E949
K-033
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Experiment 949
Technical Note No. 33
Summary of the 2002 Pass1 processing

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Abstract

This technote describes some features of the processing of the 2002 data set through Pass1. The 2002 run (which was run during US FY02) continued from January 27, 2002 – June 9, 2002, with a one month interruption for an attempted repair of Separator #1, February 7, 2002 – March 7, 2002 and a 10 day break for a NASA run April 6–17, 2002. Since the period from January 29 – February 7 was rocky, not much data was collected. The real run from March 7 – April 6 and April 18 – June 9 covered 82 days or 12 weeks. The Pass1 processing took place at BNL from Nov. 20, 2002 through Dec. 2, 2002 on bnlku7, bnlku9 and bnlku11(slower performance, not understood if due to earlier tapes or a system problem). The average number of tapes processed per day was 17 during 'relatively smooth' running. The Pass1 processing at TRIUMF took place from Dec. 12–20, 2003. The average number of tapes processed per day during 'relatively smooth' running was xxx. The computers used at TRIUMF were sitka and sitka1.

For the Pass1 processing we included runs 47592–50218 (tapes 30217–30398) as can be seen in Table 1. See Section 1.4 for more details. The tapes labeled 30xxx.y.1 were processed at BNL and those labeled 30xxx.y.2 were processed at TRIUMF (see $PASS1_TAPES/tapes.[bnl,tri])

E949 Run	start	end	1^{st} run	last	1^{st} tape	last	$\|\vec{p}\|$	#tps	KBL
Pass1#1	3/09/02	4/06/02	47592	48734	30217	30276	710	120	0.45×10^{12}
NASA run	4/06/02	4/20/02	48735	48940	30276	30281	—	—	—
Pass1#2	4/20/02	6/09/02	48941	50218	30282	30398	710	238	1.34×10^{12}
2002 Total	3/09/02	6/09/02	47592	50218	30217	30398	710	358	1.79×10^{12}

Table 1: Summary of E949 runs into Pass1.

Contents

1 Pass1 Strategy **3**
- 1.1 Overview . . . 3
- 1.2 Code . . . 3
  - 1.2.1 trbit . . . 3
  - 1.2.2 rd_trk . . . 3
  - 1.2.3 FITPI . . . 4
  - 1.2.4 UTC . . . 5
  - 1.2.5 Bad_stc . . . 8
  - 1.2.6 STLAY . . . 8
  - 1.2.7 INTIME . . . 9
  - 1.2.8 Other? . . . 9
- 1.3 Scripts . . . 9
- 1.4 Bad_run's . . . 9
- 1.5 Tapes, Resources, etc. . . . 10

2 Pass1 Summary **10**
- 2.1 Acceptance/Rejection . . . 10
- 2.2 Input/Output Statistics . . . 13
- 2.3 Pass1 Problems . . . 16

3 Pass2 Outlook **17**
- 3.1 Post Pass1 Issues/Problems . . . 17
  - 3.1.1 Energy Calibration: km22, rsmon . . . 17
  - 3.1.2 Loosened PDC cut at Pass1 . . . 17
  - 3.1.3 Loosened FITPI cut at Pass1 . . . 17
  - 3.1.4 (20ct+21ct) veto . . . 17
  - 3.1.5 IC timing and energy . . . 17
  - 3.1.6 . . . 17
- 3.2 Other... . . . 17

These numbers and conclusions were reached from analysis of the 2002 Pass1 job and from analysis of the 2002 monitor triggers processed through the Pass2 code, scaler records, run_log, and from searching through the logbooks and ELOG ...

The cycle time was 5.4 sec, the spill length was mostly 2.2 sec after xxx, the AGS proton momentum was reduced by 10% to 21.5 GeV???

1 Pass1 Strategy

Original plan was to process on SGI's at BNL (bnlku7,9,11,physgi04). Later decided to process half of tapes at TRIUMF on sitka, sitka1. Processed every 3^{rd} event. Actual machines used were bnlku7,9,11 at BNL and sitka,sitka1 at TRIUMF. We used three stackers at each site. No data was backed up to tape. It was all left on disk.

1.1 Overview

1/3 now, 3/3 later, looser cuts .... remove INTIME cut, add RSHEX2 cut, loosened FITPI, PDC, and STLAY cuts

CFM database at BNL was frozen on 11/20/02. at TRIUMF???

1.2 Code

Joe

bug in implementation of RSHEX2 cut, such that the cut operated on variables from the previous event. The rejection of x1.1 before run 48080 is presumably from cutting on good events??

1.2.1 trbit

Joe, Tamaki

The TRBIT cut was broken up into 3 separate pieces. The new TRBIT cut operates only on the L0 trigger bit, so this cut serves primarily to get rid of the monitor data that was mixed onto tapes 30217–8. Since we only wrote to two tapes at that point in the run, we wrote all data to both tapes. This cut also cut all data on tape 30275.3.3 that was accidentally run through Pass1.

The remaining pieces of the old TRBIT cut were separated into L1.1 and L1.2 cuts. Since DAQ assigns data to different streams (and tapes) based only on the L0 trigger bits, our Pass1 data stream becomes contaminated with pnnL0 (and pnnL0o and perhaps kp21) events that do not pass L1.n. The L1.1 and L1.2 cuts at Pass1 remove all of these events.

1.2.2 rd_trk

rd_trk is the track finding routine. It defines a sequence of RS counters which form the track, from the T.2 counter through the stopping counter (the last one in this sequence) and estimates the track energy as a simple sum of energies seen in each track counter.

The new version of *rd_trk* written for E949 and used in pass1 is a TDC-based routine that uses basically the same algorithm that was used by "old" TD-based routine:

- One end in time TDC hit is enough for a counter to be included in a track
- T.2 is searched for independently. Only if this search fails online T.2, reported by SCF, is used.

- T.2 time defines a window for the search for candidate track counters, which is $T_{\mathrm{T.2}} \pm 10$ ns. T.2 time is derived from Detector Strobe time (DS). DS time is a signal read out by the dedicated TDC in one of the RS TDC crates.
- If the found track doesn't reach layer 6 another attempt to find a longer track (starting from different T.2) is made.
- A recent modification was made by Shaomin Chen before pass1 dedicated to reducing the probability to pick up an accidental counter as a stopping one. This is described later on.

The algorithm starts by finding the best T.2 sector. Then it grows a track from the corresponding L2 counters. It first tries to go radially outward (layer up in the same sector) to find a candidate counter. If it fails, it tries to go "left" (minus one smaller sector number in the same layer). If it fails, it tries "up-left" direction. If it fails, "up-up-left" direction is tried. The latter only if the candidate counter belongs to layer 12 or less. Once one of the attempts above is successful the counter is added to a list of track counters and the procedure above is repeated starting from the found counter. When all further attempts fail this means that the track finding is finished. The candidate counter is one that has a TDC hit in at least one end within $\pm$10 ns of the T.2 time and with energy reported by ADCUNP('RD','CMB') that is non zero.

For the T.2 finding, *rd_trk* loops over sectors looking at TDC hits in layers 1 and 2 in a $\pm$20 ns window around the DS. If there is at least one hit at any end in each layer it's a candidate for the T.2 sector. T_{av}, which is an averaged time of all hits closest to DS is measured with respect to DS itself (minimum 2, maximum 4 such hits), is calculated for the candidate. The winning candidate has the lowest absolute value of T_{av} (another complication here is that each additional hit contributes -1 ns to T_{av} at comparison stage making it smaller and therefore more competitive). So, roughly speaking, *rd_trk* chooses T.2 closest to DS in time. If the procedure above fails to find T.2 SCF's T.2 is used or, if ONET2_SCF is .FALSE., an error is reported and NTRK is put to zero.

