***Lynn Servay***

Prior Mission Performance Summary

- ***STS-98/ET-106***
- ***STS-102/ET-107***

Current Mission/External Tank Highlights

- ***STS-100/ET-108***

Mass Properties Status

Significant Changes: None

Senior Management Review NCDs: None

Special Topic

SRM&QA Assessment

KSC Processing

Verification/Certification

Mission Unique Assessment

Readiness Statement

Appendices

Overview

This review for STS-100/ET-108 includes:

- Items specific to missions STS-100
- First time differences and "out-of-family" non-conformances not previously flown and/or reviewed

FRR Series

• ET/SRB Mate Review	02/21/2001 (Complete)
• Michoud Operations Pre-Flight Review	03/13/2001 (Complete)
• ET Project Pre-Flight Review	03/19/2001
• Space Shuttle Vehicle FRR	04/05/2001
• Pre-launch Mission Management Team Review	04/17/2001

Prior Mission Performance Summary

STS-98/ET-106, 02/07/2001 Launch

System	***Performance***
• ***OMRSD***	• No ET OMRS Violations
• ***LCC***	• No ET LCC Violations

• ***Instrumentation***	• ET LH2 ullage temperature measurement (T41T1705A) failed off scale high during topping
	  • System performance not affected by failure
	  - Measurement bypassed; not required for launch, drain, or safing operations
	  • Measurement returned at approximately T+30 seconds and performed nominally for the remainder of flight
	  • Troubleshooting of Orbiter hardware complete
	  - No anomalies were found

• ***MPS***	• Nominal
• ***ET Hazardous Gas***	• No ET Violations

Prior Mission Performance Summary

STS-98/ET-106, 02/07/2001 Launch

System	***Performance***

• ***TPS***	• All observations acceptable per NSTS 08303; no out of family observations
	  • One crack observed in the TPS near the Intertank to LH2 flange
	  • Crack noted on the –Y vertical strut

• ***ET Disposal***	• Nominal
• ***Film Review - Post-Launch***	• No ET anomalies noted

• ***Orbiter Tile Damage***	• Foam performance in-family with NCFI LWTs
	  • Lower surface hits
	  – Diameter > 1" = 8
	  – Total = 73

• ***Film Review - Post-Flight***	• On board film not available for review

Prior Mission Performance Summary

STS-102/ET-107, 03/08/2001 Launch

System	***Performance***
• ***OMRSD***	• No ET OMRS Violations
• ***LCC***	• No ET LCC Violations
• ***Instrumentation***	• Nominal
• ***MPS***	• Nominal
• ***ET Hazardous Gas***	• No ET Violations

Prior Mission Performance Summary

STS-102/ET-107, 03/08/2001 Launch

System	***Performance***

• ***TPS***	• All observations acceptable per NSTS 08303; no out of family observations
	  • Four cracks observed in the TPS near the Intertank to LH2 flange
	  • Crack noted on the –Y vertical strut
	  • Frost observed on LH2 and LO2 acreage foam

• ***ET Disposal***	• Nominal
• ***Film Review - Post-Launch***	• No anomalies reported
• ***Orbiter Tile Damage***	• Pending Orbiter landing on 3/20/2001

• ***Film Review - Post-Flight***	• Film review incomplete
	• ET downlink video review
	  • Poor resolution due to large distance between Orbiter and ET
	  • No anomalies noted

Mission/External Tank Highlights

STS-100/ET-108 (as of 03/14/2001)

Mission	***STS-100***
Launch	***04/19/2001***
• Window	2:04 p.m. EDT
• Pad	39-A
• Orbiter	Endeavour (OV-105)
• Orbital Inclination	51.6 degrees/173 nautical miles
• ET Photo Coverage	• Crew photos from cockpit window • Umbilical well cameras (35 mm)

Primary Payload	• International Space Station (ISS) Assembly Flight 6A
	  • Rafaello Multi-Purpose Logistics Module (MPLM) (Lab outfitting)
	  • Ultra High Frequency (UHF) antenna
	  • Space Station Remote Manipulator System (SSRMS) (Mechanical Arm)

Landing	***KSC, 04/30/2001, 10:33 a.m. EDT***
External Tank	***ET-108***
DD250 Acceptance	02/10/2000
Shipped to Launch Site	07/13/2000

Agenda

Overview

Prior Mission Performance Summary

Current Mission/External Tank Highlights

ET-108 Mass Properties ***Rick Spring***

Significant Changes: None

Senior Management Review NCDs: None

Special Topic

SRM&QA Assessment

KSC Processing

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Mission Unique Assessment

Readiness Statement

Appendices

Mass Properties Status

STS-100 / ET-108

Specification Weight = 58,432 lbs.

