SnT 2019
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

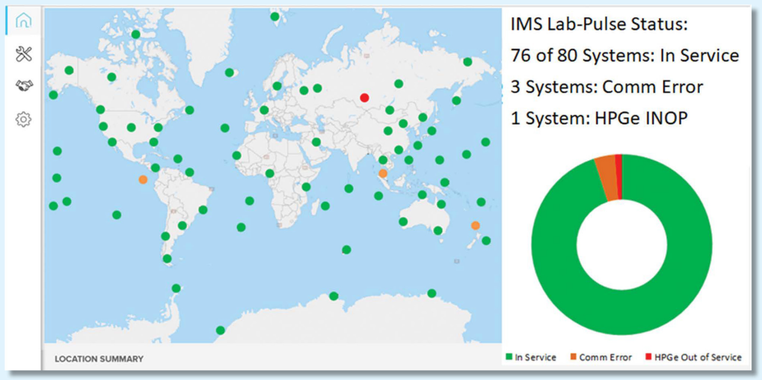
Lab-Pulse™ Technology for Both Real-Time State-of-Health Monitoring and Predictive Preventative Maintenance

D. Van Cleef, D. Sullivan, S. Laskos, C. Hurt, E. Tischenbach – Mirion Technologies(Canberra), Inc.

T4.3-P10

ABSTRACT

- Mirion Services has introduced a novel product for the purpose of maximizing radiation detection equipment uptime by utilizing real-time instrumentation state-of-health (SoH) monitoring technology.
- This technology demonstrates value for both real-time state-of-health monitoring and predictive preventative maintenance



BACKGROUND

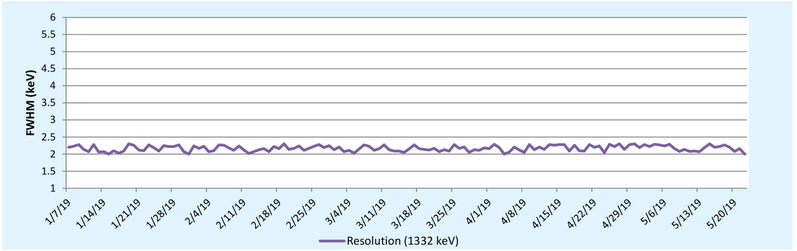
- Conventional nuclear measurements quality assurance monitoring provides point-in time detection system state-of-health
- Conventional quality assurance parameters that are out of specification or trending out of specification indicate a system failure that probably has already occurred
- Reactive detection system maintenance always involves system downtime and is normally more expensive than preventative maintenance
- Until now, advanced real-time SoH monitoring has not been available in standard detection system components.

INTRODUCING LAB-PULSE™ TECHNOLOGY

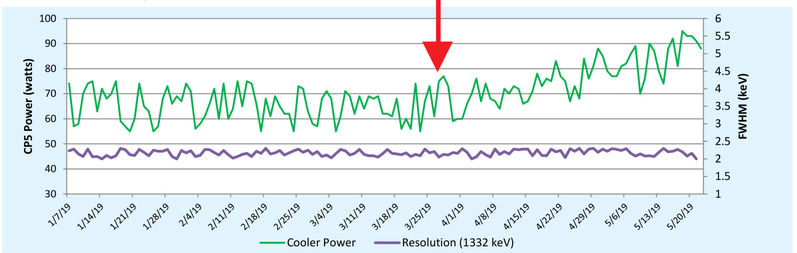
- To move from a reactive maintenance model to a proactive maintenance model
- For IMS and station operators, Lab-Pulse provides leading indicators of instrumentation problems rather than following indicators
  - Faster, simpler, and more accurate troubleshooting
  - Less down time
  - More efficient maintenance cycles
  - Better return on investment

A REAL-WORLD EXAMPLE

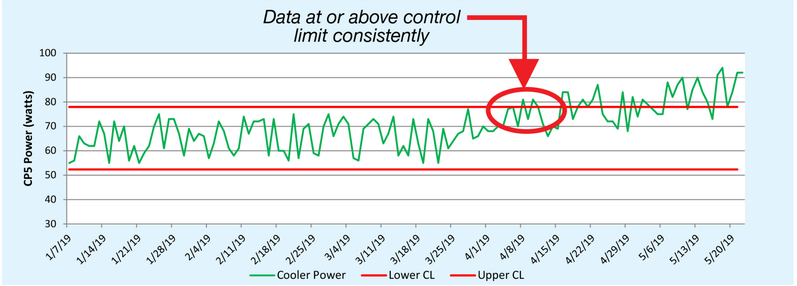
- HPGe system using conventional QA parameter monitoring
  - In this case, detector resolution at 1332 keV
  - Degrading resolution often means a detector cryostat vacuum issue



- In this example, resolution appears constant
  - Conventional data indicates no system issues
- Add Lab-Pulse and real-time monitoring of the cooler power
  - Cooler power approximately constant until about the end of March, then begins to trend upward



- The detector temperature, and therefore resolution, is unaffected through the end of this period because the cooler has enough power, but the cryostat is losing vacuum
- Using conventional QA data limits applied to the Lab-Pulse data, we can see signs of the need for detector maintenance at least 6 weeks before the resolution points to a pending failure and schedule a convenient time for service before potential failure



- Using this data, maintenance cycle planning could keep this system operational with minimal down time
- Using advanced analytics, earlier leading indication may be possible

THE LAB-PULSE PRODUCT

- Utilizes built in “designed-for-service” data collection in current products to monitor up to ~90 data points per system
- Monitoring data includes ONLY instrumentation parameters, NO analytical or radiological data is collected
- Much more SoH data than provided by any prior generation standard or custom detection system componentry
- The wealth of data enables conventional QA parameter testing as well as co-dependent and advanced analytical modeling

CONCLUSION

- By improving the awareness and knowledge of the instrumentation state-of-health, we get:
  - Greater assurance that our instrumentation is operating properly and ready to perform its intended function
  - Leading indicators for the need for maintenance or repair, before an instrument is placed out of service
  - Early warnings of adverse conditions that may allow us avert impending instrument failure
  - Better information to assist in troubleshooting
  - A wealth of additional instrumentation quality assurance data to more thoroughly reflect top instrument performance & accuracy

Lab Pulse Ready

MIRION TECHNOLOGIES

Mirion Technologies (Canberra), Inc.
800 Research Parkway – Meriden, CT 06450 U.S.A.
Tel: (203) 238-2351 – Toll free: 1-800-243-4422

www.mirion.com