The result of *rd_trk* is filled into the common block *rdtrack.cmn*. The key points of the algorithm (all except the last one) are unchanged from the previous TD-based routine:

- NTRK: Total number of tracks (actually it's always one, at least in mode which was used for pass1!)
- NHTRK(1): The number of hits in the track
- ETRK(1): The energy in the track
- ITRK(I,1): The I'th MODULE of the track
- IRUSE(IL,IS): Range Stack cells that are used (0: not used, 1: used), IL, IS - layer and sector numbers
- IMOST(1),IMOST(2): Always equal to 1 in pass1.
- TDOTA(1),TDOTA(2): TDOTA(1)=TDOTA(2)=T_{DS} + T_{av}, T_{av} is the winning T_{av} mentioned above. In the case SCF was used to find T.2 TDOTA(1)=TDOTA(2)=T_{DS}.

1.2.3 FITPI

David

Now use FITPI4 (see also Technote K-029)

Cut on calibrated TD energy???

What ipiflg's are allowed? IPIFLG=0,6,7,8,

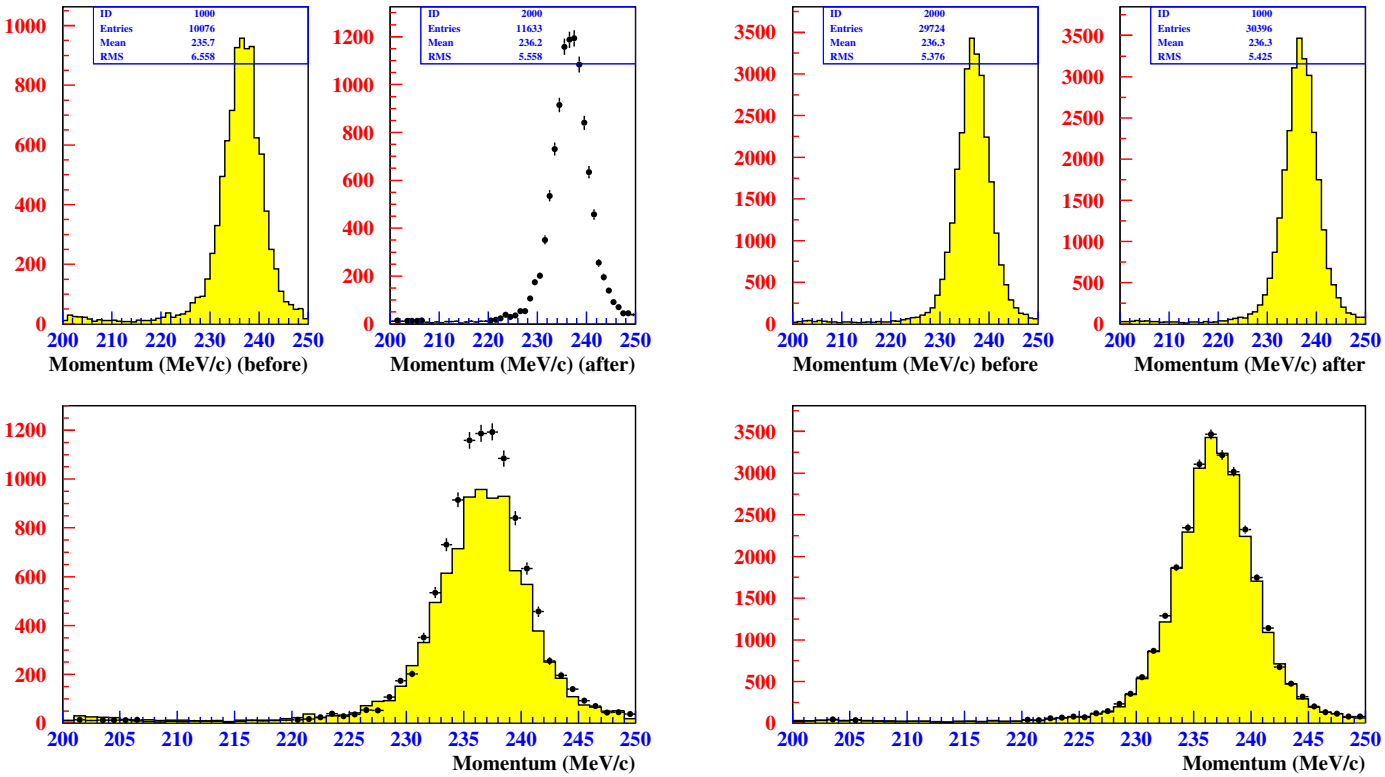

Figure 1: *a) The $K_{\mu 2}$ momentum distribution for data taken before the UTC electronic modification. b) The $K_{\mu 2}$ momentum distribution for data taken after the UTC elentronic modification. The black dots are for the events reconstructed by the modified UTC routines, while the histograms are for those reconstructed by the previous UTC routines. Both momentum resolution and UTC tracking efficiency are seen to be improved significantly.*

1.2.4 UTC

Two modifications have been made in the UTC reconstruction routine, mainly improving the tracking efficiency in the case of missing cathode strip ADC information and reducing the bias in determining the z position due to the interference from pick-up noise. The UTC geometrical alignment is also modified.

A baseline shift in the UTC ADC's caused a noticeable loss in the efficiency of finding z hits in the inner foils, especially at high rate. Although a modification to the electronics was completed during the NASA run to mitigate this effect, a special software modification was still required to handle the case when the UTC cathode strip hit has only TDC information. Two new UTC routines were created: *UTC_Z_ADCTDC* and *UTC_ADCTDC_CLUSTER*. The cluster of cathode strip hits will be searched from all the recorded hits regardless of what kind of hit they are. If the hits have TDC information only, a small ADC value is assigned. Since if a cathode strip hit is missing, it may result in a z position measurement loss in a foil. By exploiting the TDC information, a broken cluster of cathode strip hits are connected, giving a more precise z position measurement as a result. At the meantime, the z resolution values used in the fit was loosened from 0.1 cm to 0.51,0.43,0.28,0.31,0.31 and 0.37 from the different foil layer, respectively. The user can change these resolution values through a *kcm* file in the array called *UTCZRES*. Both the tracking efficiency and the momentum resolution are seen to be improved, and the difference between before and after the modification of the electronics is significantly reduced (see Fig. 1, and Fig. 2). After checking the UTC track efficiency, one can conclude that the UTC tracking efficiency increases by about 16% (2%) for data taken before (after) the UTC electronics modification. A negative impact from this modification is to introduce more possible accidental hits in one cluster.

