Summary of Team Response to Radiation Events

TYPICAL NOTIFICATIONS / TEAM INTERACTIONS

1. High Radiation Alerts

Typically, we'll have advanced warning of high radiation through some or all of the ACE , GOES and SEC space weather alerts. Of course, it is the duty of the ACIS scientist on-call to carefully monitor the space weather environment throughout the week. The relevant web links are all accessible through the "Radiation Central" web page maintained by MTA:

http://asc.harvard.edu/mta/RADIATION/

Sample Alert #1 – M5 class flare alert from SEC

```
From secproducts@noaa.gov  Thu Aug 25 00:42:05 2005
From: <secproducts@noaa.gov>
To: <acisdude@head.cfa.harvard.edu>
Subject: ALERT: X-ray Flux exceeded M5
Date: Thu, 25 Aug 2005 04:41:26 -0000

Space Weather Message Code: ALTXMF
Serial Number: 117
Issue Time: 2005 Aug 25 0439 UTC

ALERT: X-Ray Flux exceeded M5
Threshold Reached: 2005 Aug 25 0438 UTC
NOAA Scale: R2 – Moderate
```

Sample Alert #2 – ACE P3 fluence alert from MTA

```
From owner-sot_lead@head.cfa.harvard.edu  Wed Aug 24 04:45:41 2005
From: DOSS - Monitoring and Trends Analysis <mta@head.cfa.harvard.edu>
Date: Wed, 24 Aug 2005 04:45:02 -0400 (EDT)
To: sot_red_alert@head.cfa.harvard.edu
Subject: ACE_p3

 A Radiation violation of P3 (130Kev) has been observed by ACE
 Observed = 3.7644e+08
 (limit = fluence of 3.6e8 particles/cm2-ster-MeV within 2 hours)
see http://cxc.harvard.edu/mta/ace.html
This message sent to sot_red_alert
```

Sample Alert #3 – ACISDUDE Fluence alert

```
From owner-sot_red_alert@head.cfa.harvard.edu  Sun May  8 23:41:29 2005
From: ACIS Monitor <acisdude@head.cfa.harvard.edu>
Date: Sun, 8 May 2005 23:40:02 -0400 (EDT)
To: acisdude@head.cfa.harvard.edu, sot_red_alert@head.cfa.harvard.edu
Subject: ACIS FLUENCE ALERT (P3p Scaling)!!
Sender: owner-sot_red_alert@head.cfa.harvard.edu

ACIS ALERT!! ACE p+!
ACIS P3 fluence = 1.00e+09
p/(cm^2-sr-MeV),
in previous 22.9 hrs
Above limit=1.0E+09
at 112 - 187 keV.
Latest ACE P3p proton
flux = 3.78e+02
p/(cm^2-s-sr-MeV).
Next SIM trans (to
  ACIS-S) occurs at
UT:2005:129:12:24:25.523.
Present CXO alt:
119558 km and A.
CXO SI config:
  ACIS-S:HETG-OUT:LETG-OUT
Next DSN contacts:
```

```
 129:0345-0445 UT
 129:1200-1300 UT
 129:1940-2140 UT
Sun May  8 23:40:01 EDT 2005
```

2. Radiation Teleconferences & SCS107

Once high radiation is identified, it may be necessary to convene a telecon to discuss manual intervention of the loads. In a majority of cases, we'll find that SCS107 has tripped autonomously at the next available COM. However, there are those excruciating cases when a minor storm generates elevated rates that may not trip RADMON, but will eventually lead to unacceptable fluence levels.

FLUENCE LIMITS
ACE P3 (112-187 keV protons) limit of 1.0e9 p/(cm^2-s-sr-MeV) in an orbit
or 3.6e8 in a 2 hour period

Regardless of whether SCS107 is tripped manually or autonomously, we will receive multiple email/pager alerts from the FOT and MTA. Once we know when SCS107 ran, we can then run *history-files.pl* to keep the ACIS history files up-to-date for further fluence monitoring. At this point, the FOT will begin considering options for a replan science load or a maneuver only load, if needed, and we will begin investigating the possibility of running an ACIS CTI RTS CAP.

Tom's "Replan Central" page:
http://cxc.harvard.edu/mta/ASPECT/arc/

Notes on contingency load reviews and the CTI RTS:
http://asc.harvard.edu/acis/memos/webpage/lr.html#rad
http://cxc.harvard.edu/acis/memos/webpage/rts_cap.htm
(**NOTE**: we should review the new format of the CTI RTS CAP)

3. Return to Science

Depending on the severity of the solar storm(s) in progress, there will likely be multiple radiation telecons to discuss the radiation environment and options for resuming the science mission; we may be called on to perform multiple load reviews in a short amount of time and should be prepared for a CTI RTS CAP review. We're at the mercy of the space weather environment during this time. Once loads are approved and the environment is benign enough to start observing again, we can begin the cleanup processing. This consists of running *history-files.pl* again with the *-go* switch to update the history files with the replan load information. Note that running history-files in this manner automatically calls the ACE-update script. All is well with the world and the Sun and we're back to the mission!