



Run 19 QA

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2019 Run Summary

Goals:

Single-Beam Energy (GeV/n)	$\sqrt{s_{NN}}$ (GeV)	Run Time	Species	Events	Priority	Sequence
9.8	19.6	4.5 weeks	Au+Au	400M	1	1
9.8	4.5 (FXT)	2 days	Au+Au	100M	2	2
7.3	14.5	5.5 weeks	Au+Au	300M	1	3
7.3	3.9 (FXT)	2 days	Au+Au	100M	2	4
31.2	7.7 (FXT)	2 days	Au+Au	100M	3	5

Achieved:

Energy	Start	Finish	First Run	Last Run	HLTgood	Target
19.6	Feb 25 th	April 3 rd	20056032	20093036	582 M	400 M
14.6	April 4 th	June 3 rd	20094048	20154013	324 M	310 M
3.85 FXT	June 9 th	June 9 th	20160024	20160027	3.7 M	5 M
7.3 FXT	June 18 th	June 18 th	20169029	20169055	52.7 M	50 M
7.7	June 3 rd	June 27 th	20154047	20178014	2.9 M	4 M
4.59 FXT	June 28 th	July 2 nd	20179040	20183025	200.6 M	200 M
9.2	June 28 th	July 8 th	20179016	20189017	1.0 M	none
31.2 FXT	July 8 th	July 9 th	20190006	20190024	50.6 M	50 M
200	July 11 th	July 12 th	20192001	20193026	138 M	140 M

Run 19 Weekly QA meetings -- Charge

With Run 19 we will see the **several detector upgrades** that are critical to the success of STAR's BES campaign. STAR management has decided to introduce a weekly QA meeting throughout this run. For this meeting, we expect **detector experts, PWG representatives, and offline QA shift takers** to present the current status of the data that has been taken. The meeting intends to help **identify early on issues** that typically would only show up in offline QA and keep the feedback loop between QA shifters and detector experts as efficient as possible. At the same time this meeting should help make sure that **PWGs are closely aware** of any (operational) aspects that may impact the **data quality** and/or preparations that relate to e.g. calibration.

Weekly Meetings on Thursdays at 2PM (Chair – Frank Greurts)

QA experts:

- BBC - Akio Ogawa
- BTOF - Zaochen Ye
- BEMC - Raghav Kunnawalkam Elayavalli
- EPD - Rosi Reed
- eTOF - Florian Seck
- GMT - Dick Majka
- iTPC- Irakli Chakaberia
- HLT - Hongwei Ke
- MTD - Rongrong Ma
- VPD - Daniel Brandenburg
- ZDC - Miroslav Simko and Lukas Kramarik
- Offline-QA - Lanny Ray + this week's Offline-QA shift taker
- LFSUPC conveners: David Tlusty, Chi Yang, and Wangmei Zha
 - delegate: Ben Kimelman (LFSUPC)
- BulkCorr conveners: Sinlchi Esumi, Jiangyong Jia, and Xiaofeng Luo
 - delegate: Takafumi Niida (BulkCorr)
- PWGC - Zhenyu Ye
- TriggerBoard (and BES focus group) - Daniel Cebra
- S&C - Gene van Buren

Typical Agenda:

- 1) Update from STAR operations and C/AD -- Daniel Cebra
- 2) Fast Offline QA - Lanny Ray
- 3) HLT QA (Hongwei Ke)
- 4) PWG QA - Ben (LFSUPC) and Takafumi (BulkCorr)
- 5) QA of new detectors:
 - eTOF (Florian Seck)
 - TPC (Irakli Chakaberia)
- 6) QA of other detectors
ZDC: <https://www.star.bnl.gov/~lkramarik/run19.ZdcCalibration/>
- 7) Round table QA/known issues

- Reports of operations and collider performance updated on the run progress and issues
- The sample is taken from the 19.6 GeV collider run from the March 21st QA meeting

Operations History: As it relates to QA

Feb-25 day 56:

20056040 minbias 640001 (10M)

Runs 20057038 – 20058005 Gap Cleaning

Runs 20059001-20059018 Two RDOs out

Mar-01 day 60:

minbias 640011 (40M)

Run 20061026 Collimators adjusted

Mar-04 day 63

minbias 640021 (15M)

Run 20063032 Cogging adjusted

Mar-05 day 64

minbias 640031 (160M)