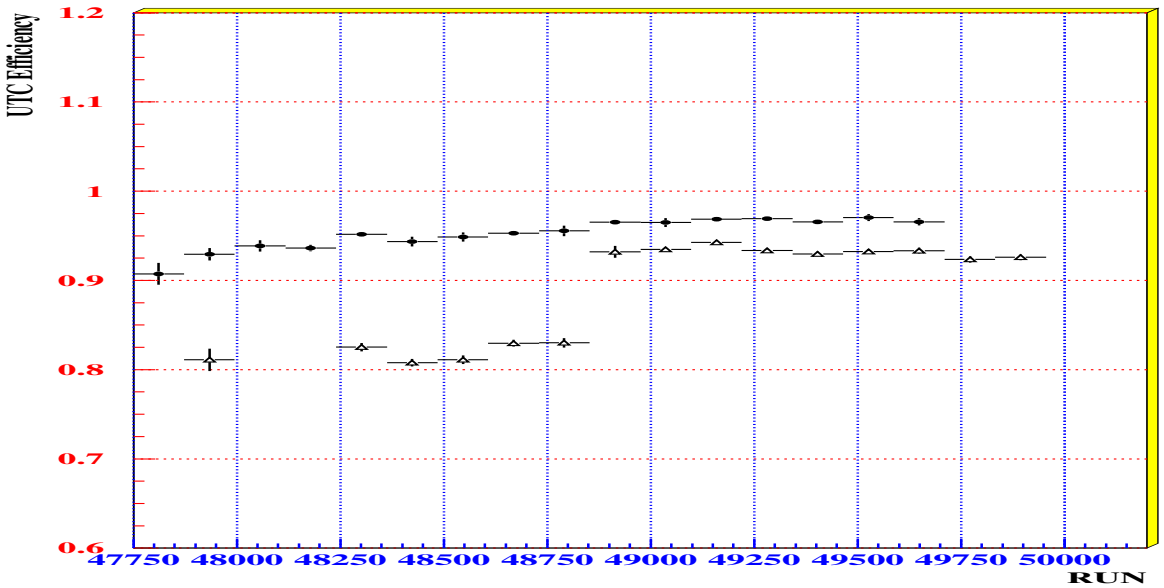

Figure 2: *The UTC tracking efficiency before (open triangles) and after (black dots) the offline UTC modification.*

Due to the high rate, cathode strips are very likely affected by the accidental hit. Even if the accidental hits are well separated from the true hit in space, they may cause a confusion in determining the z position when all of hits are classified as a cluster using the above method. A pulsate method similar to the one used in FITPI is applied to distinguish multiple hits in one cluster. In any three strips, if the middle strip has the highest ADC value, these three strips will be treated as a true cluster. If an edge strip has the high ADC value, this strip together with its adjacent strip will also be treated a cluster. After doing this new classification, one cluster may be split into several.

In determining the z position, a so-called charge ratio method is applied. The z position is derived from

$$z = \frac{w}{2}\left(\frac{Q_2 - Q_3}{Q_1 - Q_3}\right), \tag{1}$$

where $Q_1 > Q_2 > Q_3$ and w is the effective strip width. Figure 3 shows that more true hits are identified, increasing the number of z measurements used in the UTC track fit. The resolution of z measurement is also see to be improved.

It had been known for a long time that there is was a one centimeter discrepancy at z position between the UTC and the Range Stack measurements in E787. In E949, this discrepancy still persists. Using a cosmic ray data set with magnetic field off, one finds the expected T-counter, I-counter (in which the Z positions are the UTC track extrapolation to the center of the studied counter) and B4 (where the UTC track is extrapolated to get the Z position for r=0 in r-z plane if B4 is hit) positions are offset by one centimeter. For example, the ends of T-counter should be at -26 cm and +26 cm and the B4 location should be at -12 cm. This offset does not affect the data analysis as long as the cuts for matching UTC to these counters are adjusted. For the sake of convenience, the UTC geometry center is now shifted to match the magnet center. A simple -1 cm adjustment to the cathode strip Z positions makes the T-counter, I-counter and B4 stand at the expected Z positions. Previous alignments for the target and RSSC etc. should be re-adjusted. In the meantime, in these cosmic ray data with the magnetic field off, a straight line fit is performed with up to 12 z measurements. Requiring at least 10 z points in a track, one can check the present UTC cathode strip position. The observed z deviations as shown in Fig. 4 are corrected in the UTC geometry file (see ut_geo.00004).

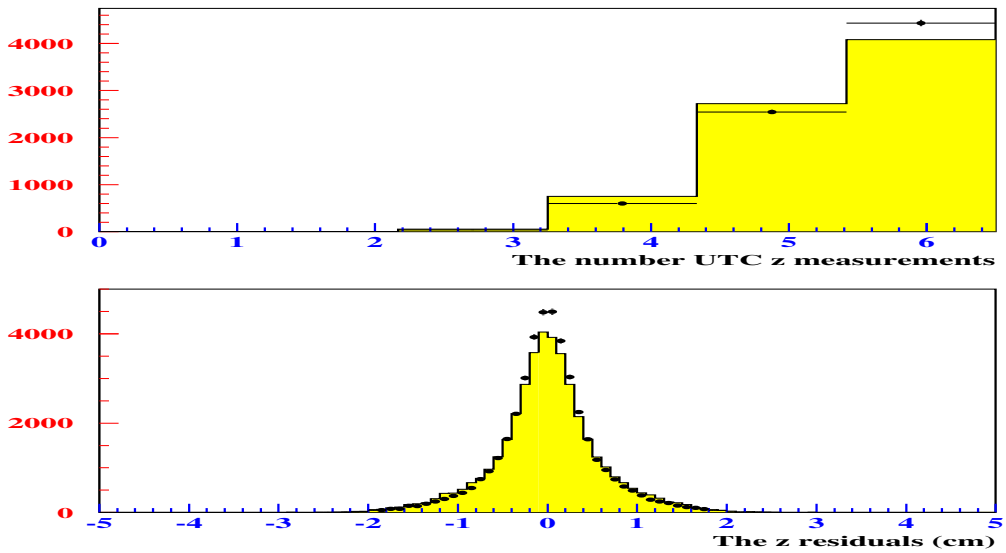

Figure 3: *The number of UTC z measurements used in the fit and the corresponding residual distribution. Histograms and blacked are for events with and without using the charge-ratio method.*

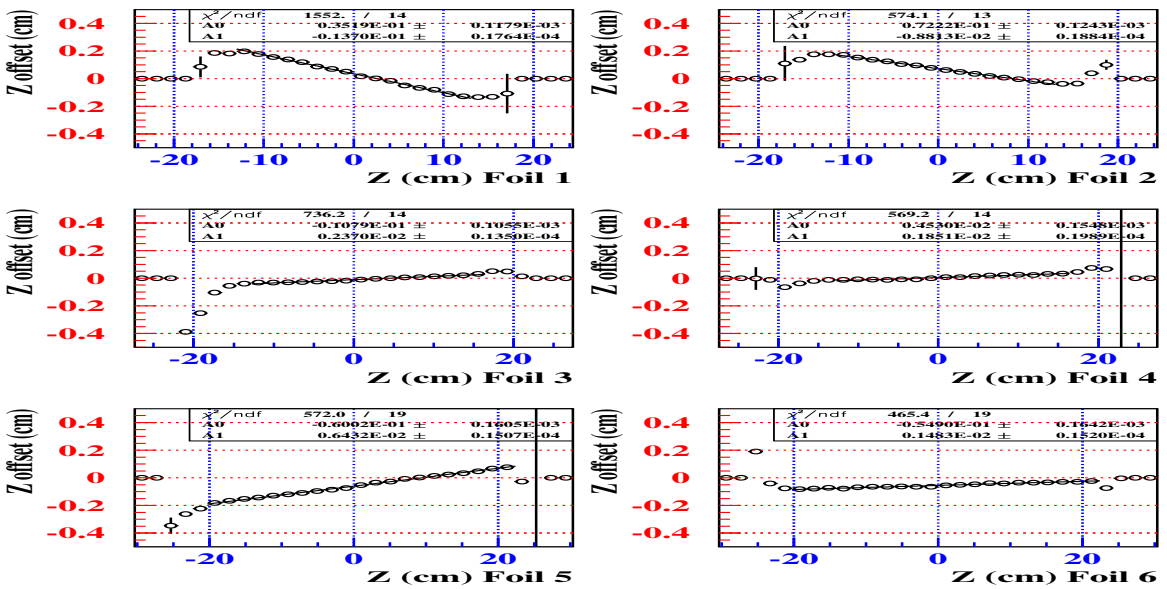

Figure 4: *The deviations in UTC z measurement for all six foil layers.*

Cut	PNN1 box	PNN2 box
Before old STLAY	6486	11281
After old STLAY	6218	10558
Old STLAY acceptance	95.87%	93.59%
Online Stopping layer=20	25(0.38%)	45(0.40%)
Online Stopping layer=21	46(0.71%)	50(0.44%)
L_{stop}(offline)-L_{stop}(online)=1	76(1.17%)	114(1.01%)
New STLAY acceptance	97.74%	95.11%

