Configuration check after thermal control loop failure
File: H_CRP_TCS_CLR.xls
Author: E. Picallo

Procedure Summary

Objectives

This procedure describes the checks to be performed after an onboard detection of a thermal control loop failure.

This failure occurs when a control loop failed to maintain the temperature within limits. Consequently the monitoring defined in the on-board Monitoring Table, MOT, triggers an out of range event.

In case the related action defined in the on-board Event Action Table, EAT, is enabled, it triggers the reconfiguration of the related HPS, i.e. it results in the switch to the redundant Heater group. The nominal Heater group is flagged as Failed.

In case the action is disabled, the event is triggered though no onboard reconfiguration takes place.

Summary of Constraints

In case the failed Heater group included HCS dedicated to the decontamination, the on-board reconfiguration does not switch the redundant HCSs ON. Thus it is up to Ground to resume decontamination if required.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
Thermal Control Management function active;
Reception of a MOT Control loop failure event packet.

End of Procedure

CDMU in default configuration;
Thermal Control Management function active;

Reference File(s)

Input Command Sequences

Output Command Sequences

HRTCLR

Referenced Displays

ANDs   GRDs   SLDs

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```
ZAZ2E999
ZAD42999
ZAZ2G999
ZAZ2H999
WAHT1584
WAHT3584
WAHT2584
ZAZ7K999
ZAZ7L999
```
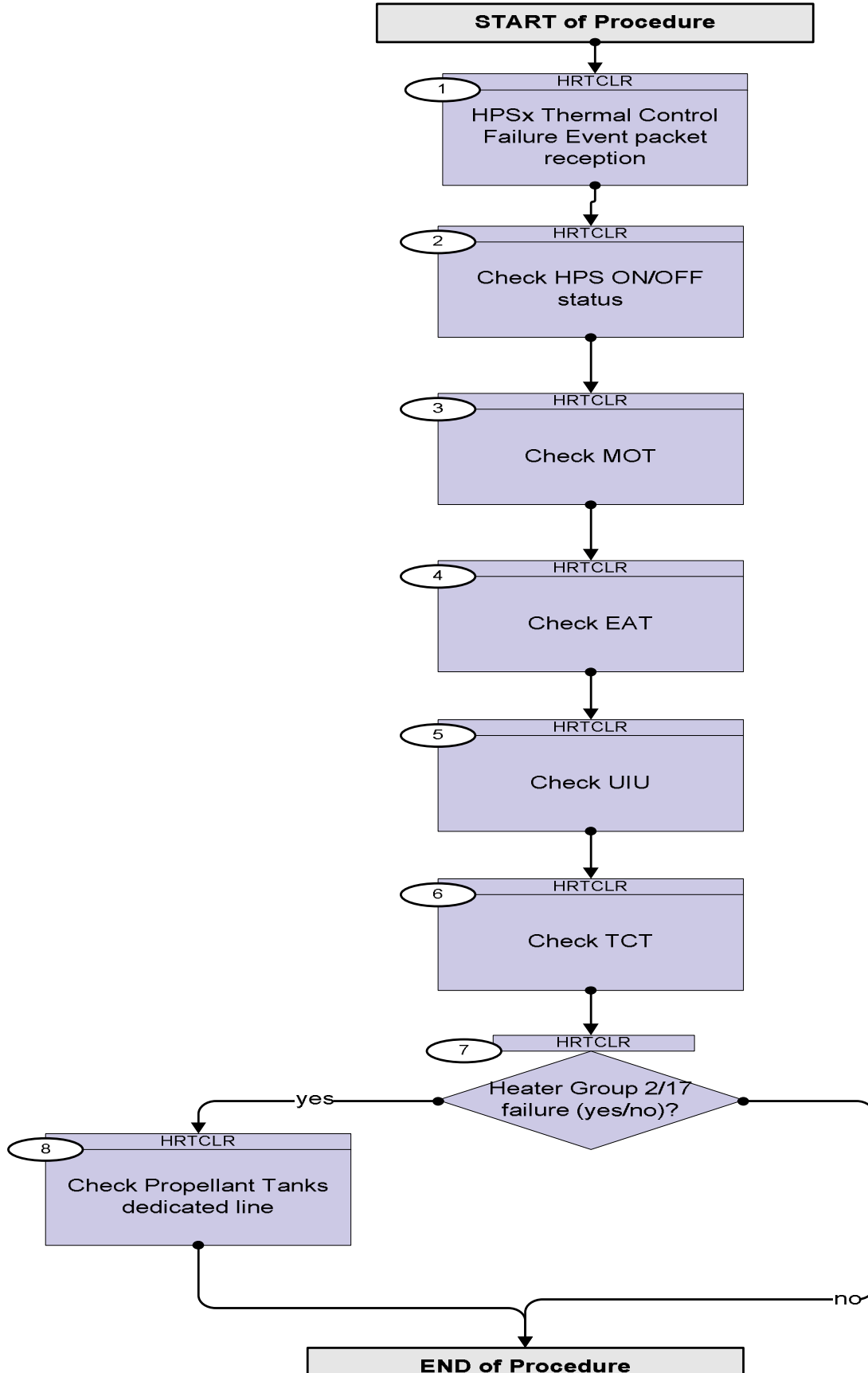
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
28/07/08	1	1	Created	E. Picallo	
10/12/08	2	2	Call to decontamination CRP deleted	E. Picallo	
18/03/09	2.2	2.01	Validation : Minor AND reference correction	E. Picallo	

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Procedure Flowchart Overview