Run 20065038 Lost RDOs 4-2 and 10-3 out rest of run

Runs 2067014 - 20067039 BTOW off

Runs 20067039 - 20071008 4 BTOW PMT boxes out

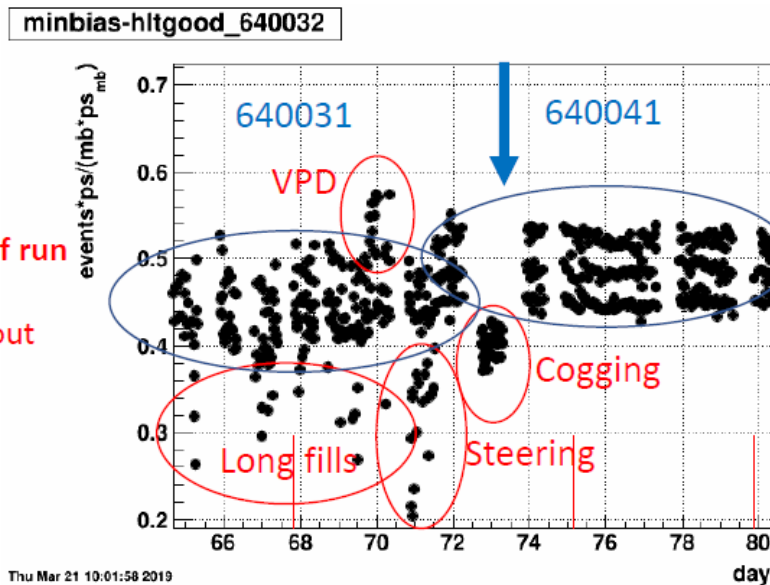
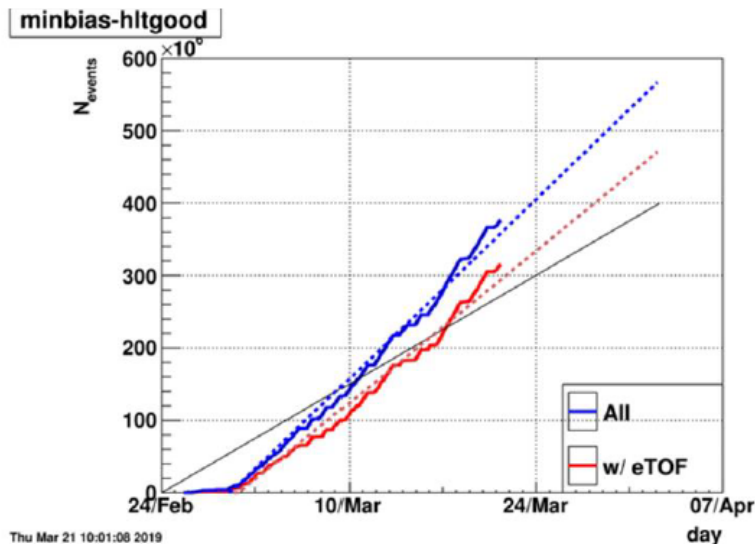
Runs 2007037 – 20071020 Steering was drifting

Runs 20072032 – 20073027 Cogging was shifted

Mar-14 day 73

minbias 640041 (145M)

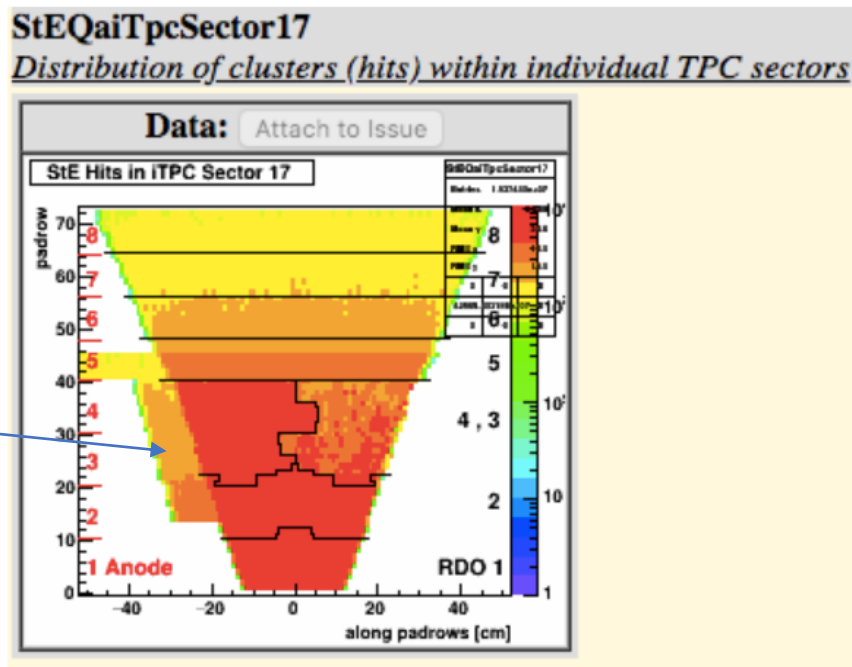
Run 20073071 – 20074027 RDOs 24-1,2,3 out