Table 2: *STLAY acceptance for the old and new STLAY cuts. Also listed are the acceptances recovered by keeping events with the online Stopping layer at Layer#20 or 21 and by modifying the offline Range Stack tracking routine.*

All of these modifications in the UTC tracking routines make the tracking efficiency (96% from a study of $K_{\mu 2}$ sample) and the momentum resolution (2.36MeV for the $K_{\pi 2}$ data taken before the UTC electronic modification and 2.33MeV for the $K_{\pi 2}$ data taken after the UTC electronic modification) very close to those in E787 (for example, 97% tracking efficiency, 2.21 MeV for the $K_{\pi 2}$ data taken in 1998), given the fact that the kaon intensity rate is about a factor of two higher than the highest one in E787.

1.2.5 Bad_stc

Tetsuro, David — PLEASE CHECK THIS INFO!!

Two TD channels behaved badly during parts of the 2002 run. Events with tracks stopping in these counters were cut by the bad_stc cut. Typically the pulse height in the TD's was very small. In one case, a cold solder joint in the tail cancelling circuit caused the TD gain to drop by x10 for periods of time.

- TD channel 138? (L10, H6) was bad from runs 47662:48186
- TD channel 102? (L10, H2) was bad from runs 48074:48412, 48588:48816

1.2.6 STLAY

The Pass1 STLAY cut rejects events when the offline Range Stack tracking routine fails to find a consistenct stopping layer with that from the online system. We want every event to pass both L1.1 and FITPI for the same stopping counter. In the past, the rejection of Pass1 STLAY cut was about 1.05. From a study of pnn1or2 triggers, the Pass1 STLAY cut shows about 5-10% more rejection in E949 compared to E787. An investigation indicated that this increase is due to cases where the online stopping layer is Layer# 20 or 21. Since L20–21 in E949 are now the BVL, and since the BVL counts at very high rate, the explicit L0 veto on L20–21 was removed. In Pass1, the STLAY cut is only applied to those events with STLAY<19. Also note that the offline stopping layer may differ from the online one by only one more layer, since the tracking routine still picks up the bad counter with energy deposit less than 1 MeV and with one end timing only. This defect has been fixed.

Piscat monitors are used for evaluating the acceptance for the STLAY cut. The track quality, online PV, HEX, L1.2 and pnn1or2 kinematic BOX cuts are applied. Table 2 gives the acceptance values for both old and new STLAY cuts. Bypassing the online stopping layer at Layer# 20 or 21, and using the modified Range Stack tracking routine, the new STLAY acceptance is seen to be improved.

(KOFIA changed so that multiple T.2's gives SHEX=7 (not 0), which will now pass Pass1?)

1.2.7 INTIME

Joe

The INTIME cut, which had been planned to be removed before 1998, was in fact removed before 2002. The 2002 processing had no INTIME cut for the first time.

1.2.8 Other?

Joe

The RSHEX2 cut was moved from Pass2 to Pass1, it cuts events with a sector crossing on the track in the stopping counter (and more than 1 MeV).

1.3 Scripts

Joe

1.4 Bad_run's

Steve

The bad_run cut as applied to the 1/3 sample Pass1 was described in detail in the Pass0 technote K-025.

New additions since the Pass1 on the 1/3 sample.

- 47679:47719 Bad UTC postamp +6V power supply (see ELOG, 47719). Mean UTC-z measurements is 3.0 in this data, instead of 5.4 in normal data. [Lose KBL = 5.57×10^9]
- 47789:47790 Large FITPI rejection ($\times$2.4) due to bad L1.1 masks (incorrect prompt window) [Lose KBL = 6.12×10^7]
- 49536 Large FITPI rejection ($\times$2) (cs4 hybrid problem?)
- Many runs with all events rejected by Pass1 L1.1 cut. (runs 47638, 47641, 47685, 47789, 47818, 47861, 47908–9, 47998, 48007, 48160, 48327, 48447, 48450, 49529) These runs are most likely runs where all events were rejected by L1.1 due to some problems in the TD crates. It is quite likely that the only events into Pass1 are from pnnL0 triggers. [Lose KBL = 1.62×10^9]
- Tape 20280, with runs 48876–7. The two smx runs with the full namelist were interspersed with mostly calibration runs while the UTC electronics were being modified (4/8–20/02) and while we were battling rstdc DAQ problems. The last good run before these was 48734, before the NASA run, and the next good run after these was 48941, after the UTC work was completed. The cut now removes runs 48756:48935. [Lose KBL = 1.08×10^8]
- Runs with no data into Pass1 (runs 47835, 48080, 48319, 48464, 49257, 49326-7, 49762-3, 49848, 49877, 50109). [Lose KBL = 0.00×10^0]
- Runs with too few events into Pass1 (50067–71). [Lose KBL = 3.2×10^7] FERA problems (see http://bnlku33.phy.bnl.gov:8081/EL/020603.46332?exp=E949)
- Runs with too few events into Pass1 (48028). [Lose KBL = 2×10^6] Tapes already full.
- Runs with no data out of Pass1 (50202). [Lose KBL = 8.90×10^6]
- Runs with no KBL (47777:47778) CAMAC Branch Driver Problems

	BNL		TRIUMF	
Cut	Events Cut	Rejection	Events Cut	Rejection
DUPEV	0	1.000	1	1.000
TRBIT	51,305	1.002	136,071	1.006
LEV11	142,251	1.006	143,122	1.006
LEV12	9,245	1.000	9,117	1.000
RD_TRK	406	1.000	447	1.000
STLAY	1,694,706	1.076	1,677,677	1.076
BAD_STC	188,325	1.009	180,514	1.008
RSHEX	749,197	1.033	748,274	1.033
TRKTIM	198	1.000	181	1.000
FITPI	4,295,945	1.229	4,238,996	1.230
UTC	1,969,883	1.118	1,948,107	1.118
RDUTM	235,003	1.015	230,874	1.015
RSHEX2	93,089	1.006	92,547	1.006
PDC	1,485,335	1.112	1,465,229	1.112
LAY14	281,670	1.022	277,935	1.022
PASS1 Total	11,103,469	1.864	11,056,544	1.856

Table 3: *Pass1 rejection from Pass1 job run on raw (pnn) data tapes. Measurements made from Pass1 logfiles.*

1.5 Tapes, Resources, etc.

Benji, Joe

176 tapes shipped to TRIUMF 30xxx.y.2 (y=3, except for 30217-8). 176 tapes at BNL 30xxx.y.1

Three stackers were used on bnlku7,9,11 and two stackers on sitka,sitka1. The 1.5 Tbytes of output was kept on disk.

