Trigger Monitoring and the Good Run List

What is the Good Run List?

How shall we define a run good for the trigger?

How shall we define a run bad for the trigger?

How many checks are sufficient?

What monitoring do we have in place now?
  - For shift crew?
  - For experts?

Can we improve or simplify our monitoring?

Trigger Meeting
3/8/2002
Greg, Peter
What is the Good Run List?

At the end of a run the shift crew is asked to declare the data good or bad for each of the 18 detector components.

- CLC
- L1 Trigger
- L2 Trigger
- L3 Trigger
- Calorimeter
- COT
- CMU
- CMP
- CMX
- IMU
- SVX
- ISL
- L00
- SVT
- SMX
- TOF
- Mini Plug
- BSC
What is the Good Run List? (cont.)

The shift crew is given a checklist for each component and asked to set “bits” for each check on the list.

Example #1: Calorimeter has 3 bits each for CEM, CHA, PEM, PHA, WHA (for a total of 15 bits)
- HV on
- No dead channels seen in YMON (1 slide)
- Less than 12 hot channels seen in YMON (same 1 slide!)

Example #2: COT has 2 bits
- HV on
- No gaps in SL occupancies seen in YMON (2 slides)

The Trigger is asked to give a similar, simple list of checks!!
Comparing calorimeter to calorimeter trigger

Calorimeter
\downarrow
ADMEM
\downarrow
YM\text{ON} \text{ occupancy plot}

There is much to check yet we must “Keep it simple!”
Proposed Trigger Checklist Hierarchy

🌟 Level 1 Trigger
- Global Decision
- Calorimeter
  - SUMET
  - Tower triggers
- Muon
  - CMU
  - CMP
  - CMX
- Track
  - XFT
  - XTRP
- CLC *, BSC *, TOF *

🌟 Level 2 Trigger
- Global Decision
- SVT

Each subsystem must satisfy a series of checks (devised by the experts and approved by the group) before a run can be declared good for trigger!

* new or not checked
What do we have now?

Currently we ask the CO to monitor the plots in the TrigMon slideshow.

- 24 slides $\Rightarrow$ 24 bits to be set for trigger.
- Slides are compared to reference plots carefully crafted by Matt.

Most of these slides are historical (?) leftover from the commissioning days.

Do these slides contain necessary and sufficient information to declare a run good for the trigger?

- Probably not . . . Some things are not yet checked at all!

Are these slides easy for the average CO to understand?

- Definitely not!
What do/can we have at our disposal?

🌱 TrigMon
- Occupancy plots
- Comparison of data to simulation
- Trigger efficiencies?

🌼 Xmon
- Check for trigger rates = 0
- Check for trigger rates = crossing rate
- Compare trigger cross sections with expectations

ර L2 alpha error checking code
ędzi L3 error trigger and error stream
Other?
Questions and Issues

Should SVT be considered a separate component from L2 trigger as it is now? Should L1 be separated from L2?

Should we have simulation programs automagically set the good run bits at the end of each run?
  – I’d say no … dangerous and discouages CO from diligence

Should we have monitoring programs alert CO ASAP in a run if something appears to be going wrong?
  – Yes, but they should not report “ignorable” errors!

Should we try to distinguish between marking runs bad and good?
  – e.g: a run is definitely bad if the L1 rate is 1.7 MHz ….
Plan and Wish List

We’d like representatives from each sub-system to come over the next couple of weeks and present good run criteria for their components (see Peter’s talk for calorimeter).

We ask that all plots, predicted cross sections, etc., be filtered through and approved by the trigger group.

- We need to stabilize the number, order and appearance of the checklist plots in the slideshow. Examples: Plot numbering should not change week to week. Subsystem plots should be grouped together ...
- We’d like to standardize the appearance of trigger plots in the slideshow
- Should keep the total number of trigger checks < 50!
- We’d like to fully understand all trigger plots in the slideshow!
Plan and Wish List (cont.)

All plots should have legible and understandable titles and axis labels. Try to avoid trigger jargon and use physics coordinates ($\eta$, $\phi$, $E_T$) where possible! This will make it easier to correlate trigger problems with detector problems.

Strict criteria for interpreting plots should accompany each slide:

- COs shouldn’t have to guess. They want things in black and white.
- Experts (you!) will be paged before a run is marked bad!
Plan and Wish List (cont.)

All plots should follow guidelines and standards agreed upon and set in this meeting

- Data vs. simulation should present as ratios or scatter plots
- In data vs. simulation, place data on the “x-axis”
- Other … (No more than 4 plots per canvas)

Acceptable criteria for declaring a run good will vary and to first order should be set by experts

- Number of dead/masked towers allowed
- Number of “over efficient” towers allowed
- Tolerances in comparing data to simulation
- Minimum number of required checks required