- Reports from the daily fast offline QA helped identify issues quickly
- Lanny Ray gave weekly updates and we cross checked observed issues with known problems
- The sample is taken from the 19.6 GeV collider run from the March 14th QA meeting

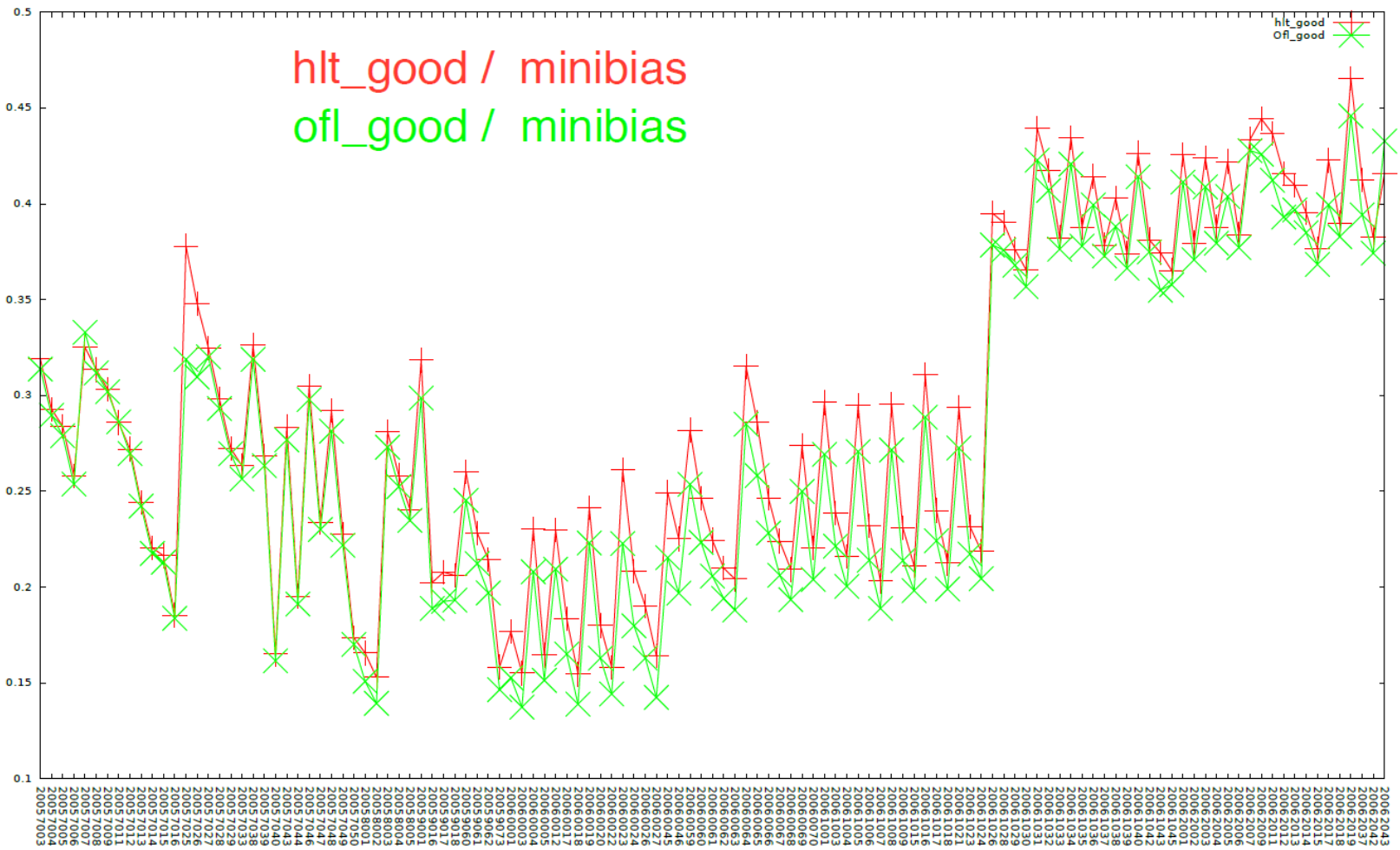
Day 73

- Beam condition problem persists in day 73 runs
- In addition, iTPC sector 17, RDO-3 has a lower shows number of hits than RDO-4
 - Sector 17, RDO-3 was masked out

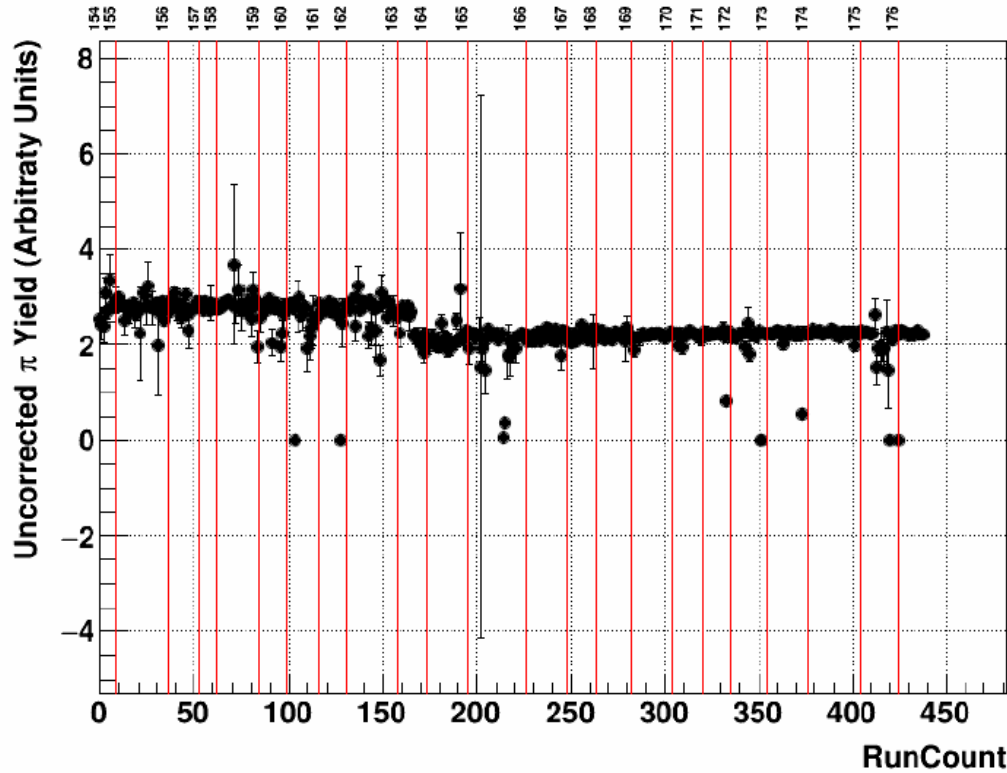


Identified as a software issue:
 Lesson... Fast offline runs on the dev library

- The online estimate of the number of good events came from HLT_good.
- Hongwei regularly tested the HLT_good versus the fast offline good to verify this metric.
- This sample plot is taken from 19.6 GeV collider events from the March 7th QA meeting.



