HESSI

DETECTOR COOL DOWN

HSI_MIT_064A

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As Run on: _____ (Date/Time)

By _____ (Test Conductor)

DOCUMENT REVISION RECORD

Rev.	Date	Description of Change
A	2000-7-16	First Release

Western Range/NASA Safety:_____ _____
Date

Project Manager: _____ _____
Peter Harvey Date

System Engineer: _____ _____
David Curtis Date

QA: _____ _____
Ron Jackson Date

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Purpose

This document describes the detector cool down procedure for use when the spectrometer is integrated to the spacecraft. Conditions are expected to be ambient. For thermal vacuum, see the spacecraft thermal vacuum procedure.

1.2 Scope

This procedure will be performed if HESSI is stuck in a NASA launch delay of 2 months or more.

2. SETUP

2.1 Test Setup

The Spacecraft will be horizontal so that the cryocooler orientation is vertical. The vacuum pump will be attached and operating.

The spacecraft shall be connected to the EGSE via the TAC and Battery Relay Box. The Flight Enable Plug (FEP) shall be disconnected to avoid accidental RF transmission or solar array deployment.

The battery shall be cooled as much as possible using the HESSI air conditioner unit on maximum cooling.

The pump cart chiller unit will be attached to the radiator, but the chiller power will remain off until the test begins.

The Battery Relay shall be enabled, and the TAC supply voltage shall be set to trickle-charge the battery at 0.2A.

Verify the test set-up is per the HESSI Spacecraft Power ON/OFF Procedure, HSI_MIT_049, Section 3.0, Spacecraft Power via Test Access Connector (TAC). Verify the following conditions:

a. Spacecraft (S/C) to Ground Support Equipment (GSE) interface connectors shall be mated at the start of this procedure. Including:

TAC-J1	_____ OK
BFP-J1	_____ Relay Box
FEP	_____Removed
UMB-J1	_____Connected to Launch Vehicle

3. TEST PROCEDURE

3.1 Spacecraft Power On

a. Power ON the spacecraft using the Spacecraft Power ON/OFF procedure, HSI_MIT_049, Section 3.0, Spacecraft Power via Test Access Connector (TAC). Record the TAC Voltage and Current.

TAC Voltage		28–36 Vdc
TAC Current		TAC-BATT = 0.5 – 1.4 Adc
Batt Current		

1. Verify Mission Mode on the ITOS PACI page is MISSION (not LAUNCH) _____OK

- If LAUNCH mode,run ITOS script "sc_mm_nom", power off the bus, and start again at step a.

b. Enable the battery onto the bus:

1. Set the TAC voltage to match the BATT VOLT value on the ITOS PACI telemetry page. _____Volts

2. Enable the battery onto the bus by clicking on the Battery Relay button on the PC _____OK

3. Increase the TAC voltage by 0.2V steps while monitoring the BATT CURRENT on the ITOS PACI page. Increase TAC voltage untill BATT CURRENT reads +1Amp (+0.2Amp with I&T battery). _____OK

c. This section powers on the battery pressure monitors

a. In the “PCB Interface” telemetry display click on the NEB2 “ON” button to command the PCB NEB2 bus on, and verify that the status indicator for NEB2 displays “ON.” _____OK

b. In the "PCB Interface" telemetry display click on the SPARE 1 "ON" button to command on the battery pressure monitor, and verify the status indicator for SPARE 1 displays "ON" _____OK

c. Record the Battery Pressure telemetry on the "PACI" page

Batt Press 1		3000-5000
Batt Press 2		3000-5000

3.2 Power on the Instrument

a. This section powers on the IDPU. Instrument displays should be on a separate ITOS computer if possible.

1. Display the “IGSE Menu” ITOS telemetry display by typing “page igse_pages” at the ITOS STOL command prompt.

2. In the IGSE menu click on the "SOH Executive" button and the "IDPU Voltages" button

3. Start the "SC_IDPUON" procedure. In the “PCB Interface" page verify that the status indicator for the IDPU displays “ON.” Verify IDPU current is less than 0.7A _____OK

4. Verify that the IDPU_MODE on the "SOH Executive" displays "Normal"_____OK

5. Record any errors on "SOH Executive" page (SPECTEMP error is normal if detectors are warm)

Error Count: _____ Errors Code:_____

6. Start the "SC_CPCON" procedure. In the “PCB Interface" page verify that the status indicator for the CRYO displays “ON.” Verify CRYO Current is less than 0.1A _____OK

7. On the "PCB" page verify no OC trips. _____OK

8. Record TAC voltage and current:

TAC Voltage		28–36 Vdc
TAC Current		TAC-BATT = 1.8 – 2.2 Adc
Batt Current		

b. Increase the TAC current limit on the PC GSE to 6Amps _____OK

c. Increase the TAC voltage on the PC GSE in 0.1V steps until the Batt Current is about 0.8A (0.2A if I&T battery), but not greater than 36V. _____OK

d. Record Battery Temperature on PACI page. If greater than 25C notify engineer immediately _____OK

e. Organize screens so that all data can be seen. Take page snaps of all screens (Instrument and Spacecraft). Be sure that a system clock is on each screen _____OK

3.3 Collect Trending Data

a. Start the "Sprt_trnd" ITOS Procedure to collect trending data _____OK

Completed Date/Time: _____

4. TEST PROCEDURE

4.1 Turn On / Ramp to Full Power

a. Run ITOS command "CFGMON CRYOPOWER" to calculate the Cryocooler power level on the Spectrometer power page.

