



Palo Verde Generating Station Obsolescence and Regulatory Impacts

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Mirion Connect 26



Palo Verde Generating Station Radiation Monitoring System

- Our Radiation Monitors are built by Kaman Sciences which was based out of Colorado Springs. Kaman was bought by ITT Industries in 1997. There are two designs that Kaman offered, one of which is unique to Palo Verde. Defined as Old Scope and New Scope, Old Scope monitors were original to Palo Verde, while New Scope was the result of TMI. Starting in the early 2000's, Palo Verde began looking at replacing NSR monitors with an in-house design, finishing in 2015. These in-house monitors are known as RMC (replacement micro-computer).





Harvesting Parts

The First NCV

How did we end up here?

- RU-142, our MSL N16 monitor had a failed CPU board
 - Out-of-service for an extended period
 - RISC-2, still falls under Maintenance Rule
- “Harvested” a CPU board from RU-158, a Multichannel Area Monitor, to restore RU-142 to service
 - No engineering evaluation was done to justify this
 - Alternate sampling measures were taken
- Determined to not be a valid strategy to restore RU-142 to service



Results?

- No longer relying on harvesting parts as a form of a bridging strategy, strictly a coping strategy if a safety-related monitor fails
- Three CPU boards purchased from Engineering Solutions
 - Limited stock available
 - 1 of 3 boards still available for use



Long Term Non-functionality

The Second NCV

Another one?

- RU-8, Aux Building Ventilation monitor, out-of-service for 3 years
 - Due to firmware issue with in-house design as well as failed CAN bus IC on the ITB
- Not prioritized properly due to the monitor being non-safety related and limited maintenance personnel
- Calibrations paused on the monitor due to the hardware issue



Where are we today?

- RU-8 remains out-of-service, waiting for maintenance to perform repairs
- Lower priority monitor as the flow path goes to plant vent
- Re-evaluating maintenance strategy to properly prioritize and schedule repairs
- Analyzing monitors that have been out-of-service for an extended period
 - Fix the low-hanging fruit



Obsolescence

Death by 1000 cuts

Lack of Component Availability

With lack of vendor support, limited spares are available for repairs. Over the years, stock levels have been depleted, requiring modifications for replacements.

Current Challenges

- Mineral Insulated Triax cables
- Silver-plated gas filled o-rings
- CPU, RAM, and System boards
- Motor starters and contactors
- Ion chamber detectors
- Flow meters
- Calibration sources
- Etc...