Au+Au $\sqrt{s_{NN}} = 7.7\text{ GeV}$ Pion Yields

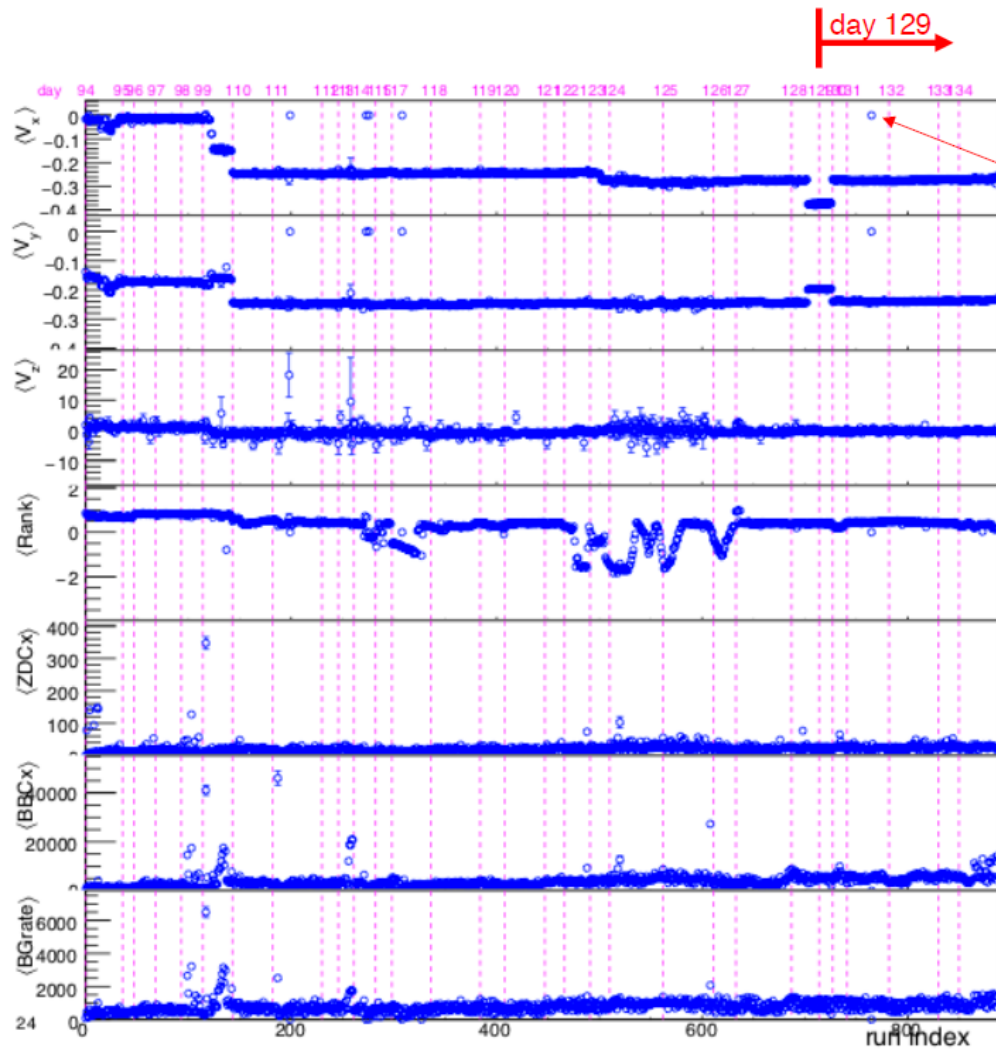


Fluctuations on day 175 (Monday) are due to TOF issues which caused short runs (<1k events)