```
                    START of Procedure
                           |
                           v
         1 ──  HRTCLR
               HPSx Thermal Control
               Failure Event packet
               reception
                           |
                           v
         2 ──  HRTCLR
               Check HPS ON/OFF
               status
                           |
                           v
         3 ──  HRTCLR
               Check MOT
                           |
                           v
         4 ──  HRTCLR
               Check EAT
                           |
                           v
         5 ──  HRTCLR
               Check UIU
                           |
                           v
         6 ──  HRTCLR
               Check TCT
                           |
                           v
         7 ──  HRTCLR
               Heater Group 2/17
               failure (yes/no)?
          yes  /              \  no
               |               |
         8 ──  HRTCLR          |
               Check Propellant Tanks
               dedicated line  |
               |               |
               └───────┬───────┘
                       v
                END of Procedure
```

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Procedure Flowchart Overview

END of Procedure

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Beginning of Procedure		
		TC Seq. Name :HRTCLR (Check Loop failure) Configuration check after thermal control loop failure *TimeTag Type: N* *Sub Schedule ID:*		
1		*HPSx Thermal Control Failure Event packet reception*		Next Step: 2
		The event identifies the Monitoring ID, thus the Heater Group (HPS). The event packet also include the failed parameter value, although this being based on a FDIR Cross Correlated it identifies which HCS was out of range, though it does not specify which OOL (i.e. Low Not Operational, or Cold Start or Low Operational). **The 9 different events related to the 9 different groups have been referenced in the sub steps 1.1 to 1.9.** **In case the group contains a decontamination heater, it is identified.** **Dedicated propellant tanks heater lines are also identified.**		
1.1		*Heater Group 1/18 failure*		

		Verify Packet Reception
		       CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8013
		Packet Details:
		                          APID:
		                          Type:
		                       Subtype:
		                           PI1:
		                           PI2:
			D_EvRpMo8013
			
			16
			5
			2
			32787
			0	

		Verify Packet Telemetry (Pkt = D_EvRpMo8013) **EventId** DE068170	= **MotExcId0x8013**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8013) **MonitorId** DE055170	= **21 <dec>**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8013) **FirstMaskParVal** DE070170	**the 8 LSB identify the failed HCS when first detected**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8013) **RepThMaskParVal** DE071170	**the 8 LSB identify the failed HCS when the event was raised**	(None)
		HPS1/18_HCS1 is dedicated to decontamination.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		XPND2 TCS Failure HPS1_HCS2 **DID_ASW_CCC_RES_2:1** **FCV A1B TCS Failure HPS1_HCS23** **DID_ASW_CCC_RES_2:2** **FCV C2B TCS Failure HPS1_HCS4** **DID_ASW_CCC_RES_2:3** **RCS piping #2 TCS Failure HPS1_HCS5** **DID_ASW_CCC_RES_2:4** **XPND1 TCS Failure HPS1_HCS6** **DID_ASW_CCC_RES_2:5**		
		Verify CL#02 XPND2 (Grp1Heat2/Grp18Heat2) 　　　　　　**TcsFdir02**　　　　　DEM52170		AND=ZAZ2E999
		Verify CL#03 FCV A1B Grp1Heat3/Grp18Heat3) 　　　　　　**TcsFdir03**　　　　　DEM51170		AND=ZAZ2E999
		Verify CL#04 FCV C2B (Grp1Heat4/Grp18Heat4) 　　　　　　**TcsFdir04**　　　　　DEM50170		AND=ZAZ2E999
		Verify CL#05 RCS PIPES (Grp1Heat5/Grp18Heat5) 　　　　　　**TcsFdir05**　　　　　DEM49170		AND=ZAZ2E999
		Verify CL#06 XPND1 (Grp1Heat6/Grp18Heat6) 　　　　　　**TcsFdir06**　　　　　DEM48170		AND=ZAZ2E999
1.2		*Heater Group 2/17 failure*		
		Verify Packet Reception 　　　　**CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8023** *Packet Details:* 　　　　　　　　　　　　　　APID: 　　　　　　　　　　　　　　Type: 　　　　　　　　　　　　　　Subtype: 　　　　　　　　　　　　　　PI1: 　　　　　　　　　　　　　　PI2:	**D_EvRpMo8023** 16 5 2 32803 0	