ET-108 Weighing

- ET-108 was weighed at MAF on February 8, 2000 using the Weigh Tronix weighing system

  - Predicted Weight 58,294 lbs.
  - As-weighed 58,445 lbs.
  - Delta to Predicted +151 lbs.

Mission Planning

- MMC-ET-SE40, ET Project - Mass Properties Weight and Balance Report, was submitted February 14, 2000 to support mission planning
- Coordination with Level II on March 14, 2001 indicates approximately 1,616 lbs. performance margin for STS-100

Agenda

Overview

Prior Mission Performance Summary

Current Mission/External Tank Highlights

Mass Properties Status

Significant Changes: None

Senior Management Review NCDs: None

Special Topic:

- ***Crane Grease Contamination*** ***Philip Kopfinger***

SRM&QA Assessment

KSC Processing

Verification/Certification

Mission Unique Assessment

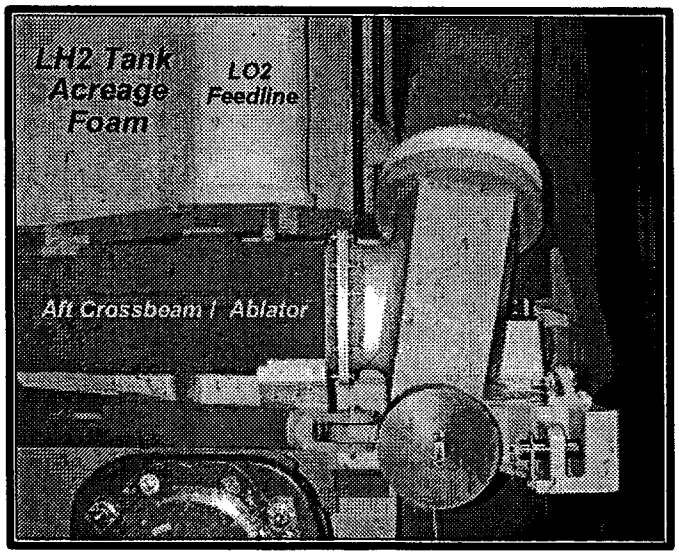
Readiness Statement

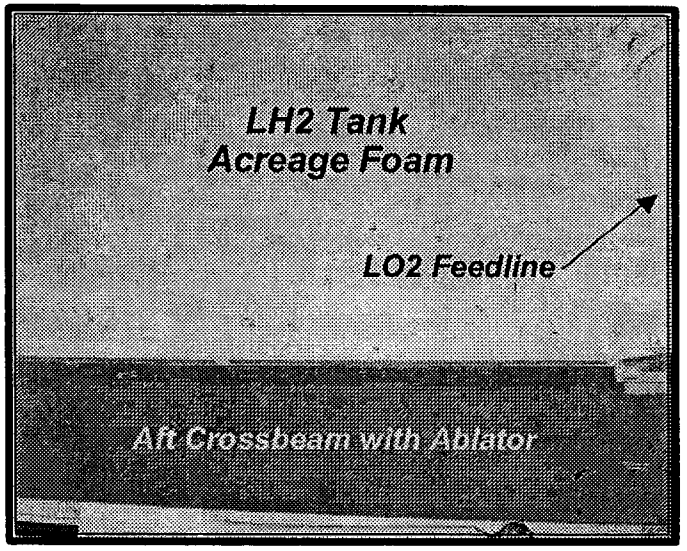
Appendices

Crane Grease Contamination

Background

- Grease from 175 ton crane at KSC leaked grease onto ablator, foam insulation and metallic surfaces located predominately in +Y/+Z quadrant aft of XT1900