Au+Au $\sqrt{s_{NN}} = 3.9\text{GeV}$ FXT Pion Yields y_{CM}



Bulk Corr QA – Takafumi Nilda

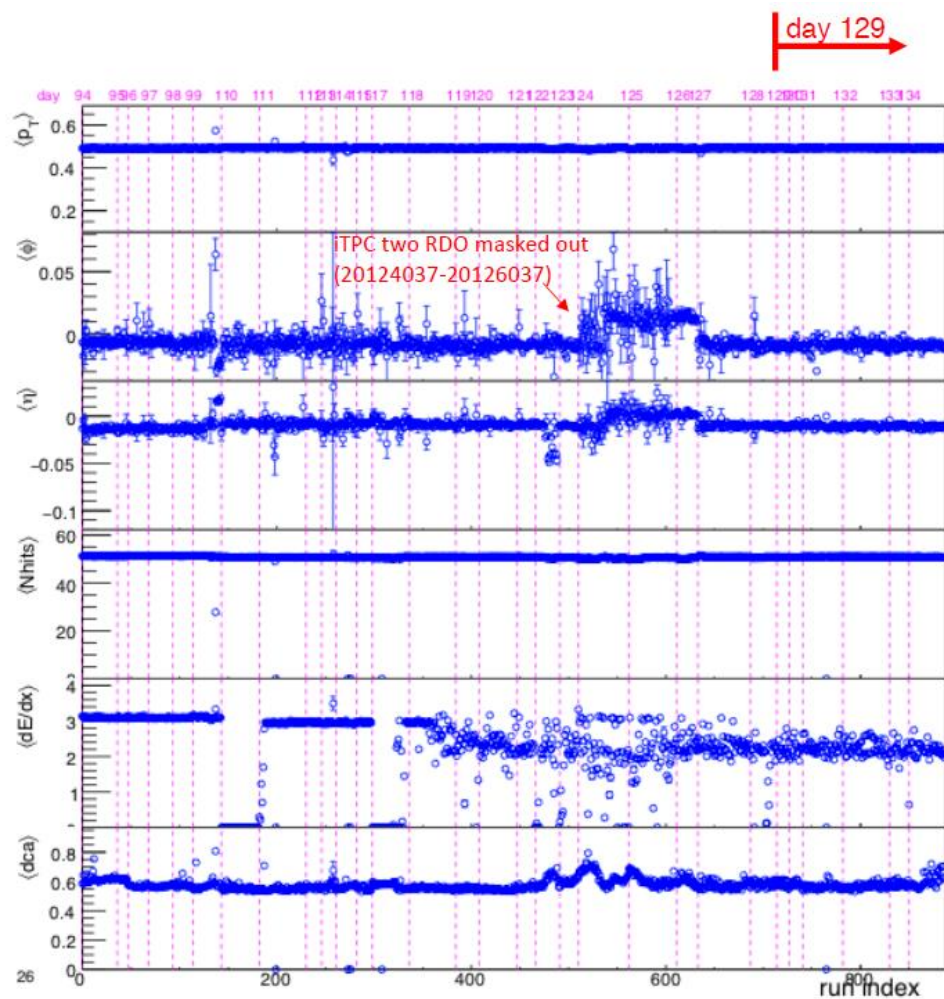


no TOF in run20131028

For the last week (day 129-134),
nothing strange except a bit higher $\langle \text{BBCx} \rangle$ in day 134

