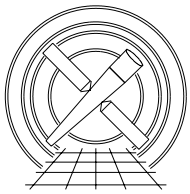

MIT Kavli Institute **Chandra X-Ray Center**

MEMORANDUM
February 27, 2007

To:	Jonathan McDowell, SDS Group Leader
From:	Glenn E. Allen, SDS
Subject:	FLTGRADE Caveats
Revision:	1.0
URL:	http://space.mit.edu/CXC/docs/docs.html#fltgrade
File:	/nfs/cxc/h2/gea/sds/docs/notes/notes_fltgrade_1.0.tex

The ACIS flight grade is a coded description of the distribution of charge in a 3 pixel × 3 pixel event island. Of the 256 possible FLTGRADEs, events with FLTGRADE = 24, 66, 107, 214 or 255 are typically not telemetered to the ground because the events with these FLTGRADEs are dominated by cosmic rays. Including these events would require too much telemetery. Yet, some events in Level 1 ACIS event-data files have these FLTGRADEs.

1 OBS_ID 3501

For example, the event-data file acisf03501_000N002_evt1.fits for OBS_ID 3501 has twenty-one events with FLTGRADE = 255. The frame number and detector location of these events are listed in Table 1. There was one and only one bias-parity error during this OBS_ID. The error occured on the pixel (CCD_ID, CHIPX, CHIPY) = $(1, 607, 1014)$. While there are a total of 216,296 events on CCD_ID = 1 for this observation, the events with FLTGRADE = 255 occur only immediately adjacent to (but not on) the pixel with the bias-parity error. The error occured in frame 6,687. There is at least one event per frame on CCD_ID = 1 between frames 3 and 11,356, except for frame 10,243. Yet the events in Table 1 occur only after the bias-parity error. The pixels on which the events in Table 1 occur have valid bias values and the pixels are not identified as bad for any reason other than being adjacent to a pixel with a bias-parity error.

The likely explanation for the presence of the twenty-one events in OBS_ID 3501 is that the charge on the pixel affected by the bias-parity error is ignored by the onboard event-processing code. As a result, the events are not assigned a flight grade of 255 and are telemetered to the ground. When the data is processed on the ground, the charge on the bias-parity error is included when computing the value of the flight grade. Therefore, the twenty-one events are assigned FLTGRADE = 255 in the file acisf03501_000N002_evt1.fits.

Table 1: Events with FLTGRADE = 255.

EXPNO	CCD_ID	CHIPX	CHIPY
6724	1	608	1014
6724	1	606	1015
6800	1	607	1015
7235	1	606	1013
7235	1	607	1015
7260	1	608	1014
7294	1	606	1014
7976	1	607	1013
7976	1	606	1015
8010	1	607	1015
8169	1	606	1014
8742	1	608	1014
8765	1	608	1013
9080	1	608	1013
9787	1	608	1014
10000	1	608	1015
10235	1	606	1014
10578	1	608	1015
10585	1	608	1014
10631	1	606	1015
10845	1	608	1013