		Verify Packet Telemetry (Pkt = D_EvRpMo8023) 　　　　　　**EventId**　　　　　DE068170	= **MotExcId0x8023**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8023) 　　　　　　**MonitorId**　　　　　DE055170	= **27 <dec>**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8023) 　　　　**FirstMaskParVal**　　　　　DE070170	**the 8 MSB identify the failed HCS when first detected**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8023) 　　　　**RepThMaskParVal**　　　　　DE071170	**the 8 MSB identify the failed HCS when the event was raised**	(None)

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		HPS2/17_HCS1 is dedicated to decontamination. **HPS2_HCS6 is dedicated to the Propellant Tanks and should always be ON.**		
		FCV C1B TCS Failure HPS2_HCS2 **DID_ASW_CCC_RES_2:9** **FCV A2B TCS Failure HPS2_HCS3** **DID_ASW_CCC_RES_2:10** **FCV C4B TCS Failure HPS2_HCS4** **DID_ASW_CCC_RES_2:11** **FPDPU/FPSPU TCS Failure HPS2_HCS5** **DID_ASW_CCC_RES_2:12**		
		Verify CL#08 FCV C1B (Grp2Heat2/Grp17Heat2) **TcsFdir08**　　　　　**DEM46170**		AND=ZAZ2E999
		Verify CL#09 FCV A2B (Grp2Heat3/Grp17Heat3) **TcsFdir09**　　　　　**DEM45170**		AND=ZAZ2E999
		Verify CL#10 FCV C4B (Grp2Heat4/Grp17Heat4) **TcsFdir10**　　　　　**DEM44170**		AND=ZAZ2E999
		Verify CL#11 FPSPU, FPDPU (Grp2Heat5/Grp17Heat5) **TcsFdir11**　　　　　**DEM43170**		AND=ZAZ2E999
		Verify CL#12 TANKS (Grp2Heat6/Grp17Heat6) **TcsFdir12**　　　　　**DEM42170**		AND=ZAZ2E999
1.3		*Heater Group 3/16 failure*		
		Verify Packet Reception 　　　**CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8033** *Packet Details:* 　　　　　　　　　　　　　**APID:** 　　　　　　　　　　　　　**Type:** 　　　　　　　　　　　**Subtype:** 　　　　　　　　　　　　　**PI1:** 　　　　　　　　　　　　　**PI2:**	**D_EvRpMo8033** 16 5 2 32819 0	
		Verify Packet Telemetry (Pkt = D_EvRpMo8033) 　　　　**EventId**　　　　**DE068170**	= **MotExcId0x8033**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8033) 　　　　**MonitorId**　　　　**DE055170**	= **33 <dec>**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8033) 　　　　**FirstMaskParVal**　　　**DE070170**	**the 8 LSB identify the failed HCS when first detected**	(None)

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Telemetry (Pkt = D_EvRpMo8033) **RepThMaskParVal** **DE071170**	the 8 LSB identify the failed HCS when the event was raised	(None)
		FPBOLC TCS Failure HPS3_HCS1 **DID_ASW_CCC_RES_3:0** **CRS-1 TCS Failure HPS3_HCS2** **DID_ASW_CCC_RES_3:1** **FPDECMEC TCS Failure HPS3_HCS3** **DID_ASW_CCC_RES_3:2** **RCS piping #1 TCS Failure HPS3_HCS4** **DID_ASW_CCC_RES_3:3** **CCU TCS Failure HPS3_HCS5** **DID_ASW_CCC_RES_3:4** G**YRO TCS Failure HPS3_HCS6** **DID_ASW_CCC_RES_3:5**		
		Verify Cl#13 FPBOLC (Grp3Heat1/Grp16Heat1) **TcsFdir13** **DEM41170**		AND=ZAD42999
		Verify CL#14 CRS 1 (Grp3Heat2/Grp16Heat2) **TcsFdir14** **DEM40170**		AND=ZAD42999
		Verify Cl#15 FPDECMEC (Grp3Heat3/Grp16Heat3) **TcsFdir15** **DEM39170**		AND=ZAD42999
		Verify Cl#16 RCS PIPES (Grp3Heat4/Grp16Heat4) **TcsFdir16** **DEM38170**		AND=ZAD42999
		Verify Cl#17 CCU, HSDCU, HSFCU (Grp3Heat5/Grp16Heat5) **TcsFdir17** **DEM37170**		AND=ZAD42999
		Verify CL#18 GYRO (Grp3Heat6/Grp16Heat6) **TcsFdir18** **DEM36170**		AND=ZAD42999
1.4		*Heater Group 4/15 failure*		

		Verify Packet Reception
		          CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8043
		Packet Details:
		                              APID:
		                              Type:
		                         Subtype:
		                              PI1:
		                              PI2:
			D_EvRpMo8043
			
			16
			5
			2
			32835
			0	

		Verify Packet Telemetry (Pkt = D_EvRpMo8043) **EventId** **DE068170**	= **MotExcId0x8043**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8043) **MonitorId** **DE055170**	= **39 <dec>**	(None)

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Telemetry (Pkt = D_EvRpMo8043) **FirstMaskParVal** DE070170	the 8 MSB identify the failed HCS when first detected	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8043) **RepThMaskParVal** DE071170	the 8 MSB identify the failed HCS when the event was raised	(None)
		HPS4/15_HCS1 is dedicated to decontamination.		
		FHWOV TCS Failure HPS4_HCS2 **DID_ASW_CCC_RES_3:9** **RCS piping # 6 TCS Failure HPS4_HCS3** **DID_ASW_CCC_RES_3:10** **FCV A1A&A1B TCS Failure HPS4_HCS4** **DID_ASW_CCC_RES_3:11** **FCV C2A&C2B TCS Failure HPS4_HCS5** **DID_ASW_CCC_RES_3:12** **RCS piping # 7 TCS Failure HPS4_HCS6** **DID_ASW_CCC_RES_3:13**		
