HPR experience at JLab

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JLab HPR History

- Started using HP rinsing with inexpensive pumps with good success 1993-4

- In 1995 we upgraded our cleanroom facility for a production HPR system
  - Raised the cleanroom ceiling in Class 100 section
  - (no access below this room)
  - Power and DI loop brought to cleanroom
  - Repeated up and down wand motion, many nozzles

JLab HPR History

- SNS production many problems identified
  - Not enough rinsing on cavities
  - Program not optimized for shape
  - Pump not capable for production operation
  - Poor choice for filter material
  - Bacterial contamination
  - Particle counter would drift off due to bacterial contamination
- Changes made
  - Trickle flow added to reduce bacterial growth
  - Reprogrammed to scan surface then drain and repeat one direction only

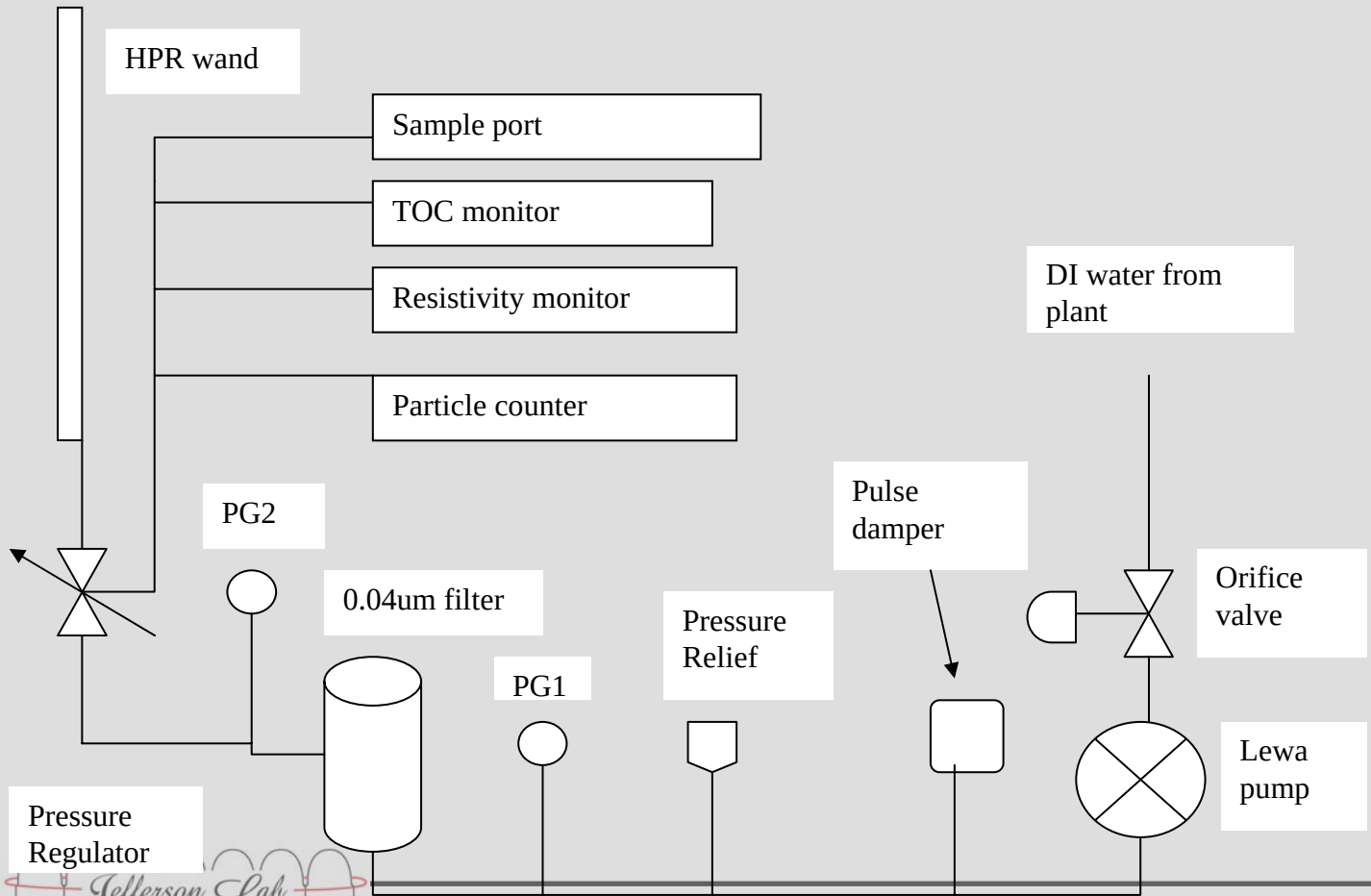
JLab HPR History

- Changes made
  - Trickle flow added to reduce bacterial growth
  - Reprogrammed to scan surface then drain and repeat one direction only
  - New fan jet used only two nozzles (more water to the surface)