- Various methods were investigated for cleaning ablator, foam insulation, and metal
  - Methods included mechanical, solvents, surfactants, microbes and cryogenic
  - Ablator and foam cleaning processes were developed and validated by hot gas and flammability testing on simulated panels

Crane Grease Contamination

Discussion

- Metallic surfaces
  - Standard process using isopropyl alcohol was used to clean metal surfaces

- Foam insulation
  - Solvent (Citrus Solve) used to remove grease on foam surfaces
    - Solvent performance on net sprayed "rind" surfaces - 90% removal
    - Solvent performance on machined "sanded" surfaces - 75% removal
      - Grease remains in the cells open to the surface, residual grease is acceptable

- Ablator (SLA-561)
  - Phenolic tool used to mechanically remove excess grease until non-transferable criteria met
    - Solvents were determined to be unacceptable
      - Testing indicated SLA absorbed grease along with solvent
  - Residual grease on ablator surface is acceptable

Crane Grease Contamination

Rationale for Acceptance

- Testing
  - Test panel configurations
    - Control panels (foam and ablator) with no grease contamination
    - Foam and Ablator panels with grease contamination
    - Foam panels cleaned with "Citrus-Solve" solvent per developed procedures
    - Ablator panels mechanically cleaned per developed procedures
  - Hot gas testing results
    - No distinct difference in terms of char layer formation or material erosion characteristics compared to control panels
  - Flammability tests results (performed at MSFC)
    - All panels met flight requirements
      - Acceptance Category for Flight (B)

- Accessible External Tank surfaces contaminated by grease have been cleaned
  - Excess grease removed from foam and ablator surfaces
  - All grease removed from metallic surfaces

- ***Hot gas and flammability testing shows ET-108 is acceptable for flight***

Agenda

Overview

Prior Mission Performance Summary

Current Mission/External Tank Highlights

Mass Properties Status

Significant Changes: None

Senior Management Review NCDs: None

Special Topic

SRM&QA Assessment ***Terry McKeough***

KSC Processing

Verification/Certification

Mission Unique Assessment

Readiness Statement

Appendices

SRM&QA Assessment

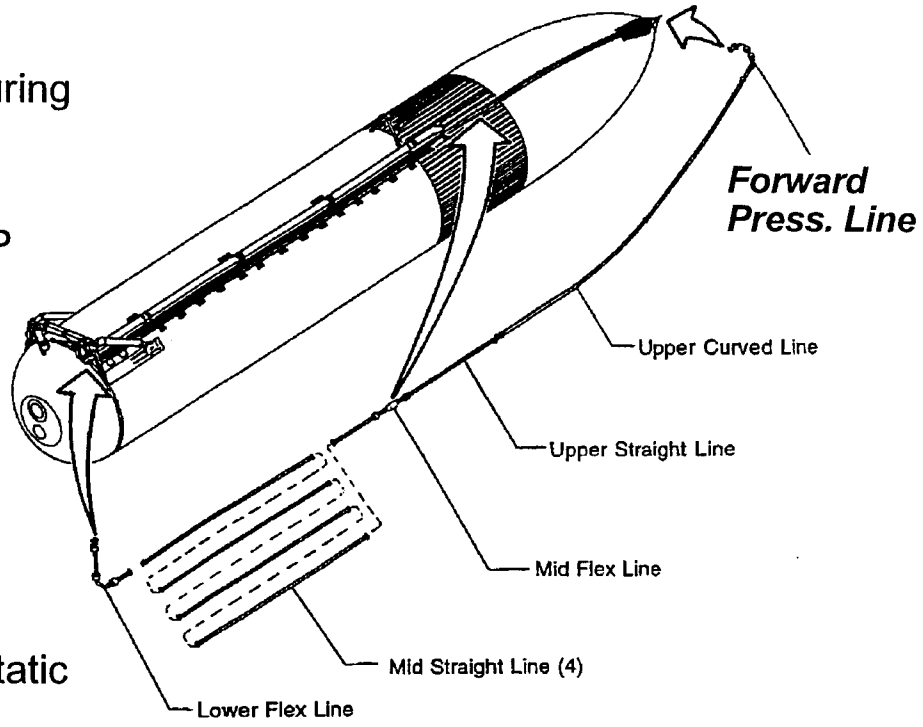
as of 03/14/2001

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
• ***CIL Retention Rationale***	• Complete - No issues/no impact to CIL retention rationale
• ***Corrective Action Problem Summary (CAPS)***	
• S-083, Post proof NDE concerns	• ET-108 cleared • Closure pending implementation of corrective action
• S-085, Sanded/shaved Al 2195 welds	• ET-108 cleared - Rationale accepted at PRCB, 12/04/00 • Pending implementation of corrective action
• P-094, GO2 Forward Pressurization Line Leak	• ET-108 cleared - All installed lines successfully passed ATP • Pending determination of cause and corrective action