b. Verify that the CPC Status on the SOH Spectrometer Power page is "TRIPPED"
TC Verify:_____

c. Start the ITOS script "ICRYO_ON". Verify that CPC Status is now "OK"
TC Verify:_____

d. Record the ICT1T Temperature on the SOH Spectrometer Power ITOS page
ICT1T:_____

e. Record the accelerometer setting on the SOH Spectrometer Power ITOS page. Should be about 10mG
IACCEL:_____

f. Start the ITOS proc "ICRYOMAIN_RAMP(20)". Record the following values:
TIME_____
ICRYOMAIN_____
ICRYOBAL_____
ICRYOPHASE_____
CRYO POWER_____
IACCEL_____

g. Measure the room temperature and relative humidity
RoomTemp_____
RelHumidity_____

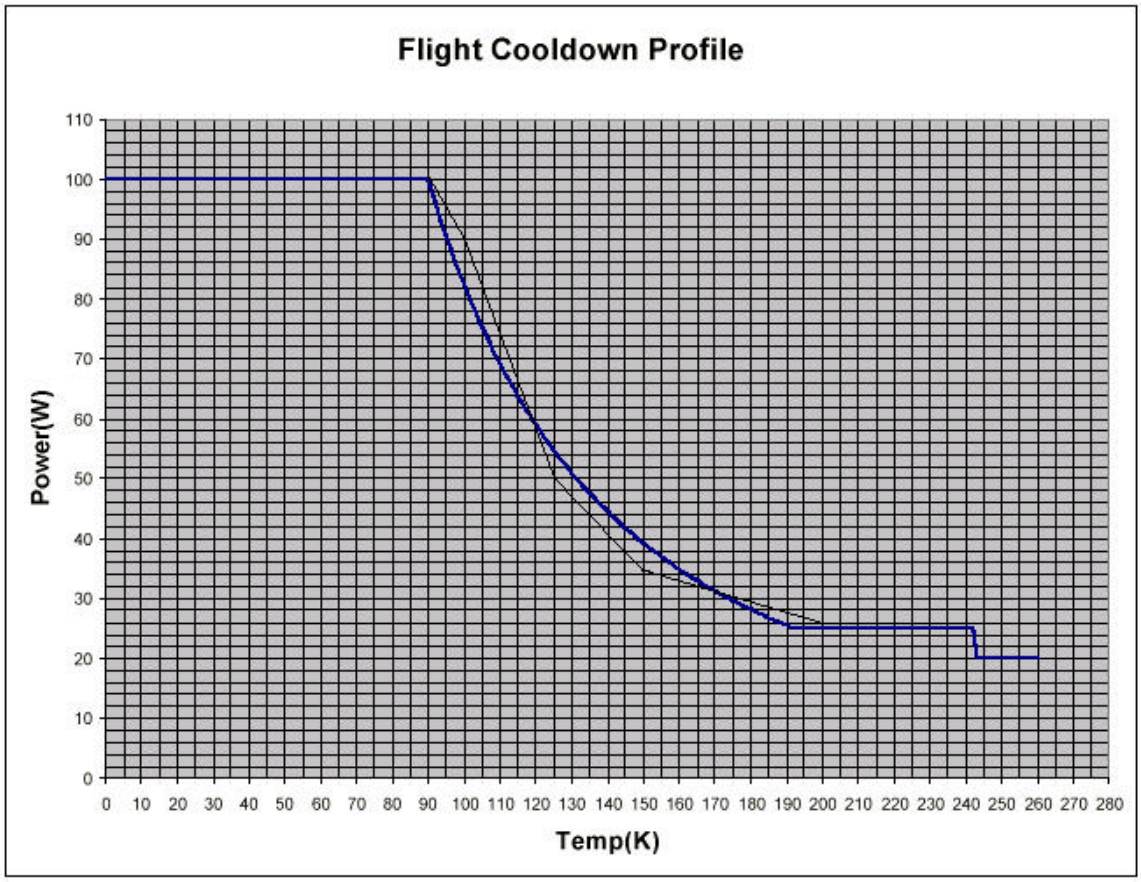
h. Calculate the dew point
Dew Point_____

i. Set the Chiller unit to DewPoint plus 3F
Chiller Setting_____

j. Step the cryocooler power up as the cold tip temperatures fall:

ColdTip	Power Setting	Time	Accel	RAD1T
240K	25W			
180K	30W			
160K	35W			
150K	40W			
140K	45W			
130K	50W			
125K	55W			
120K	60W			
115K	65W			
112K	70W			
110K	75W			
107K	80W			
104K	85W			
100K	90W			
95K	95W			

Note that the Red Team has imposed a 5W margin in the use of the cryocooler and therefore, HESSI operators should not exceed 95W.



4.2 Detector Cool Down

a. Wait for the Cold Plate temperature (CP1T and CP2T) to be lower than the Thermal Shield (TST). Record the date and time Date-Time_____
b. Record the temperature of crossover TST_____
c. For added cooling, set up LN2 GSE and connect to cold plate _____OK
d. When Cold Plate reaches 80K, start ICRYOMAIN_RAMP(0) _____OK
e. Record Cryo Off Time and enter Cryo duration to operating time. _____OK
f. Shut Off Spacecraft using spacecraft shutdown procedure.

4.3 Monitoring

When spacecraft is off, connect Spectrometer GSE to the spectrometer utility box using the A/B switch box. Verify that the temperatures are nominal and that the web page software can read the data.