T. Niida, May 16/2019

Bulk Corr QA – Takafumi Nilda

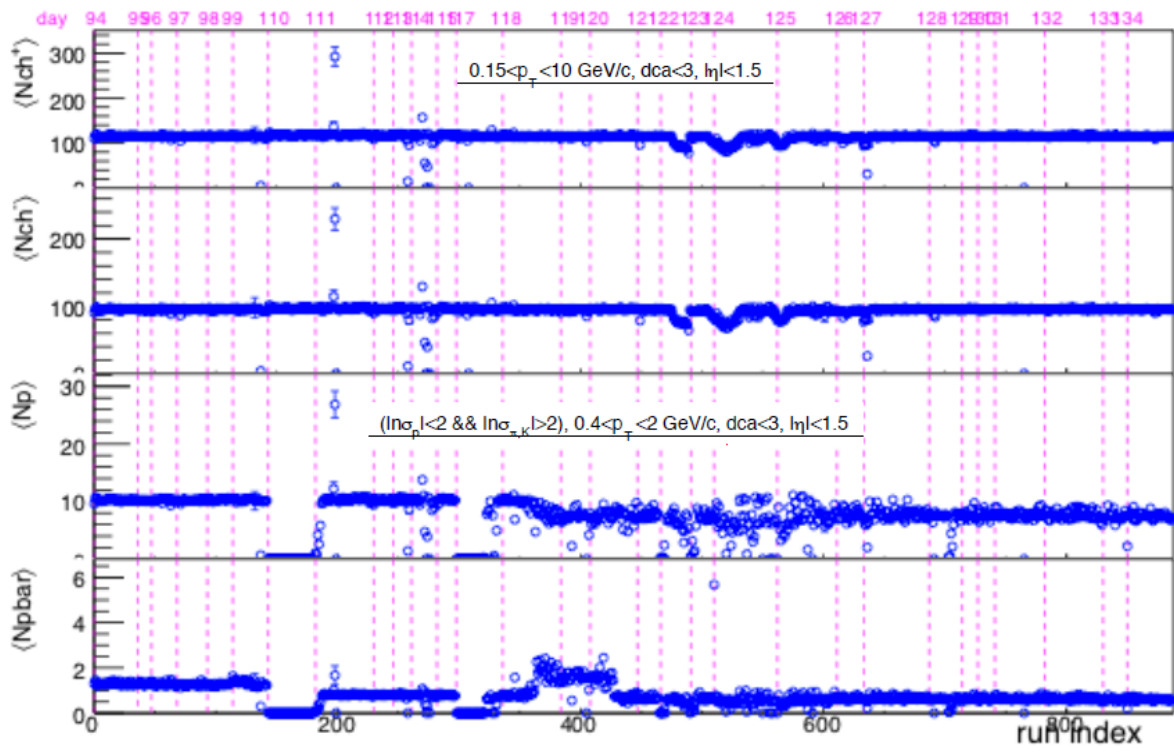


- still lower and fluctuating $\langle dE/dx \rangle$
- $\langle dca \rangle$ is a bit higher in day 134, perhaps related to higher $\langle BBCx \rangle$
- other track quantities look stable