SRM&QA Assessment

CAPS P-094, GO2 Forward Pressurization Line Leak

- Issue
  - GO2 forward pressurization line leaked during supplier ATP
- Acceptance Requirements
  - Penetrant and x-ray inspection before ATP
  - Supplier acceptance test procedure
    - Hydrostatic proof test (1500 psig)
    - Non-pressurized deflection test
    - Hydrostatic pressurized deflection test (600 psig)
    - GN2 bubble leak test (300 psig)
- Background
  - Manual butt weld #3 leaked during hydrostatic pressurization deflection test
    - During the deflection test a mist of water was seen by LM Quality (source unknown)
    - Leakage verified by GN2 leak test
- Rationale for Acceptance
  - All installed lines on ET-108 successfully passed ATP
- Cause and Corrective Action
  - Pending completion of failure analysis



Agenda

Overview
Prior Mission Performance Summary
Current Mission/External Tank Highlights
Mass Properties Status
Significant Changes: None
Senior Management Review NCDs: None
Special Topic
SRM&QA Assessment
KSC Processing ***Doug Powell***
Verification/Certification
Mission Unique Assessment
Readiness Statement
Appendices

KSC Processing

as of 03/14/2001

Discrepancy Reports (DRs)/Problem Reports (PRs) Review

- PR/MRB discrepancies/dispositions similar to previously flown vehicles
  - All KSC/MRBs have been reviewed by MAF Reliability for potential SMR
  - No items were elevated to the SMR

Limited Life Component/ET Status

- All within required life through scheduled launch date plus 90 days

OMRSD Exceptions/Waivers

- None

KSC Processing - Status

as of 03/14/2001

Changes

- ET modifications
  - Mod Kits 0
  - DC&R 0
  - Bldg 45 0
  - FEC 1 Intertank thrust panel foam venting
  - OMRSD/LCC 0
  - Facility 0
  - Software 0

SIM Launch (S0044) *3/19/01*

SIM Load (S0056) *3/29/01*

Agenda

Overview

Prior Mission Performance Summary

Current Mission/External Tank Highlights

Mass Properties Status

Significant Changes: None

Senior Management Review NCDs: None

Special Topic

SRM&QA Assessment

KSC Processing

Verification/Certification Readiness Statement ***Lynn Servay***

Appendices

- A: Minor Changes
- B: SRM&QA Assessment
- C: KSC Processing
- D: Level II Waivers/Level III Deviations
- E: Previously Presented Items

Verification/Certification

as of 03/14/2001

Item	**Status**
NSTS 07700, Volume X, Book 1, Baseline	
• **Revision M, Change 268**	• **Complete - No Issues**
Certification Documentation	
• **Certificates of Qualification (COQ)**	• **No new items**

• **Hardware Certification Sheets (HCS)**
  • T501J, Acreage Foam - Implementation Intertank Venting at MAF (B02059A)
	• **Complete - No Issues**
	  • Approved 2/16/00, 00MO-0128

Verification/Certification

as of 03/14/2001

Item	**Status**
New Deviations/Waivers	
• **LH2 Feedline Contamination (Teflon Particles)**	
• Missing Teflon discovered on Naflex seal (GFP) during replacement following leak test failure	
- Missing Teflon was not recovered	
- Waivers processed for suspect contamination	
• **Specified requirements**	
- CPT01M09A (ET Contract End Item Specification - Part I)	• DAR MMC-ET-238 approved 02/03/00, CCBD ET3-00-9615
- MMC-ET-RA12 (Contamination Control Plan)	
- SE-S-0073 (Specification, Fluid Procurement and Use Control)	• SSP approved on 02/23/00 PRCBD S058410E (SE-S-0073)
- ICD-2-12001 (Orbiter Vehicle)	• SSP approved on 03/14/00 PRCBD S058410F (ICD 2-12001)