		Verify CL#20 FHWOV (Grp4Heat2/Grp15Heat2) **TcsFdir20** DEM34170		AND=ZAD42999
		Verify CL#21 RCS PIPES (Grp4Heat3/Grp15Heat3) **TcsFdir21** DEM33170		AND=ZAD42999
		Verify Cl#22 FCV A1A (Grp4Heat4/Grp15Heat4) **TcsFdir22** DEM32170		AND=ZAD42999
		Verify Cl#23 FCV C2A (Grp4Heat5/Grp15Heat5) **TcsFdir23** DEM31170		AND=ZAD42999
		Verify Cl#24 RCS PIPES (Grp4Heat6/Grp15Heat6) **TcsFdir24** DEM30170		AND=ZAD42999
1.5		*Heater Group 5/14 failure*		

		Verify Packet Reception
		        CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8053
		Packet Details:
		                              APID:
		                              Type:
		                           Subtype:
		                                PI1:
		                                PI2:
			D_EvRpMo8053
			
			16
			5
			2
			32851
			0	

		Verify Packet Telemetry (Pkt = D_EvRpMo8053) **EventId** DE068170	= **MotExcId0x8053**	(None)

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Telemetry (Pkt = D_EvRpMo8053)		
		MonitorId DE055170	= 45 <dec>	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8053) **FirstMaskParVal** DE070170	the 8 LSB identify the failed HCS when first detected	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8053) **RepThMaskParVal** DE071170	the 8 LSB identify the failed HCS when the event was raised	(None)
		CRS-2 TCS Failure HPS5_HCS1 **DID_ASW_CCC_RES_4:0** **FHHRH TCS Failure HPS5_HCS2** **DID_ASW_CCC_RES_4:1** **FHWEV/FHICU TCS Failure HPS5_HCS3** **DID_ASW_CCC_RES_4:2** **FCV C3B TCS Failure HPS5_HCS4** **DID_ASW_CCC_RES_4:3** **RCS piping #8 TCS Failure HPS5_HCS5** **DID_ASW_CCC_RES_4:4** **PT/LF/LV1/LV2 TCS Failure HPS5_HCS6** **DID_ASW_CCC_RES_4:5**		
		Verify CL#25 CRS-2 (Grp5Heat1/Grp14Heat1) **TcsFdir25** DEM29170		AND=ZAD42999
		Verify CL#26 FHHRH (Grp5Heat2/Grp14Heat2) **TcsFdir26** DEM28170		AND=ZAD42999
		Verify CL#27 FHWEV, FHICU (Grp5Heat3/Grp14Heat3) **TcsFdir27** DEM27170		AND=ZAD42999
		Verify CL#28 FCV C3B (Grp5Heat4/Grp14Heat4) **TcsFdir28** DEM26170		AND=ZAD42999
		Verify CL#29 RCS PIPES (Grp5Heat5/Grp14Heat5) **TcsFdir29** DEM25170		AND=ZAD42999
		Verify CL#30 PT, LF, LV1, LV2 (Grp5Heat6/Grp14Heat6) **TcsFdir30** DEM24170		AND=ZAD42999
1.6		*Heater Group 6/13 failure*		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Reception 　　　　**CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8063** *Packet Details:* 　　　　　　　　　　　　　　**APID:** 　　　　　　　　　　　　　　**Type:** 　　　　　　　　　　　　　**Subtype:** 　　　　　　　　　　　　　　　**PI1:** 　　　　　　　　　　　　　　　**PI2:**	**D_EvRpMo8063** 16 5 2 32867 0	
		Verify Packet Telemetry (Pkt = D_EvRpMo8063) 　　　　　　　**EventId**　　　　　DE068170	= **MotExcId0x8063**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8063) 　　　　　　　**MonitorId**　　　　DE055170	= **51 <dec>**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8063) 　　　　**FirstMaskParVal**　　　DE070170	**the 8 MSB identify the failed HCS when first detected**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8063) 　　　　**RepThMaskParVal**　　　DE071170	**the 8 MSB identify the failed HCS when the event was raised**	(None)
		HPS6_HCS1 is dedicated to decontamination.		
		RWL4 TCS Failure HPS6_HCS2 **DID_ASW_CCC_RES_4:9** **RWL1 TCS Failure HPS6_HCS3** **DID_ASW_CCC_RES_4:10** **RWL3 TCS Failure HPS6_HCS4** **DID_ASW_CCC_RES_4:11** **FHIFV TCS Failure HPS6_HCS5** **DID_ASW_CCC_RES_4:12** **RWL2 TCS Failure HPS6_HCS6** **DID_ASW_CCC_RES_4:13**		
		Verify CL#32 RWL4 (Grp6Heat2/Grp13Heat2) 　　　　　**TcsFdir32**　　　　DEM22170		AND=ZAD42999
		Verify CL#33 RWL1 (Grp6Heat3/Grp13Heat3) 　　　　　**TcsFdir33**　　　　DEM21170		AND=ZAD42999
		Verify CL#34 RWL3 (Grp6Heat4/Grp13Heat4) 　　　　　**TcsFdir34**　　　　DEM20170		AND=ZAD42999
		Verify CL#35 FHIFV (Grp6Heat5/Grp13Heat5) 　　　　　**TcsFdir35**　　　　DEM19170		AND=ZAD42999
		Verify CL#36 RWL2 (Grp6Heat6/Grp13Heat6) 　　　　　**TcsFdir36**　　　　DEM18170		AND=ZAD42999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
1.7		*Heater Group 7/12 failure*		
		Verify Packet Reception 　　　　**CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8073** *Packet Details:* 　　　　　　　　　　　**APID:** 　　　　　　　　　　　**Type:** 　　　　　　　　　　**Subtype:** 　　　　　　　　　　　**PI1:** 　　　　　　　　　　　**PI2:**	D_EvRpMo8073 16 5 2 32883 0	