2 Pass1 Summary

2.1 Acceptance/Rejection

The individual rejection factors (applied sequentially) are given in Table 3.

The pass1 rejection as measured by a sequential application of the cuts to the pnn1or2 monitor sample is listed in Table 4. There are a number known problems as detailed below. The L1.2 return code was not installed until run 48070, so no L1.2 trigger was applied until this run. The pass1 STLAY cut was not applied to online stopping counters in L20 or L21. These events were passed to see if later we could recover some acceptance in pnn2. The offline stopping counter determination was found to frequently (1%) find a counter one layer beyond the online stopping counter — presumably due to noise with low energy and one-end timing only. These Pass1 STLAY problems have been either by-passed or fixed as described in the STLAY section (Section 1.2.6) in this note. *Acceptance for STLAY are not the ones with the modification.* A loose fitpi cut was chosen to maximize acceptance at Pass1. Also a new version, FITPI4 (see Section 1.2.3) is in use that fits for 3 pulses amongst other modifications. The UTC and PDC rejection anomaly from run 49278 to 49751 is due to the change in the IC CFD width (from 30 nsec to 10 nsec). *The UTC and RDUTM cuts are totally correlated because the UTC track is required to match the*

Cut	1998 Rej.	2002 Rej.	2002 Acc.
TRBIT	1.01	-	-
RD_TRK	1.00	1.00	1.00
STLAY	1.05	1.08-1.30	0.80-0.82
RSHEX	1.01	1.01-1.38	0.92
TRKTIM	1.06	1.0	1.0
INTIM	1.10	-	-
FITPI	2.22-4.00	1.25	0.58
UTC	1.14	1.18-1.25	0.94
RDUTM	1.00	1.01	0.99
Range1	1.00	-	-
PDC	1.11	1.11-1.15	0.75
LAY14	1.03	1.02-1.03	1.0
PASS1 Total	3.58-6.45	1.83-3.35	0.30

Table 4: *Pass1 rejection broken down to individual cut for 1998 and 2002 pnn1or2 data. Also given are the corresponding acceptance evaluation from the Piscat monitors. Since some cuts are removed from the pass1 cut category in the E949 data analysis, their acceptances are not given.*

T.2 hit. The UTC acceptance should not be interpreted as the UTC cut, because about 50% of the loss here is actually due to the mis-match between UTC and RS. The rejection of the pass1 cuts are shown in the following pages. All of the new bad_run (post 1/3) are applied to these plots. Fig. 5 shows the rejection of the TRBIT, L1.1, L1.2 and RD_TRK cuts.

We note that the tapes 30217–8.2.1–2 have been excluded from the TRBIT cut plot, as the rejection is quite large ($\sim$2). For these two tapes the monitor triggers are intermixed with the pnn triggers, so TRBIT does in fact cut a lot of events. Also, we note that the rejection of TRBIT is $\sim$1.08 for runs 47786–47806. This increased rejection has not yet been understood.

The rejection power of the L1.1 cut depends on the fraction of pnnL0 triggers. DAQ assigns events to output streams depending on their L0 bits, so DAQ cannot distinguish between pnn1or2 and pnnL0, and all are written to the pnn tapes. However, the pnnL0 triggers, in general do not pass L1.1*L1.2, so the Pass1 L1.1 cut is cutting pnnL0 triggers. At run 47617 the Pass1 L1.1 rejection falls from 1.025 to 1.0025. At this run we switched from smx_v12o (with lots of monitor triggers) to smx_v12u (with fewer monitor triggers). We also see the Pass1 L1.1 rejection jump from 1.0025 to 1.005 at run $\sim$48090, where L1.2 became active (why???).

The Pass1 L1.2 cut had no power before run $\sim$48090 because there was no valid L1.2 bit to cut on. The RDTRK cut had more rejection before L1.2 was functioning (why???).

Fig. 6 shows the rejection of the STLAY, BAD_STC, RSHEX and TRKTIM cuts.

The STLAY rejection is larger before L1.2 was working (due to the L1.2 bad stopping counter cut?). The runs 50067–71 were excluded from this plot. The STLAY rejection also falls a little after the NASA run (why???)

The bad stopping counter cut, BAD_STC cut events with the stopping counter in a bad TD channel. There were two bad TD channels: L10, HEX6 from 47662–48186 and L10, H2 from 48074–816.

The RSHEX cut rejection falls at run 48090, when the L1.2 cut starting working.

The TRKTIM or TRS cut has little rejection.

Fig. 7 shows the rejection of the FITPI4, UTC, RDUTM and RSHEX2 cuts.

