Checking Out What is Checked In

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- Need to optimize balance of checking between users and developers.
  - infuse more of a culture of detailed checking by developers.
  - add help through analysis group. Today: review list, brainstorm additional items, and gather volunteers.
- Start a more formal list of some of the things to check. Appended list is not complete!

First Principles

- When a developer checks in a change, the new module should be tested ***as it will be used.***
  - compiling, linking, and completing 100 events is certainly not bad…but it's not enough!
  - find the memory leaks on a production-scale job and confirm that PC users can still run large jobs without 10GB of RAM. [Related: what is the status of the "recent" RootIO leak?]
  - check the stability and functionality both in generation and event read-back. check that the single event display works.
  - think through the impacts, and check the system test histograms…and any other distributions that might be affected… before/after change. If help is needed, ask for it!
- Follow your nose. The suggested list is just a minimal place to start. If you notice anything odd, grab on and don't let go until you have an answer. Then, share it.

Some Things to Check (I)

- Event Display. Scan a few hundred events:
  - any laws of physics obviously violated (energy, momentum, charge conservation)?
  - TKR hits match charged particle trajectories in detail [magnify regions!]. recon tracks reasonably match MC truth.
  - CAL recon locations sensible?
  - particle flux is as expected (direction, energy, type)?
  - compare trigger bits with display in detail.
  - ACD hits consistent with MC truth particle trajectories?

Some Things to Check (II)

- Trigger Distributions
  - rates of TKR, CAL-LO and CAL-HI for benchmark fluxes (suggest all_gamma, backgndavg, and normal_gamma_10GeV)
  - all 32 filter status bit frequencies (now there, should be declared stable very soon)
  - Aeff at trigger level (require L1T) at 100 MeV, 1 GeV, 10 GeV at ~normal incidence and at ~50° (better: plot Aeff vs θ).
  - After L1T, total visible raw energy in CAL for benchmark gamma fluxes and total background flux.

Some Things to Check (III)

- Basic recon distributions for reference fluxes and for a run of "empty" events (checks noise implementations), requiring a L1T:
  - #hit ACD tiles, and frequency of hits for each tile
  - #TKR hits by layer (and by tower?)
  - #CAL logs hit. Total raw CAL energy visible.
- When the "standard" analysis is ready, check final PSF and Aeff + FOV for reference fluxes. Look at Aeff by layer. Residual background rate, in Hz, by flux component. Total residual background raw visible energy in CAL, and reconstructed energy. Check diffuse_gamma rate after all cuts, and plot reconstructed energy.