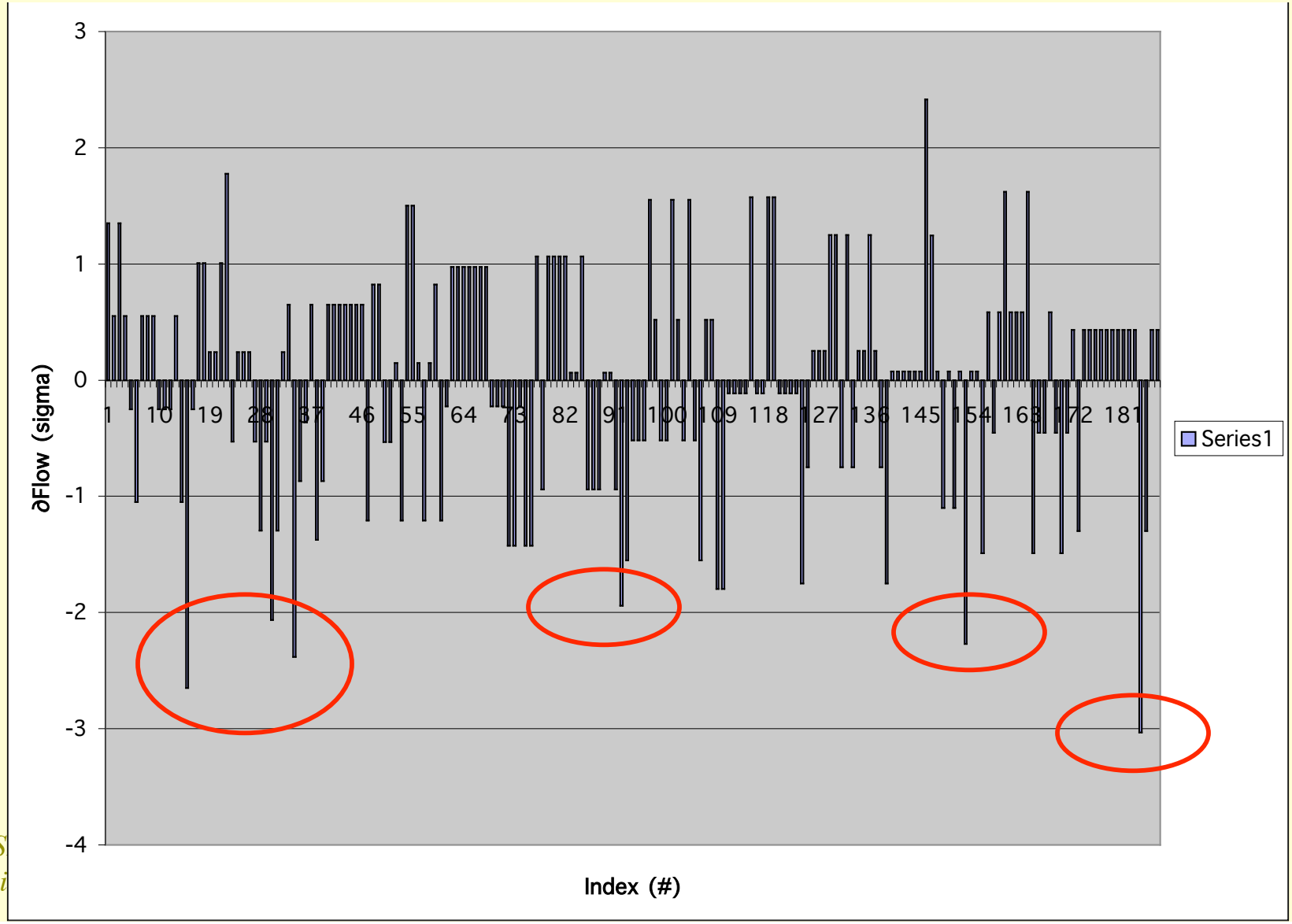
Open Reliability Issues (Vacuum, Magnets & PS)

- Two root causes for failures:
  - Aging & deterioration
  - Heat load from increased beam currents while shortening bunches
- The aging process is gradual, don't expect slope to change dramatically in the last running year.
  - Magnets & ps are understood & standard items @ SLAC with spares being maintained.
  - Some ring components have shown a rather steep increase in failure rate recently:
    - HER dipole chamber cooling channels clogging
      - measured all flows, closer inspection of hoses for some.
    - rf cavity spools, ferrite loads cooling channels clogging
      - replumbed several, added coolers, remains a concern
    - rf seals

HER Dipole Flow Rates

"0" is 5…6 gpm depending on half-arc.

"σ" is the spread in the half-arc the chamber is in (0.2…0.3 gpm typ.).



High-Beam-Current Concerns

- Up to 2.2 on 4 A, bunches shorter by ≈20%
  - HER, Straight BPM buttons will get hotter than ever
    - Ecklund evaluation: near or in danger zone, need vigilance
  - Injection/abort kicker vacuum chamber
    - One assembled spare kicker ea., 4 installed/ring, may have some ceramic pipe blanks.
    - Catastrophic failure will be hard to recover from.
  - Feedback kickers, feedthru's, loads, cables, filters, …
    - We have spare materials, & the kicker structures are expected to last. However, if feedthroughs, filters, loads or cables reach the limit of performance we may become beam-current limited.
  - (IR-2-) Vacuum system:
    - If large-scale difficulties arise we may become resource-limited.
    - Some "spare" parts are becoming patched-up spares.
    - A failure in the vtx system may end the Run prematurely.

Lack of Spares, Other Concerns

- Injection septa
  - No spares exist, but have not had failures or issues other than flakey flow switches.
- Corrosion
  - The PEP tunnel is a fairly aggressive environment. As machine gets older, corrosion cases will become more frequent
    - Ongoing program to mitigate corrosion, deflect water (M. Zurawel, M. Loc)
    - Fix bigger issues [HENIT support feet rusted through, being replaced (M. Dormiani)]
    - May become a concern for the "mothballed" machine.