		Verify Packet Telemetry (Pkt = D_EvRpMo8073) 　　　　　　　**EventId**　　　　　DE068170	= **MotExcId0x8073**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8073) 　　　　　　　**MonitorId**　　　　DE055170	= **57 <dec>**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8073) 　　　　　**FirstMaskParVal**　　　DE070170	the 8 LSB identify the failed HCS when first detected	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8073) 　　　　　**RepThMaskParVal**　　DE071170	the 8 LSB identify the failed HCS when the event was raised	(None)
		STR's TCS Failure HPS7_HCS1 **DID_ASW_CCC_RES_6:0** **BATTERY TCS Failure HPS7_HCS2** **DID_ASW_CCC_RES_6:1** **FHWOH TCS Failure HPS7_HCS3** **DID_ASW_CCC_RES_6:2** **FHWEH TCS Failure HPS7_HCS4** **DID_ASW_CCC_RES_6:3** 　**FCV C1A&C1BTCS Failure HPS7_HCS5** **DID_ASW_CCC_RES_6:4** **FCV A2A&A2B TCS Failure HPS7_HCS6** **DID_ASW_CCC_RES_6:5**		
		Verify CL#37 STR's (Grp7Heat1/Grp12Heat1) 　　　　　**TcsFdir37**　　　　DEM17170		AND=ZAZ2G999
		Verify CL#38 BATTERY (Grp7Heat2/Grp12Heat2) 　　　　　**TcsFdir38**　　　　DEM16170		AND=ZAZ2G999
		Verify CL#39 FHWOH (Grp7Heat3/Grp12Heat3) 　　　　　**TcsFdir39**　　　　DEM15170		AND=ZAZ2G999
		Verify CL#40 FHWEH (Grp7Heat4/Grp12Heat4) 　　　　　**TcsFdir40**　　　　DEM14170		AND=ZAZ2G999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify CL#41 FCV C1A (Grp7Heat5/Grp12Heat5) **TcsFdir41** **DEM13170**		AND=ZAZ2G999
		Verify CL#42 FCV A2A (Grp7Heat6/Grp12Heat6) **TcsFdir42** **DEM12170**		AND=ZAZ2G999
1.8		*Heater Group 8/11 failure*		

		Verify Packet Reception
		          CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8083
		Packet Details:
		                                        APID:
		                                        Type:
		                                  Subtype:
		                                         PI1:
		                                         PI2:
			D_EvRpMo8083
			
			16
			5
			2
			32899
			0	

		Verify Packet Telemetry (Pkt = D_EvRpMo8083) **EventId** DE068170	= **MotExcId0x8083**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8083) **MonitorId** DE055170	= 63 <dec>	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8083) **FirstMaskParVal** DE070170	**the 8 MSB identify the failed HCS when first detected**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8083) **RepThMaskParVal** DE071170	**the 8 MSB identify the failed HCS when the event was raised**	(None)
		FHHRV TCS Failure HPS8_HCS1 **DID_ASW_CCC_RES_6:8** **FCV C3A&C3B TCS Failure HPS8_HCS2** **DID_ASW_CCC_RES_6:9** **RCS piping #3 TCS Failure HPS8_HCS3** **DID_ASW_CCC_RES_6:10** **STR 2 Primary Baffle TCS Failure HPS8_HCS4** **DID_ASW_CCC_RES_6:11** **RCS piping #5TCS Failure HPS8_HCS5** **DID_ASW_CCC_RES_6:12** F**HLCU TCS Failure HPS8_HCS6** **DID_ASW_CCC_RES_6:13**		
		Verify CL#43 FHHRV (Grp8Heat1/Grp11Heat1) **TcsFdir43** **DEM11170**		AND=ZAZ2G999
		Verify CL#44 FCV C3A (Grp8Heat2/Grp11Heat2) **TcsFdir44** **DEM10170**		AND=ZAZ2G999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify CL#45 RCS PIPES (Grp8Heat3/Grp11Heat3) **TcsFdir45** **DEM09170**		AND=ZAZ2G999
		Verify CL#46 STR2 Prim. Baffle (Grp8Heat4/Grp11Heat4) **TcsFdir46** **DEM08170**		AND=ZAZ2G999
		Verify CL#47 RCS PIPES (Grp8Heat5/Grp11Heat5) **TcsFdir47** **DEM07170**		AND=ZAZ2G999
		Verify CL#48 FHLCU, FHIFH (Grp8Heat6/Grp11Heat6) **TcsFdir48** **DEM06170**		AND=ZAZ2G999
1.9		*Heater Group 9/10 failure*		
		Verify Packet Reception **CdmuAsw Event 5-2 Evt_Mot_Exc_Id_0x8093** *Packet Details:* APID: Type: Subtype: PI1: PI2:	**D_EvRpMo8093** 16 5 2 32915 0	
		Verify Packet Telemetry (Pkt = D_EvRpMo8093) **EventId** **DE068170**	**= MotExcId0x8093**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8093) **MonitorId** **DE055170**	**= 69 <dec>**	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8093) **FirstMaskParVal** **DE070170**	the 6 LSB identify the failed HCS when first detected	(None)
		Verify Packet Telemetry (Pkt = D_EvRpMo8093) **RepThMaskParVal** **DE071170**	the 6 LSB identify the failed HCS when the event was raised	(None)
		HPS9/10_HCS1 is dedicated to decontamination.		
		Tank -Y TCS Failure HPS9_HCS2 **DID_ASW_CCC_RES_5:1** **FCV C4A&C4B TCS Failure HPS9_HCS3** **DID_ASW_CCC_RES_5:2** **FHLSU TCS Failure HPS9_HCS4** **DID_ASW_CCC_RES_5:3** **STR_1 Primary Baffle TCS Failure HPS9_HCS5** **DID_ASW_CCC_RES_5:4** **Tank +Y TCS Failure HPS9_HCS6** **DID_ASW_CCC_RES_5:5**		