Mission Unique Assessment

as of 03/14/2001

STS-100/ET-108

Review of MRB actions using updated loads

No new loads or environments requiring assessment have been identified at this time

MPS Preflight Prediction Package

ECD 04/09/2001

Readiness Statement

The External Tank, ET-108, is certified and ready for STS-100 flight pending completion/closure of open and planned work

Appendices

A: Minor Changes

B: SRM&QA Assessment

- NCD Assessment Criteria

C: KSC Processing

- PR/MRB Summaries
- OMRSD Exceptions/Waivers
- Modification Summaries/Status
- Limited Life Component Status
- OMRSD Changes (RCNs): None
- Software Changes: None
- Facility Modifications: None

D: Level II Waivers/Level III Deviations

Change Presentation Criteria

- Changes for Presentation
  - *Type I Documentation*
  - *Requirements*
  - *Configuration* (affects part interchangeability)
  - *Materials* (requires SE16 revision)
  - *Technical Changes to Processes* (STPs)
- Changes for inclusion in Appendix
  - *Minor configuration* (affects part interchangeability)
  - *Minor updates* - Does not affect part interchangeability, materials or processes
    - Revise point of incorporation
    - Drawing clarification
    - Non-flight hardware installation/removal
    - Datum changes
    - Update usage/List of Materials
    - Drawing incorporation errors
    - Manufacturing aid
    - Drawing errors
    - Fastener type/grip
    - Producibility
    - Update vendor list
    - Laboratory test procedures
    - Materials
- All Class I and Class II changes have been reviewed by the MSFC Resident Office
- All Class II STP/STM/Standard/Code sheet changes have been submitted to the MSFC Materials, Processes and Manufacturing Department for concurrence

Minor Change – Configuration

Change	Description	Basis for Certification
Implementation of Intertank Foam Venting at MAF (B02059A)	▪ Implemented in-line venting of thrust panel acreage foam to reduce venting effort at KSC	Similarity – Vented foam configuration previously implemented by FEC at KSC

Minor Changes

Change No.	Discipline	Description	Effectivity
H35809-700	Structural	Drawing error - Removed erroneous penetrant inspection requirement from LH2 umbilical cable tray detail; prior builds not penetrant inspected	ET-108 & sub
H35809-701	Structural	Drawing clarification - Revised drawing to clarify perpendicularity requirement of tooling holes in nosecone spike.	ET-108 & sub
H35809-874	Structural	Drawing error - Slosh baffle serialization. SLWT reqmt all AL-LI hardware to be traceable. Change details slosh baffle traceability; assemblies to be serialized.	ET-108 & sub
H36809-068	Structural	Producibility - Revised shim matrix to allow additional shim thickness at installation of LH2 aft dome fence; necessary due to tolerance stack-up	ET-108 & sub
H36809-125	Structural	Fastener type/grip - I/T Thrust Panel #4 and #5 roll tie installation revised to correct Hilok fastener grip-length, two places, due to reduced thickness for SLWT	ET-108 & sub
H36809-153	Structural	Drawing error - Remove reference to Method #9 in process spec for aft manhole cover. Method #9 no longer exists, proper method selected directly from STP4502.	ET-108 & sub
H36809-260	Structural	Drawing clarification - Weld Acceptance Manual was revised to clarify X-ray inspection of O2 cover pass welds	ET-108 & sub
H36809-286	Structural	Drawing error - Revise cable tray and fairing installation drawing to call out proper component part numbers.	ET-108 & sub
H36809-318	Structural	Producibility - Revise installation drawing for nosecone louver to call out only one grip length of fastener – (26L30P3-5). Eliminates potential installation errors.	ET-108 & sub