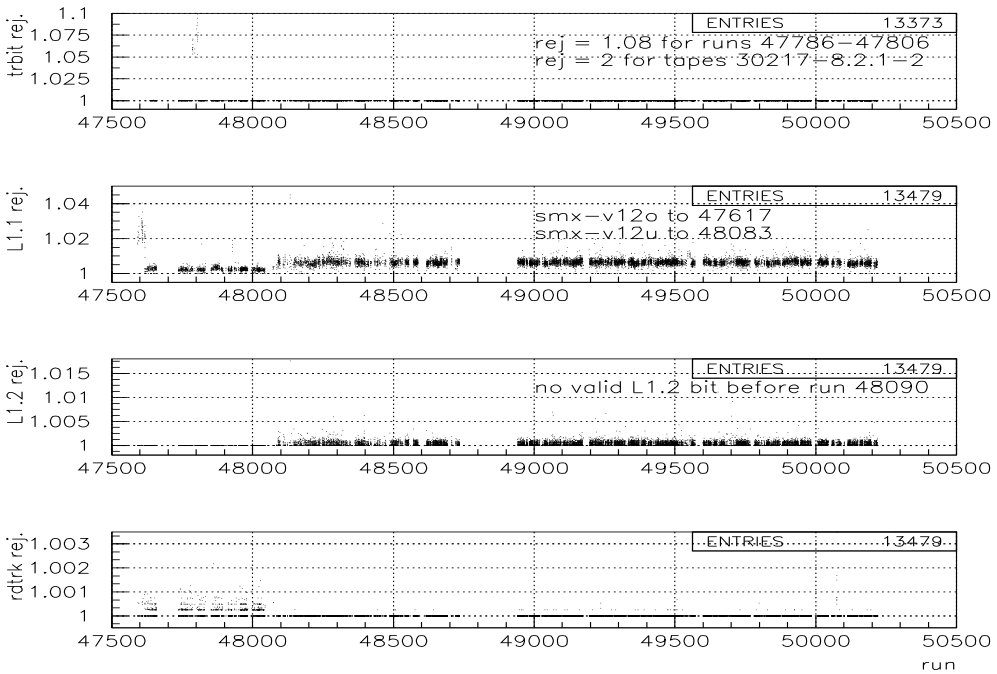

Figure 5: *The rejections of the TRBIT, L1.1, L1.2 and RD_TRK cuts in E949*

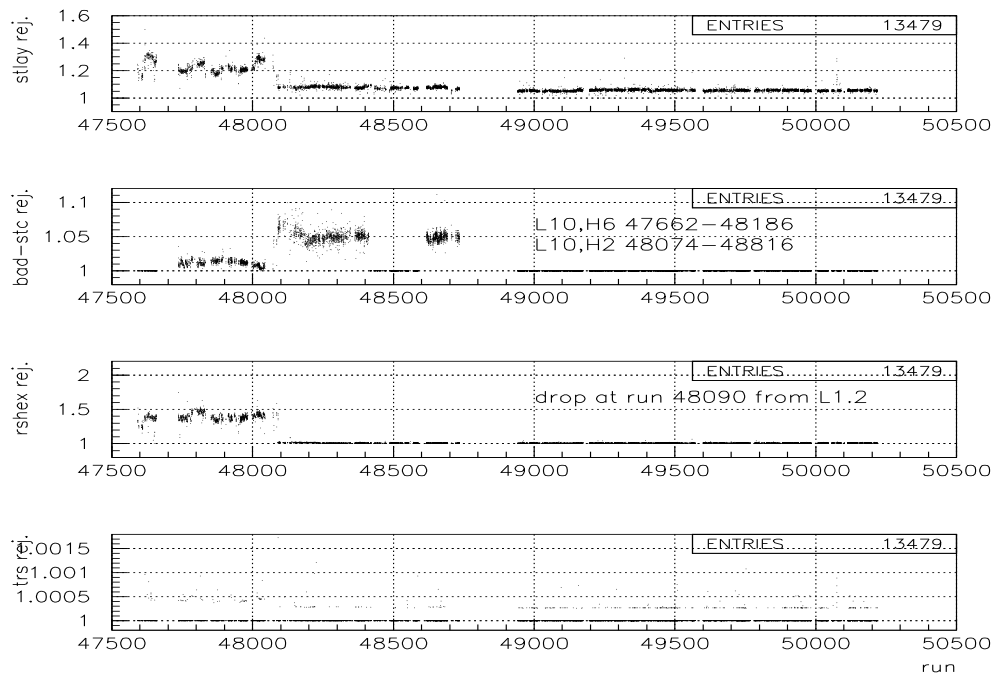

Figure 6: *The rejections of the STLAY, BAD_STC, RSHEX and TRKTIM cuts in E949.*

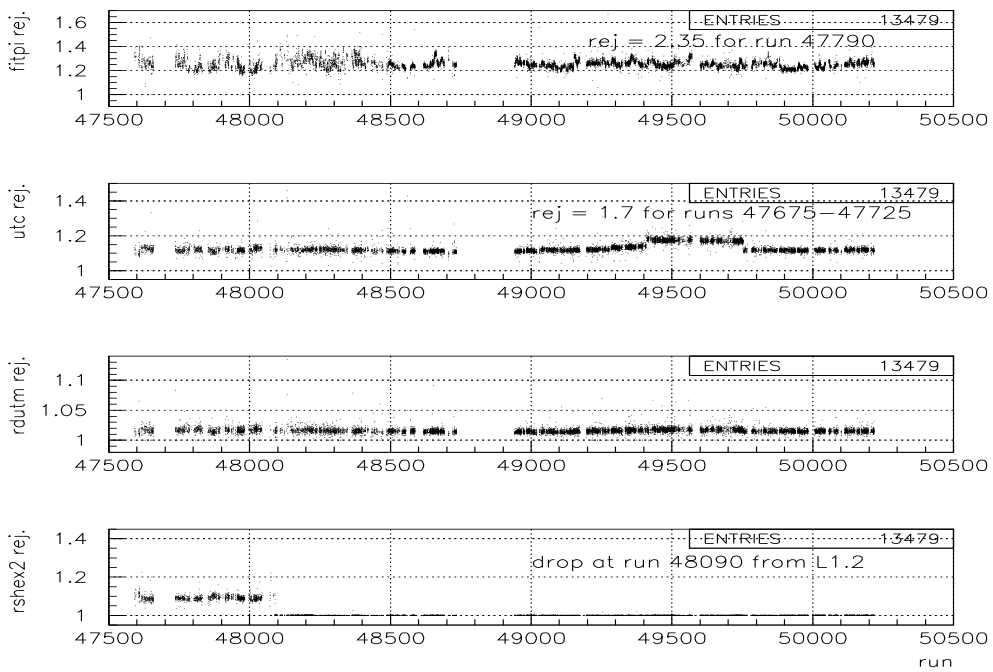

Figure 7: *The rejections of the FITPI4, UTC, RDUTM and RSHEX2 cuts in E949.*

The rejection of FITPI4 is low since the Pass1 code allowed ipiflg.gt.0 events to pass. One run had very large FITPI rejection, run 47790, at 2.4. This is likely due to...

The UTC rejection is large, $\sim$1.7 at runs 47675–47725 due to a bad power supply for the postamps. The rejection is large at runs 49407(49278)–49751 due to decreased deadtime in the IC CFD's and subsequent increase in 2-beam triggers (also PDC rejection is large at these runs).

The RDUTM cut rejection is stable vs. run. The RSHEX2 cut rejection falls when the online L1.2 trigger started working.

Fig. 8 shows the rejection of the PDC, LAY14 and Total Pass1 cuts.

PDC and LAY14 look OK. Total Pass1 rejection falls after the online L1.2 trigger started working. After run 48090 the total Pass1 rejection varies from 1.7–2.0.

The corresponding acceptances are also given in Fig. 9, Fig. 10 and Fig. 11. In Table 4, one observes a big acceptance loss in the PDC cut, this is because the piscat monitor sample contains many protons, failing the cut on PDC<280 MeV/c.

2.2 Input/Output Statistics

Benji, Joe, Steve

The BNL Pass1 sample, with a prescaling of input events by 3, recorded a total of KBL = 8.97×10^{11}, with 24.2 M events in and 13.0 M events out, for a rejection factor of 1.86. The total data volume out was 1.466 Tbytes in 6823 files from 1541 runs on 176 tapes (missing tape 30342, runs 49533–4, 49536–8, 49540,5, 49551,3–5,7–8). This tape was not included in the tape list, as it is not listed in the original, uncorrected DAQLOG. The data on this tape was labelled as going to tape 30242.3.1 as far as DAQ and DAQLOG are concerned.) (Also missing are runs 47645, 48013, 48028, 49122, 49304, 49339).

The TRIUMF Pass1 sample, with a prescaling of 1/3, recorded a total of KBL = 8.95×10^{11}, with