Status : Version 2 – Unchanged
Last Checkin: 10/12/08

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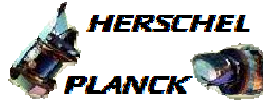| Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify CL#50 TANK -Y (Grp9Heat2/Grp10Heat2) **TcsFdir50** DEM04170		AND=ZAZ2H999
		Verify CL#51 FCV C4A (Grp9Heat3/Grp10Heat3) **TcsFdir51** DEM03170		AND=ZAZ2H999
		Verify CL#52 FHLSU (Grp9Heat4/Grp10Heat4) **TcsFdir52** DEM02170		AND=ZAZ2H999
		Verify CL#53 STR1 Prim. Baffle (Grp9Heat5/Grp10Heat5) **TcsFdir53** DEM01170		AND=ZAZ2H999
		Verify CL#54 TANK +Y (Grp9Heat6/Grp10Heat6) **TcsFdir54** DEM00170		AND=ZAZ2H999
2		*Check HPS ON/OFF status*		Next Step: 3
		In the following checks, it has been assumed that Heater Groups 1-9 are the Nominal ones and Heater Groups 18-10 the Redundant. ***If this was not the case, the checks should be reversed, ie the HPS paired with the failed one should be ON and the failed one should be OFF.***		
2.1		*Heater Group 1/18 status*		
		Verify Telemetry **GRP1_HPS_STS** WM12G565	**If Failed OFF**	AND=WAHT1584
		Verify Telemetry **GRP18_HPS_STS** WMA2G565	**If GRP1 Failed ON**	AND=WAHT3584
2.2		*Heater Group 2/17 status*		
		Verify Telemetry **GRP2_HPS_STS** WM22G565	**If Failed OFF**	AND=WAHT1584
		Verify Telemetry **GRP17_HPS_STS** WM92H565	**If GRP2 Failed ON**	AND=WAHT3584
2.3		*Heater Group 3/16 status*		
		Verify Telemetry **GRP3_HPS_STS** WM22H565	**If Failed OFF**	AND=WAHT1584
		Verify Telemetry **GRP16_HPS_STS** WM92G565	**If GRP3 Failed ON**	AND=WAHT3584

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Step No.	Time	Activity/Remarks		TC/TLM	Display/ Branch
2.4		*Heater Group 4/15 status*			
		Verify Telemetry			AND=WAHT1584
		GRP4_HPS_STS	**WM32G565**	**If Failed OFF**	
		Verify Telemetry			AND=WAHT3584
		GRP15_HPS_STS	**WM82H565**	**If GRP4 Failed ON**	
2.5		*Heater Group 5/14 status*			
		Verify Telemetry			AND=WAHT1584
		GRP5_HPS_STS	**WM32H565**	**If Failed OFF**	
		Verify Telemetry			AND=WAHT3584
		GRP14_HPS_STS	**WM82G565**	**If GRP5 Failed ON**	
2.6		*Heater Group 6/13 status*			
		Verify Telemetry			AND=WAHT1584
		GRP6_HPS_STS	**WM42G565**	**If Failed OFF**	
		Verify Telemetry			AND=WAHT3584
		GRP13_HPS_STS	**WM72H565**	**If GRP6 Failed ON**	
2.7		*Heater Group 7/12 status*			
		Verify Telemetry			AND=WAHT2584
		GRP7_HPS_STS	**WM42H565**	**If Failed OFF**	
		Verify Telemetry			AND=WAHT2584
		GRP12_HPS_STS	**WM72G565**	**If GRP7 Failed ON**	
2.8		*Heater Group 8/11 status*			
		Verify Telemetry			AND=WAHT2584
		GRP8_HPS_STS	**WM52G565**	**If Failed OFF**	
		Verify Telemetry			AND=WAHT2584
		GRP11_HPS_STS	**WM62H565**	**If GRP8 Failed ON**	
2.9		*Heater Group 9/10 status*			

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```

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry **GRP9_HPS_STS** WM52H565	**If Failed OFF**	AND=WAHT2584
		Verify Telemetry **GRP10_HPS_STS** WM62G565	**If GRP9 Failed ON**	AND=WAHT2584
3		*Check MOT*		Next Step: 4
		The MOT entry related to the failed group should be enabled as now using the redundant HPS/HCS. **This allows detection of any future failure within the group.**		

		Execute Telecommand
		
		                  ReportMonitList
		
		TC Control Flags :
		                     GBM IL DSE
		                     --Y -- ---
		
		Subsch. ID : 10
		Det. descr. : TEMPLATE Report current monitoring list, TC(12,8) no appl. data
			DC51F170	

		The monitoring ID / Heater Group allocation being: **Parameter ID** **Mon ID** **Monitoring Status** HPS1_Thermal_Control_Failure 21 ENABLED HPS2_Thermal_Control_Failure 27 ENABLED HPS3_Thermal_Control_Failure 33 ENABLED HPS4_Thermal_Control_Failure 39 ENABLED HPS5_Thermal_Control_Failure 45 ENABLED HPS6_Thermal_Control_Failure 51 ENABLED HPS7_Thermal_Control_Failure 57 ENABLED HPS8_Thermal_Control_Failure 63 ENABLED HPS9_Thermal_Control_Failure 69 ENABLED		
4		*Check EAT*		Next Step: 5
		The EAT entry related to the failed group should be disabled as no future on-board reconfiguration is possible.		

		Execute Telecommand
		
		                  ReptEvtActTable
		
		TC Control Flags :
		                     GBM IL DSE
		                     --Y -- ---
		
		Subsch. ID : 10
		Det. descr. : TEMPLATE Report The contents of the event/action table TC(19,6)
			DCT86170	