Minor Changes

Change No.	Discipline	Description	Effectivity
H36809-348	Structural	Producibility - Revised drawing to add 'Far-Side' ink stamp requirement to flag note on crossbeam fairing SLA application	ET-108 & sub
H36809-372	Structural	Drawing clarification - Clarify vent areas and material for LO2 feedline fairing installation around the feedline and corners by the mounting flanges. Delete composite from callout.	ET-108 & sub
H36809-552	Structural	Drawing clarification - Revise LH2/LO2 Proof Test Requirements to clarify that engineering review of tools, fixtures, etc. is required	ET Project
H36809-319	TPS	Producibility - Reinstated +/- 5° angular tolerance requirement to aft SRB fairing foam closeout drawing. Part of off-site TPS effort (B02051-001).	ET-108 & sub
H36809-345	TPS	Drawing clarification - Add a hard trim dimension to the LO2 feedline isolator foam trims within the LH2/IT flange closeout. (Change from a reference dimension.)	ET-108 & sub
H36809-337	TPS	Producibility - Added notes to allow foam adhesive exposure at surface and to allow foam migration into nose cone compartment provided validated foam charge size is not exceeded.	ET-108 & sub
J31210-001	TPS	Producibility - Revise 'Seal & Blend nose cone installation' drawing to include the use of Al tape barriers to reduce risk of PDL poured foam migration.	ET-108 & sub
H36809-498	Systems	Drawing clarification - Revise ET acceptance manuals (80900000010, 80901019010) to delete obsolete requirements / references and to clarify post build acceptance requirements for TPS	ET Project

Minor Changes – STD/STM/STP/AVL

Change No.	Document	Description
H36809-364	STML1A5	Revise specification to correct the HCFC content range in components A & B, representing the correct range based on statistical analysis
H36809-493, H36809-494	STP 2501 STP2507	Revise specification to incorporate NEQA findings: Specify removal of penetrant per STP5002, require sensitivity testing of 319, record penetrant batch numbers, add missing references and clarify Level II inspector requirement
H36809-499	809-3200	Revise supplier critical components list to add new part numbers and delete erroneous entries that were included in the initial release.
H36809-521	MMS 4250	Clarify receiving inspection tests for corrosion resistant steel tubing to measure grain size on at least one specimen from each lot and to perform sensitization test on st least one sample per lot
H36809-522	MCSY045 Aluminum Core Material	Revise to delete surface coating per current purchasing specification; surface coating is added during subsequent processing
H36809-533	STP5508 VPPA Welding of Al-Li	Revise to incorporate NEQA and Weld Process Review findings: - Sanding/dressing of welds by MRB only, - Specify alternate angle for locations where tank configuration prevents 35° angle shots - Specify x-ray angle 6" on either side of a repair, 5 " extending from an intersection, Tack welding to be performed in accordance to a Weld Technique Card.
H35809-549	STP6014 Closeout Adhesive Appl.	Revise to add minimum mix requirements for TPS tiecoat adhesive (Conathane)

Minor Changes – STD/STM/STP/AVL

Change No.	Document	Description
H36809-563	AVL34L1, AVL34L10, AVL34L2	Revise approved vendor lists for inserts to reflect change in supplier
H36809-570	STM M723	Revise polyurethane adhesive code sheet to update vendor name

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-108 DR/PR/OMRSD Waiver/Exceptions

as of 03/14/2001

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

ET-108 PR/MRBs, Thermal

PR No./Status	Title/Description	Disposition
PET-108-TS-0001	• Crane grease contamination on LH2 tank aft of Xt 1900, located predominately in the +y/-z quadrant	• Remove grease from foam using Citrusolve • Remove grease from SLA using non-metallic tools • Accept residue "use as is"

ET-108 KSC Modification Summary/Status

Item	***Title***	***Status***
• ***Field Engineering Changes***		
– FEC KET-0069	Intertank +Z stringer area foam venting	Work complete

ET-108 Limited Life Components

Cycle Sensitive

Description	Part No.	Serial No.	Limit	Required	Remaining
LH2 Manhole Cover Assy	80914081488 -509	0000810290	14	2	14
LO2 Tank Mechanical Assy	80912002000 -500	0000870250	14	2	14
LH2 Tank Mechanical Assy	80914002000 -509	0000870610	14	2	14
LO2 Manhole Cover Assy	80911001205 -509	0000862010	14	2	14
LO2 Fwd Ogive Cover Plate	80911001207 -509	0000859670	14	2	14
LH2 Manhole Cover Assy -Aft	80911001444 -509	0000859680	14	2	14