T. Niida, May 16/2019

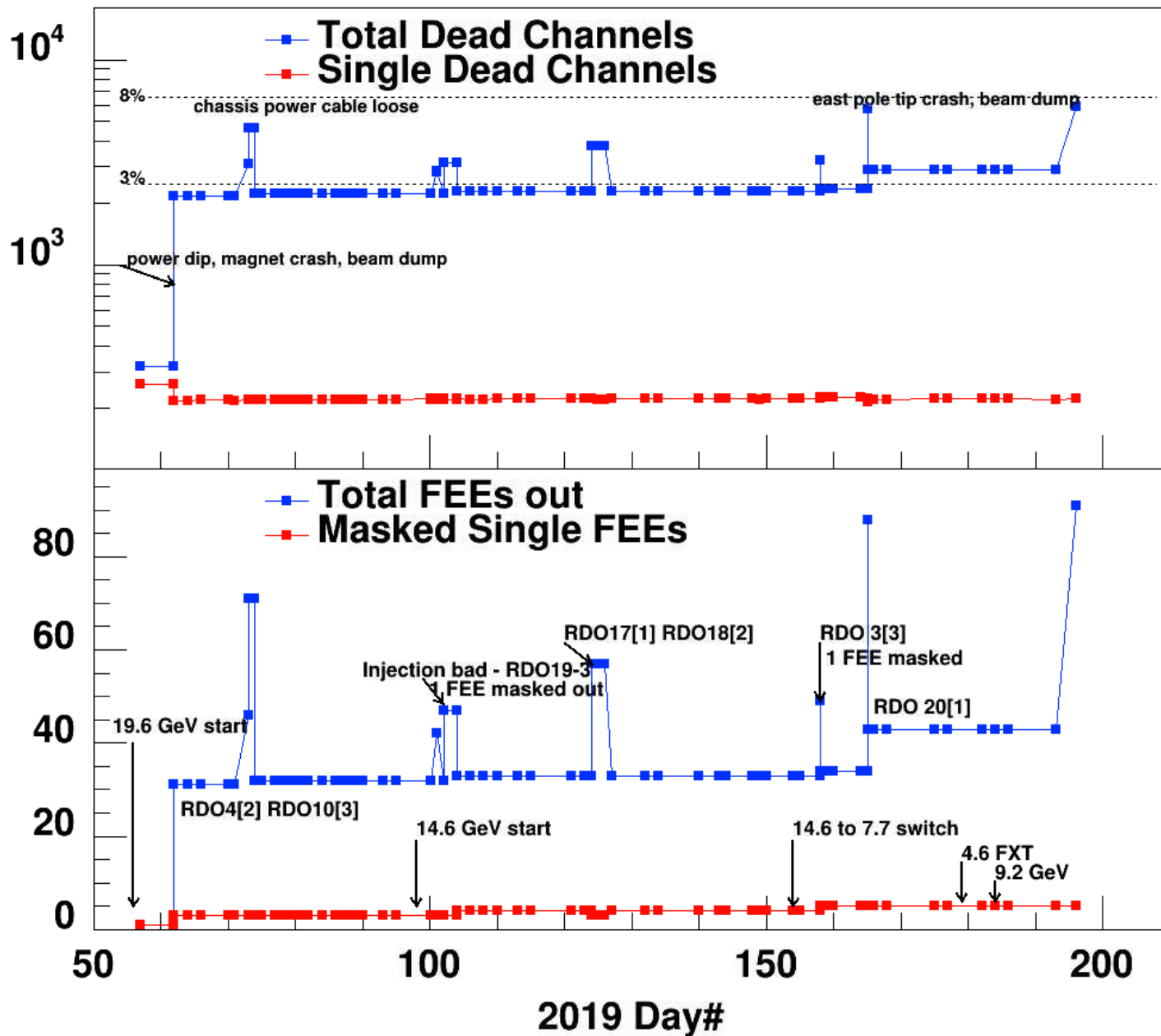
Bulk Corr QA – Takafumi Nilda

day 129 →



getting stable but still keeping lower values with fluctuations since day 118

TPC issues are well documented on Flemming's blog page



All these run time QA reports are documented on drupal → a goal would be a full summary

History of Run 19 – As it might affect run-by-run QA

- Friday 22-Feb-2019 day 053
 - First run with beams 20053045 - tune_2019 configuration
- Saturday 23-Feb-2019 day 054
- Sunday 24-Feb-2019 day 055
 - Switched strawman_2019 configuration on run 20055082
- Monday 25-Feb-2019 day 056
 - Switched to production_19GeV_2019 configuration on run 20056040 minbias 640001
- Tuesday 26-Feb-2019 day 057
 - [Run 20057017](#) - ZDC voltage on the East 2 tower was changed to the correct value
 - [Run 20057038](#) – Gap cleaner turned on
- Wednesday 27-Feb-2019 day 058
- Thursday 28-Feb-2019 day 059
 - [Run 20059001](#) - production_19GeV_2019 – Gap cleaner turned off
 - [Run 20059040](#) - unmasked iTPC sector 21 and unmasked the iTPC 19-2
 - [Run 20059060](#) – beta-star changed from 3m to 2m
- Friday 01-Mar-2019 day 060
 - [Run 20060045](#) – First run with minbias 640011 (TOFmult3, EPDmult3)
- Saturday 02-Mar-2019 day 061
 - [Run 20061026](#) – Adjustment to collimators
- Sunday 03-Mar-2019 day 062
 - [Run 20062030](#) – iTPC 4-2 and 10-3 masked out (failure due to power dip)
- Monday 04-Mar-2019 day 063
 - [Run 20063032](#) – First run with minbias 640021 (new EPD settings)
 - [Run 20063034](#) – Cogging adjustment