```
 Status     : Version 2 - Unchanged
 Last Checkin: 10/12/08
```

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Event Description **Event ID** **Action Status** HPS1_Th_Cntrl_Failure 0x8013 Disabled if group 1 failed HPS2_Th_Cntrl_Failure 0x8023 Disabled if group 2 failed HPS3_Th_Cntrl_Failure 0x8033 Disabled if group 3 failed HPS4_Th_Cntrl_Failure 0x8043 Disabled if group 4 failed HPS5_Th_Cntrl_Failure 0x8053 Disabled if group 5 failed HPS6_Th_Cntrl_Failure 0x8063 Disabled if group 6 failed HPS7_Th_Cntrl_Failure 0x8073 Disabled if group 7 failed HPS8_Th_Cntrl_Failure 0x8083 Disabled if group 8 failed HPS9_Th_Cntrl_Failure 0x8093 Disabled if group 9 failed		
5		*Check UIU*		Next Step: 6
		The UIU entry related to the failed group should be set to FAILED and OFF. **The UIU entry related to the associated redundant group should be set to NOT FAILED and ON.**		
		In the following checks, it has been assumed that Heater Groups 1-9 are the Nominal ones and Heater Groups 18-10 the Redundant. ***If this was not the case, the checks should be reversed***		
5.1		*If Group 1 failed then Verify Heater Group 1/18 status*		
		Verify Telemetry **Hps1FuncSts** DEG77170	**= Off**	AND=ZAZ7K999
		Verify Telemetry **Hps1Use** DEG79170	**= Not_In_Use**	AND=ZAZ7K999
		Verify Telemetry **Hps1LogSts** DEG78170	**= Nominal**	AND=ZAZ7K999
		Verify Telemetry **Hps1FailSts** DEG76170	**= Failed**	AND=ZAZ7K999
		Verify Telemetry **Hps18FuncSts** DEG73170	**= On**	AND=ZAZ7K999
		Verify Telemetry **Hps18Use** DEG75170	**= In_Use**	AND=ZAZ7K999
		Verify Telemetry **Hps18LogSts** DEG74170	**= Redundant**	AND=ZAZ7K999
		Verify Telemetry **Hps18FailSts** DEG72170	**= Not_Failed**	AND=ZAZ7K999
5.2		*if Group 2 failed then Verify Heater Group 2/17 status*		

Configuration check after thermal control loop failure
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Step No.	Time	Activity/Remarks		TC/TLM	Display/ Branch
		Verify Telemetry Hps2FuncSts	DEG81170	= Off	AND=ZAZ7K999
		Verify Telemetry Hps2Use	DEG83170	= Not_In_Use	AND=ZAZ7K999
		Verify Telemetry Hps2LogSts	DEG82170	= Nominal	AND=ZAZ7K999
		Verify Telemetry Hps2FailSts	DEG80170	= Failed	AND=ZAZ7K999
		Verify Telemetry Hps17FuncSts	DEG69170	= On	AND=ZAZ7K999
		Verify Telemetry Hps17Use	DEG71170	= In_Use	AND=ZAZ7K999
		Verify Telemetry Hps17LogSts	DEG70170	= Redundant	AND=ZAZ7K999
		Verify Telemetry Hps17FailSts	DEG68170	= Not_Failed	AND=ZAZ7K999
5.3		if Group 3 failed then Verify Heater Group 3/16 status			
		Verify Telemetry Hps3FuncSts	DEG85170	= Off	AND=ZAZ7K999
		Verify Telemetry Hps3Use	DEG87170	= Not_In_Use	AND=ZAZ7K999
		Verify Telemetry Hps3LogSts	DEG86170	= Nominal	AND=ZAZ7K999
		Verify Telemetry Hps3FailSts	DEG84170	= Failed	AND=ZAZ7K999
		Verify Telemetry Hps16FuncSts	DEG65170	= On	AND=ZAZ7K999
		Verify Telemetry Hps16Use	DEG67170	= In_Use	AND=ZAZ7K999
		Verify Telemetry Hps16LogSts	DEG66170	= Redundant	AND=ZAZ7K999
		Verify Telemetry Hps16FailSts	DEG64170	= Not_Failed	AND=ZAZ7K999
5.4		if Group 4 failed then Verify Heater Group 4/15 status			
		Verify Telemetry Hps4FuncSts	DEG89170	= Off	AND=ZAZ7K999

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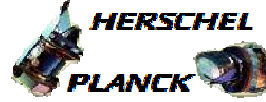
Step No.	Time	Activity/Remarks			TC/TLM	Display/ Branch
		Verify Telemetry Hps4Use	DEG91170		= Not_In_Use	AND=ZAZ7K999
		Verify Telemetry Hps4LogSts	DEG90170		= Nominal	AND=ZAZ7K999
		Verify Telemetry Hps4FailSts	DEG88170		= Failed	AND=ZAZ7K999
		Verify Telemetry Hps15FuncSts	DEG61170		= On	AND=ZAZ7K999
		Verify Telemetry Hps15Use	DEG63170		= In_Use	AND=ZAZ7K999
		Verify Telemetry Hps15LogSts	DEG62170		= Redundant	AND=ZAZ7K999
		Verify Telemetry Hps15FailSts	DEG60170		= Not_Failed	AND=ZAZ7K999
