REQUEST FOR ACTION (RFA) RESPONSE

GLAST LAT Project
Calorimeter Peer Review **17 – 18 March 2003**

Action Item:	CAL – 028
Presentation Section:	Schedule and Transportation
Submitted by:	Bill Wisniewski

Request: Crystal Production delivery - Schedule is tight: pre-plan for about a month of cumulative delays in delivery of crystals. If schedule analysis indicates that the crystals are on the critical path, consider tuning "bad" crystal light taper on receipt rather than returning to vendor (This may be several percent of the crystals!).

Reason / Comment: Schedule risk is high.

Response: Revised 25 April 2003

The CsI crystal production is planned on a schedule that has significant float against need dates for CDE manufacturing. The first 48 flight crystals will be completed by April 15th and will be inspected by Swedish collaborators at the factory in the Ukraine. The first 120 crystals are needed in France in late July. The flight production rate of 200 crystals per month will deliver essentially all CsI crystals to Sweden before the end of the calendar year. This plan indicates 80 days of float against need dates in France. The crystals will be stored in France until needed.

With the delivery of ~250 crystals in about 6 lots (including redelivery of modified crystals), the shipping and customs issues for delivery of crystals from the Ukraine to Sweden are well established. The typical delivery takes about 3 days.

The CAL team has demonstrated the ability to correct light tapers. This correction was required due to the excessive handling many of the EM crystals received during rework of the length and chamfers. These problems with the light taper are not expected with the flight crystals. Amcrys-H, Sweden and France all have the same optical test bench to measure light yields and tapers. The French are considering an adaptation of their bench for a PIN diode readout to create light yield measurements that may be more representative of the expected CDE performance. We are also testing aperture masks on the normal PMT readout from the bench as a modification to all benches that might correlate better with the final CDE measurement. We have demonstrated that the same light taper can be verified with either PMT or diode readout. For absolute light yield, a conversion factor is required. EM correlations of PMT measurements to CDE light yields are not as tight as we would like. Contributors to this include quality of the bonds, differing wrapping materials and differing crystal end treatments. Amcrys and Sweden must use identical benches and configurations to verify contracted performance of the crystal.

CEA is more concerned with predicting CDE performance based on crystal light yield as a control of their contractor's bonding process. To that end, they want the best measurement of light yield with little or no corrective factors for differing test conditions. In EM CDEs we have also been able to use large/small PIN diode light ratios and end-to-end ratios (for center muons) to detect bad bonds. The fact of the matter is that we have 40% more light than the requirement. So the objectives are mainly to obtain a more uniform performance from the CDEs and to detect poor quality bonds.

Our taper requirements are minimal – essentially monotonic. The actual product is much better. The taper is calibrated with cosmic muons on the ground and recalibrated with cosmics (protons and heavy ions) in orbit. These calibrations provide absolute gain measurements, taper gain corrections, and positional calibration which are used in ground data analysis. When we receive crystals that haven't had so much rework as the EM crystals received, we expect few, if any, bad tapers. Material with bad taper shall be set aside for return to Amcrys-H or for repair in Sweden, depending on schedule constraints.