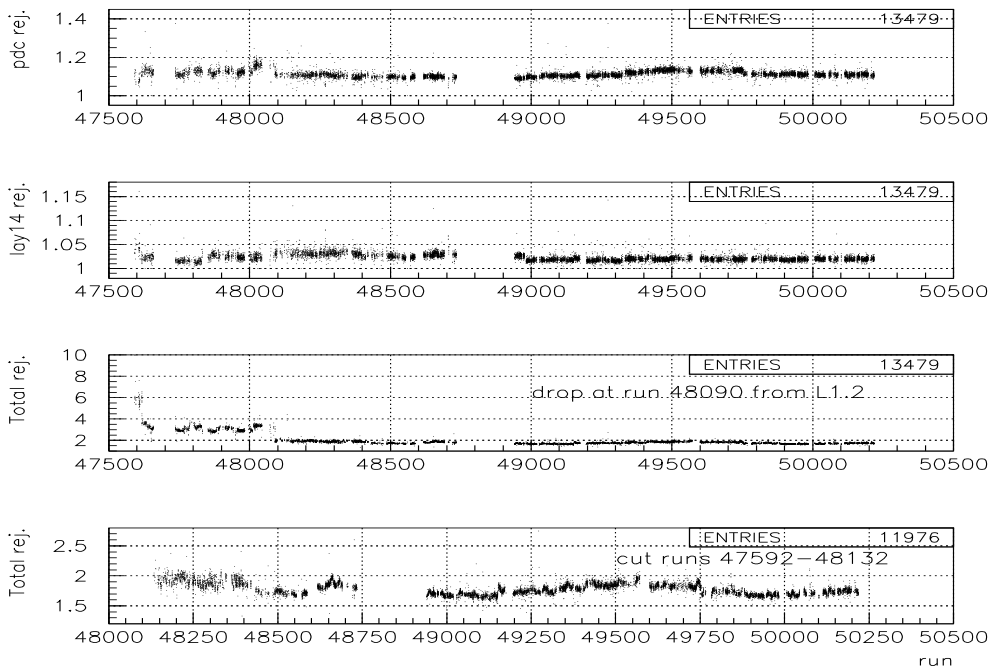

Figure 8: *The rejections of the PDC, LAY14 and Total Pass1 cuts in E949.*

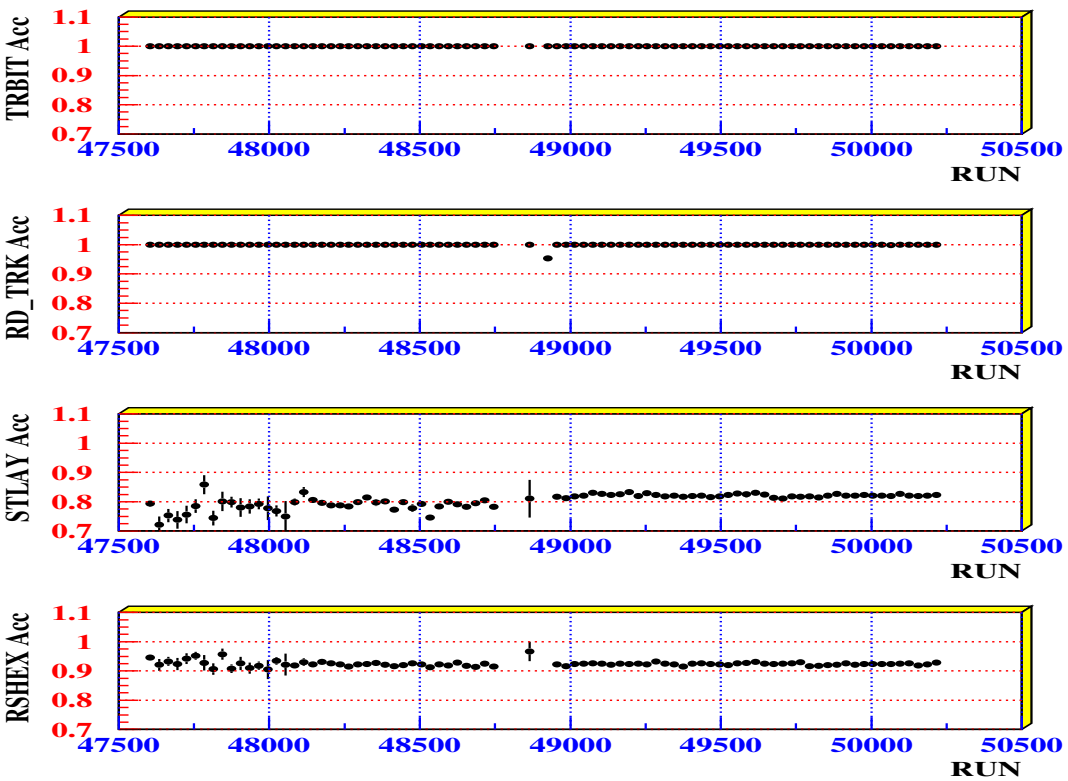

Figure 9: *The acceptances of the TRBIT, RD_TRK, STLAY and RSHEX cuts in E949*

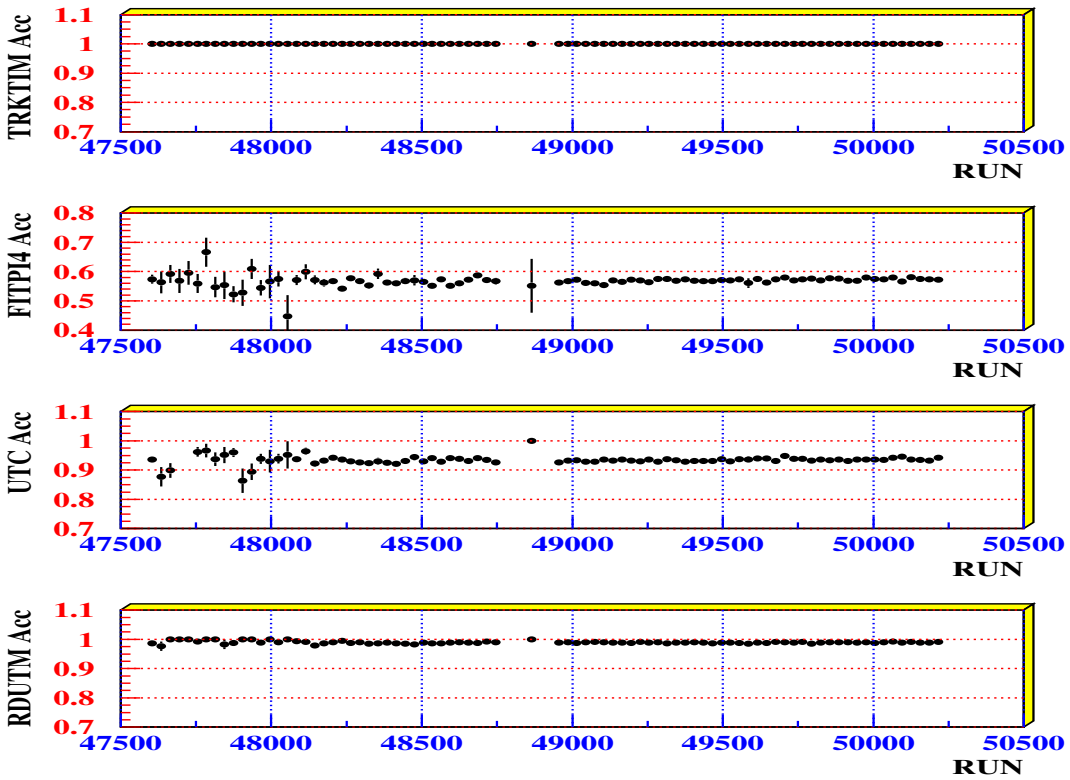

Figure 10: *The acceptances of the TRKTIM, FITPI4, UTC and RDUTM cuts in E949.*

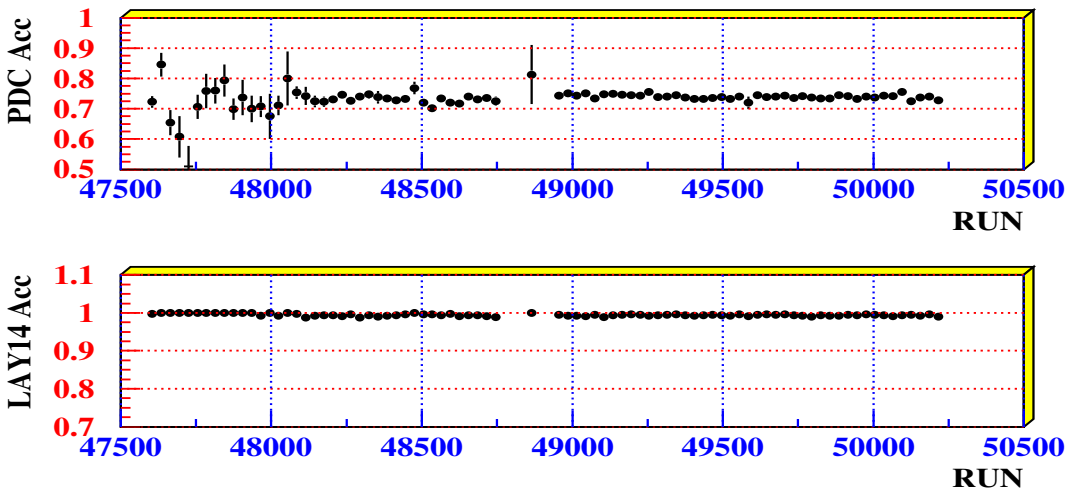

Figure 11: *The acceptances of the PDC and LAY14 cuts in E949.*

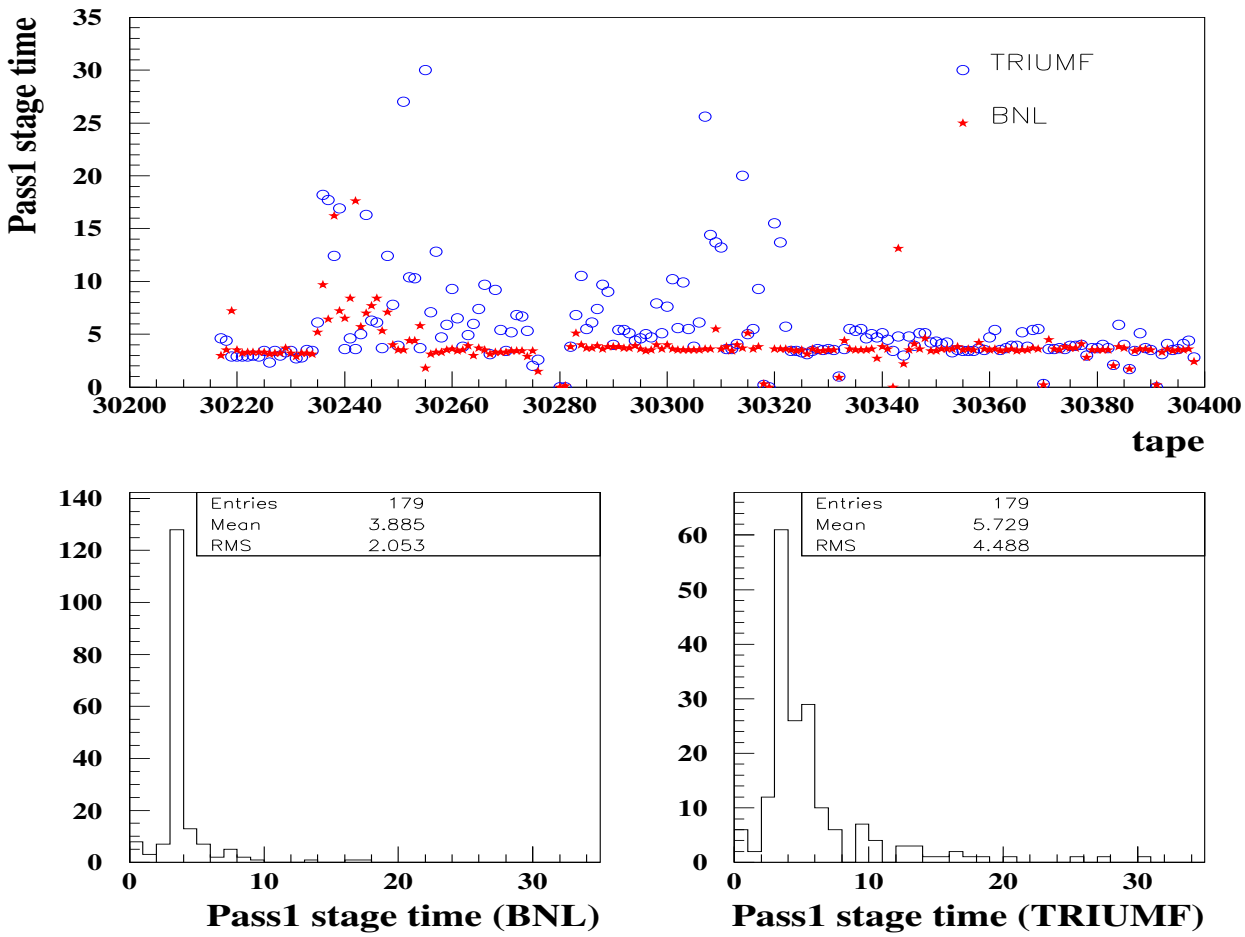

Figure 12: *Staging time for all tapes during the 1/3 Pass1.*

23.9 M events in and 12.8 M events out, for a rejection factor of 1.87. The total data volume out was xxx Tbytes in 6885 files from 1557 runs on 176 tapes (missing tape 30391, run 50148. Also missing runs 47995, 49290, 50148).

Only one duplicate events was found in one file processed at TRIUMF. The KBL counted from the scalers in the Pass1 job of 1.79×10^{12} is consistent with the expectation (see K-033, Table 14) 1.74–1.80×10^{12}.

2.3 Pass1 Problems

Benji, Joe, Shaomin

Some tapes had very long staging times; this was particularly problematic at TRIUMF (see Fig. 12).

Some DAQLOG problems affected Pass1, see TN K-025 section 1.7. In particular, tape 30342.3.1 was not run through Pass1. The other Pass1 runs affected by DAQLOG problems: 48554–5, 48583–5, 49520–32 and tape 30342.3.2 (49533–58) all appear to have been successfully processed.

Tape 30275.3.2 was not processed at TRIUMF. It appears that the labels for 30275.3.2 and 30275.3.3 were swapped when the tapes were written and tape 30275.3.3 was sent to TRIUMF instead of 30275.3.2.

Tape 30391.3.2 was unable to be staged at TRIUMF.