5.5		if Group 5 failed then Verify Heater Group 5/14 status				
		Verify Telemetry Hps5FuncSts	DEG93170		= Off	AND=ZAZ7K999
		Verify Telemetry Hps5Use	DEG95170		= Not_In_Use	AND=ZAZ7K999
		Verify Telemetry Hps5LogSts	DEG94170		= Nominal	AND=ZAZ7K999
		Verify Telemetry Hps5FailSts	DEG92170		= Failed	AND=ZAZ7K999
		Verify Telemetry Hps14FuncSts	DEG57170		= On	AND=ZAZ7K999
		Verify Telemetry Hps14Use	DEG59170		= In_Use	AND=ZAZ7K999
		Verify Telemetry Hps14LogSts	DEG58170		= Redundant	AND=ZAZ7K999
		Verify Telemetry Hps14FailSts	DEG56170		= Not_Failed	AND=ZAZ7K999
5.6		if Group 6 failed then Verify Heater Group 6/13 status				
		Verify Telemetry Hps6FuncSts	DEG97170		= Off	AND=ZAZ7K999
		Verify Telemetry Hps6Use	DEG99170		= Not_In_Use	AND=ZAZ7K999

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Step No.	Time	Activity/Remarks		TC/TLM	Display/ Branch
		Verify Telemetry Hps6LogSts	DEG98170	= Nominal	AND=ZAZ7K999
		Verify Telemetry Hps6FailSts	DEG96170	= Failed	AND=ZAZ7K999
		Verify Telemetry Hps13FuncSts	DEG53170	= On	AND=ZAZ7K999
		Verify Telemetry Hps13Use	DEG55170	= In_Use	AND=ZAZ7K999
		Verify Telemetry Hps13LogSts	DEG54170	= Redundant	AND=ZAZ7K999
		Verify Telemetry Hps13FailSts	DEG52170	= Not_Failed	AND=ZAZ7K999
5.7		if Group 7 failed then Verify Heater Group 7/12 status			
		Verify Telemetry Hps7FuncSts	DEH01170	= Off	AND=ZAZ7K999
		Verify Telemetry Hps7Use	DEH03170	= Not_In_Use	AND=ZAZ7K999
		Verify Telemetry Hps7LogSts	DEH02170	= Nominal	AND=ZAZ7K999
		Verify Telemetry Hps7FailSts	DEH00170	= Failed	AND=ZAZ7K999
		Verify Telemetry Hps12FuncSts	DEG49170	= On	AND=ZAZ7K999
		Verify Telemetry Hps12Use	DEG51170	= In_Use	AND=ZAZ7K999
		Verify Telemetry Hps12LogSts	DEG50170	= Redundant	AND=ZAZ7K999
		Verify Telemetry Hps12FailSts	DEG48170	= Not_Failed	AND=ZAZ7K999
5.8		if Group 8 failed then Verify Heater Group 8/11 status			
		Verify Telemetry Hps8FuncSts	DEH05170	= Off	AND=ZAZ7K999
		Verify Telemetry Hps8Use	DEH07170	= Not_In_Use	AND=ZAZ7K999
		Verify Telemetry Hps8LogSts	DEH06170	= Nominal	AND=ZAZ7K999

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Step No.	Time	Activity/Remarks		TC/TLM	Display/ Branch
		Verify Telemetry Hps8FailSts	DEH04170	= Failed	AND=ZAZ7K999
		Verify Telemetry Hps11FuncSts	DEG45170	= On	AND=ZAZ7K999
		Verify Telemetry Hps11Use	DEG47170	= In_Use	AND=ZAZ7K999
		Verify Telemetry Hps11LogSts	DEG46170	= Redundant	AND=ZAZ7K999
		Verify Telemetry Hps11FailSts	DEG44170	= Not_Failed	AND=ZAZ7K999
5.9		*if Group 9 failed then Verify Heater Group 9/10 status*			
		Verify Telemetry Hps9FuncSts	DEH09170	= Off	AND=ZAZ7L999
		Verify Telemetry Hps9Use	DEH11170	= Not_In_Use	AND=ZAZ7L999
		Verify Telemetry Hps9LogSts	DEH10170	= Nominal	AND=ZAZ7L999
		Verify Telemetry Hps9FailSts	DEH08170	= Failed	AND=ZAZ7L999
		Verify Telemetry Hps10FuncSts	DEG41170	= On	AND=ZAZ7L999
		Verify Telemetry Hps10Use	DEG43170	= In_Use	AND=ZAZ7L999
		Verify Telemetry Hps10LogSts	DEG42170	= Redundant	AND=ZAZ7L999
		Verify Telemetry Hps10FailSts	DEG40170	= Not_Failed	AND=ZAZ7L999
6		*Check TCT*			Next Step: 7
		The TCT entries related to the failed group should be enabled as now using the redundant HPS/HCS.			
		Execute Procedure: **H_FCP_TCS_REPO** **Thermal Control Status Report**			
7		*Heater Group 2/17 failure (yes/no)?*			Next Step: no END yes 8

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
8		*Check Propellant Tanks dedicated line*		Next Step: END
		The HCS6 of the redundant group should be ON.		
8.1		*If GRP2 failed, verify G17H6 tanks heater line status*		
		Verify Telemetry **tanks_G17H6_S** **WM91M565**	**= ON**	AND=WAHT3584
8.2		*If GRP17 failed, verify G2H6 tanks heater line status*		
		Verify Telemetry **tanks_G2H6_S** **WM21F565**	**= ON**	AND=WAHT1584
		End of Procedure		