 - [Run 20063038](#) – Vernier scan and steering adjustment
 - [Run 20063043](#) – Go to one hour fills
- Tuesday 05-Mar-2019 day 064
 - [Run 20064037](#) – minbias 040031 (EPD TAC offset and slewing tables)
- Wednesday 06-Mar-2019 day 065
 - [Run 20065038](#) – Power supplies for iTPC RDOs 4-2 and 10-3 repair unsuccessful
 - [Run 20065056](#) – Start of the runs per fill (0, 1, 2) conduct of operations
- Thursday 07-Mar-2019 day 066
- Friday 08-Mar-2019 day 067
 - Runs 20067014 - 16; 23-30 – BTOW off
 - From Run 20067039 to 20071008 ~4 dead PMT boxes in BTOW
- Saturday 09-Mar-2019 day 068
- Sunday 10-Mar-2019 day 069
- Monday 11-Mar-2019 day 70
 - Runs 2007037 – 20071020 Steering was drifting may affect data quality
- Tuesday 12-Mar-2019 day 71
 - Run 20071008 – BTOW boxes repaired
 - Corrected t0 is the offline analyses
- Wednesday 13-Mar-2019 day 72
 - Changing minbias to include ZDC.and.
- Thursday 14-Mar-2019 day 73
 - First run with minbias 640041 (add ZDC trigger)
 - The cogging was off, vertex is shifted
 - Run 20073004 to 20073031 – iTPC RDO 17-3 is masked
 - Run 20073071 – Power supply issue iTPC RDOs 24-1, 24-2, and 24-3 off
- Friday 15-Mar-2019 day 74
 - Run 20074030 – iTPC RDOs 24-1, 24-2, and 24-3 recovered, back in run

Summary:

- Weekly QA meetings during run 19 brought detector and QA experts together
- Issues were found that effected the run strategy – choice of energies, number of events
- These archives on drupal will be a valuable resource when preparing for production
- A similar prompt effort will be needed from the PWGs when data are produced