Many events were cut by TRBIT (rejection of 100) in runs 48726–48731 in the processing at TRIUMF. These runs were OK in the processing at BNL. (It turns out that the tape 30275.3.3 was processed at TRIUMF instead of the correct tape 30275.3.2.) Also a problem in the fifth file of run 47617 in the processing at TRIUMF (rejection of 30 instead of 6 in the first 4 files. The fifth file had 56 events; a sixth file with 0 events was also staged.); only 4 files were staged at BNL and all were OK.

The last chunk of data in runs 47608 (rejection of 300 in the third file as compared to 6 in the first two files) were almost all cut by TRBIT in processing at both BNL and TRIUMF.

3 Pass2 Outlook

3.1 Post Pass1 Issues/Problems

3.1.1 Energy Calibration: km22, rsmon

Shaomin,Benji,Kentaro,Jim

3.1.2 Loosened PDC cut at Pass1

At the time of processing Pass1, there was a concern about the PDC acceptance loss due to pick-up noise in the UTC track reconstruction. The minimum requirement is for 8 xy hits. This was reduced to 6 at Pass1 in order to keep some events which might later be recovered with further modification of the UTC tracking software (for example, using target pion fiber constraint to resolve the left-right ambiguities in the xy position measurement, especially at high rates). Since the UTC tracking modification was completed after the original Pass1, there is no longer any need for a loose PDC cut at Pass1. The requirement for a minimum of 8 xy hits can be switched back on for Pass2.

3.1.3 Loosened FITPI cut at Pass1

David,Joe

3.1.4 (20ct+21ct) veto

who?

3.1.5 IC timing and energy

David,Shaomin

(see also Technote K-032)

3.1.6

3.2 Other...

Pass2 resources needed?, pnn2?,.....

References