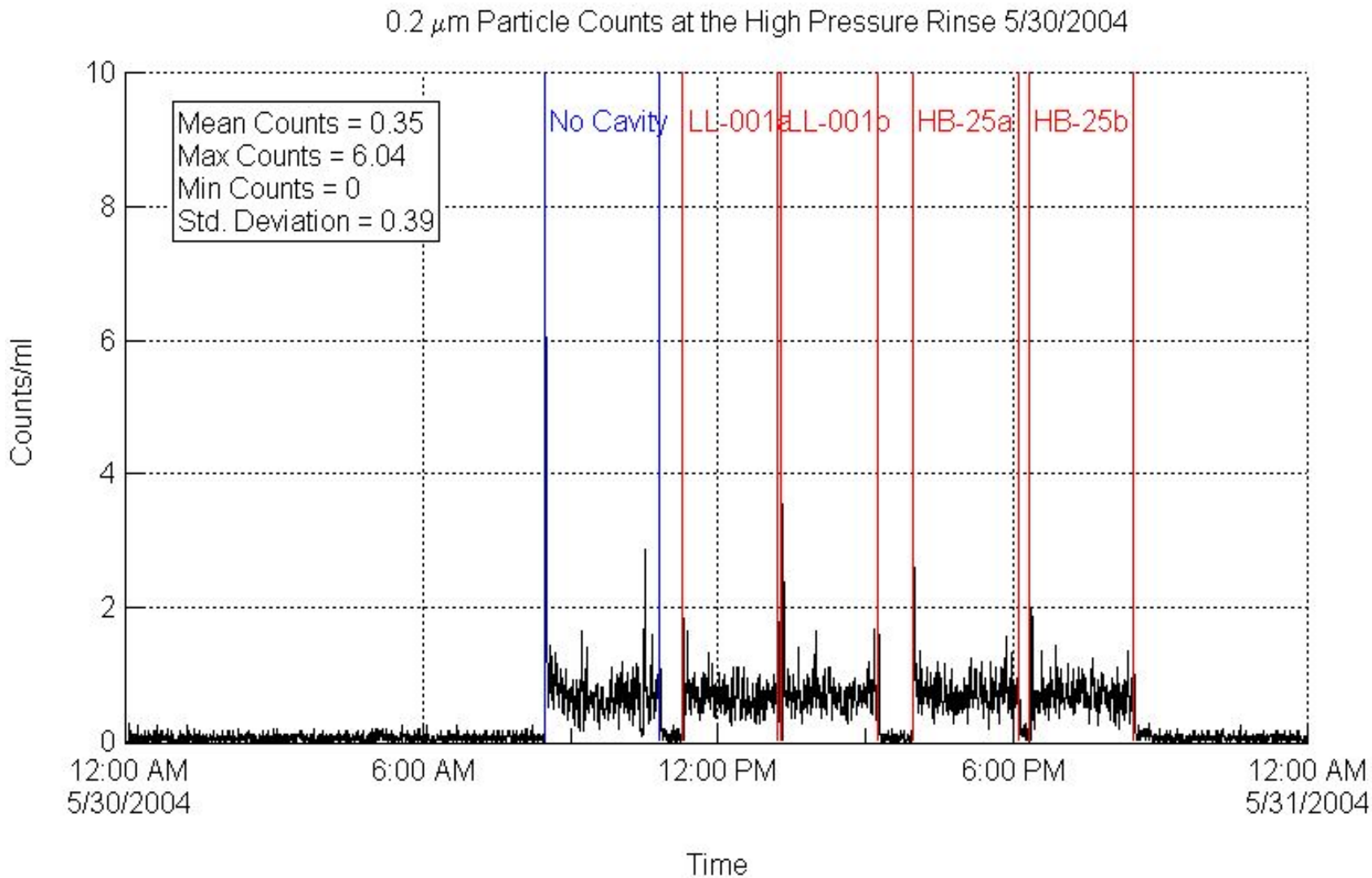
Discoveries

- Particle counter not trusted and needed TOC and resistivity for full picture of what was happening
- This led to routine cleaning and storage with solvent during maintenance periods longer an hour
  - Recovery slow sometimes days
- Trickle flow helped keep system clean from bacteria and diagnostic systems operating smoothly
- We get good results when particle counts are < 1 and resistivity reaches 18 M-ohm-cm after 20 minutes into run, and TOC below 6 ppb

JLab HPR System



Typical HPR Runs



Questions?

- More effort is needed to understand the HPR effectiveness
  - What is right type, amount and placement of nozzles
  - Should the wand spray in up direction or is single pass better?
  - How long is enough to get the job done?