Problem in Trigger Package

Trigger package looks for 3-in-a-row in towers.
- Iteration over tracker planes forms map to see if plane had a hit.
- Problem is that it assumes TkrDigiCol implies a hit on the plane.
- Sometimes this is not the case….must test to see if a hit exists. (Can be caused by dead strips…collection is formed…but then no real hit.)

Fix to both TriggerAlg.cxx and ThrottleAlg.cxx:

```cpp
// this loop sorts the hits by setting appropriate bits in the tower-plane hit map
for( Event::TkrDigiCol::const_iterator it = planes.begin(); it != planes.end(); ++it){
  const TkrDigi& t = **it;
  if(t.getNumHits()==0) continue;  // MUST BE ADDED
  layer_bits[std::make_pair(t.getTower(), t.getView())] |= layer_bit(t.getBilayer());
}
```

This change did not make it into DC2. The fix to TriggerAlg has been in cvs a few months, but the change to ThrottleAlg only recently went into CVS.
Testing the Effect

- Generated Background Monte Carlo with v7r3p20:
  Sources:
  ```
  FluxAlg.sources +={"CrProtonMix"};
  FluxAlg.sources +={"CrElectronMix"};
  FluxAlg.sources +={"CrPositronMix"};
  FluxAlg.sources +={"CrAlpha"};
  FluxAlg.sources +={"CrHeavyIon"};
  FluxAlg.sources +={"Earth10"};
  FluxAlg.sources +={"clock"};
  ```
- Generated XX events and produced MeritTuple
- Generated same events with and without Bug Fix and then looked a how the trigger fired.
Trigger & Filter Conditions

TrigCon1:  Tkr&!Veto & calHi
TrigCon2:  Tkr&(!Veto||calLo) & calHi
TrigCon3:  (Tkr&!Veto) || calHi

Filter Condition:  FilterStatus_HI == 0

• Using MeritTuple checked:
  • How often individual trigger bits are set.
  • How many events pass hardware trigger conditions
  • How many events pass hardware trigger + Filter

• Compared 2 (3) Cases:
  • Default code
  • Bug Fix the Trigger Package
  • New EbfWriter and OnboardFilter

I believe these match Steve’s Definitions

Caution: Needs to be revisited...possible problem with pedestals used for generation.

Brian Winer, The Ohio State University  March 13, 2006
<table>
<thead>
<tr>
<th>Code</th>
<th>Default</th>
<th>Trigger Bug Fix</th>
<th>Ratio</th>
<th>New EBF +OBF</th>
<th>Ratio</th>
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<td>0.85</td>
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</tbody>
</table>

Caution: Needs checking.
Still working…

• Need to understand why such a big impact on Filtered events.
• Explore differences between old EbfWriter/OnboardFilter and new versions (original goal).