ET-108 Limited Life Components

Age Sensitive

Description	Part No.	Serial No.	Limit	Initiation	Expiration
External Tank	80901010000-509	00000101	6 Yrs	02/2000	02/2005

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

Description	Part No.	Lot No.	Serial No.	Latest Retest	Expiration
Separator Assy GUCP	PD5000020-059	AAH	0001162	01/27/1998	01/2002
Cartridge Assy	PD5000020-030	AAH	0001333	01/17/1998	01/2002
Cartridge Assy	PD5000020-030	AAH	0001334	01/17/1998	01/2002

Level II Waivers - Baseline

Document / Requirement	Authority	Paragraph	Waiver No.	Effectivity
NSTS 07700, Volume V, Information Management Requirements				
Generic part name, type, common designation, and part manufacturer H4 code are not required for EEE parts status print out	PRCBD S000127B 06/28/88	Table C.5 Item 2SR-10	6	ETs 49 & up
Data required in limited life status report is supplied in acceptance data package	PRCBD S000127B 06/28/88	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	PRCBD S000127B 06/28/88	Table C.6 Item 2SR-7	10	ETs 49 & up

Level II Waivers - Baseline

Document / Requirement	Authority	Paragraph	Waiver No.	Effectivity
NSTS 07700, Volume X, Book 1, Space Shuttle Flight and Ground System Specification, Requirements				
Electrical bonding	PRCBD S040732M 09/09/88	3.6.14	378	ETs 23, 27-29, 31 & up
Soldering, circuit boards, and connectors	PRCBD S040732M 09/09/88	3.6.15.1.1	379	ETs 23, 27-29, 31 & up
PD7400106 circuit boards	PRCBD S040732M 09/09/88	3.6.15.2.1	382	ETs 23, 27-29, 31 & up
Pressure transducer circuit boards	PRCBD S040732M 09/09/88	3.6.15.2.1	383	ETs 23, 27-29, 31 & up

Level II Waivers - Baseline

Document / Requirement	Authority	Paragraph	Waiver No.	Effectivity
NSTS 07700, Volume X, Book 1, Space Shuttle Flight and Ground System Specification, Requirements				
Launch Probability	PRCBD S071290R1 04/10/00	3.2.1.2.14.1	682	ETs 102, 107 - 110
Applicability of Space Shuttle Manned Spacecraft Criteria and Standards (NSTS 08080-1)	PRCBD S061451 08/08/00	Table 2.0	683	ET-96 & up
NSTS 07700-10-MVP-01, Shuttle Master Verification Plan - Volume I, General Approach and Guidelines				
Environmental acceptance of ET components	PRCBD S002130H 03/07/89	3.7.1	13	ETs 23, 27-29, 31 & up

Level II Waivers - Baseline

Document / Requirement	Authority	Paragraph	Waiver No.	Effectivity
ICD 2-12001, Revision T - Orbiter Vehicle				
Cleanliness of propellant system components downstream of filter screens	PRCBD S058410F 03/14/00	3.3.1	IRN IO-1613	ET-108
SE-S0073 - Specification Fluid Procurement and Use Control				
Cleanliness of ground hardware between main propulsion final filters and vehicle interface	PRCBD S058410E 02/23/00	Table 6.1	30	ET-108
SL-E-0001 - Specification Electromagnetic Compatibility Requirement				
Wire marking is not applicable to ET	PRCBD S040732K 09/27/89	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 feet on ground half of GUCA	PRCBD S087020L 08/17/88	3.4.2.1	21	ETs 23, 27-29, 31 & up

Level III Deviations

Document / Requirement	Paragraph	DAR No.	Effectivity
CPT01M09A - External Tank Contract End Item Specification - Part I			
• Photographic evidence shows a loss of foam from both +Y and -Y Intertank Thrust Panels / Analysis concluded a low probability of debris impact on Orbiter critical area	3.2.1.1.17	MMC-ET-236	ETs 106 - 108
• Contamination control limitations for components downstream of the tank outlet screens	3.3.10(d) 3.2.1.2.2.1.11	MMC-ET-238	ET-108
MMC-ET-RA12 - External Tank Contamination Control Plan			
• Contamination control limitations for components downstream of the tank outlet screens	3.2	MMC-ET-238	ET-108