CM Support of Equipment Reliability

* Risk Recognition
  + Example: Recorder replacement – Engineer Involved in approval – from-to termination specified. Power cut off to feedwater control. Didn’t recognize risk of re-term work.
    - Assumed it was just a list and work planner assumed engineer evaluated.
  + For CM to support ER, each actor needs to stay in role and perform it well
  + Replacing steam dump valves – last one before INPO eval. Fast track mod with no formal risk evaluation. Operators knew to bleed in slowly and how to introduce water to dump valves. Valve destroyed on start-up with trip of plant. Design differences and operating modes of valve not discussed in detail between design and ops.
  + Consider if the formal risk process is robust enough – FMEA example
  + Need for intellectual curiosity
  + Relay logic – coil is “black-box”. Monitoring circuit energized and won’t turn on coil. Replaced with digital and didn’t question purpose of resistors.
  + Behaviors and considerations in design
* Ops critical components
  + Are there things in this component that could cause down power or scram?
  + Bump hazards (valve positions) – Where do we have restraint devices in place and how to track? It is design equivalent to have the restraint, but is of concern to operations to operate the valve.
* Funding often depends on Sys Eng risk evaluation and importance on a given day. How can CM help clarify priority.
  + If it is Ops critical (originally SPV) it gets high priority
  + System mgr convinces management on importance of component issues but design knows it is ops critical or SPV. Need awareness of ops critical components and potential for trips/down-power events.
* Technical Rigor
  + Checking to the point of already validated information
  + Example: Card inputs + and common for each input. New card had only one common terminal. Determined to be ok as long as from same supply. Common being connected at different places in circuit. One caused equipment breaker trip. Didn’t examine the circuit with enough rigor, but the information was available
  + Example: In-take structure Chlorination via a bay. Assumption is the treatment goes in the in-take. Chlorine was dumped directly over traveling screen in-take….sent Chlorine to environment.
* Reliability data
  + Equipment attributes in the equipment database to let maintenance know what is important or could cause a problem.
  + Maintenance schedules –
  + Critical components identified in MEL – how about physical markings / designations?
    - Hazards and floor markings for configuration control zones
    - Flagging for future operations in the walk downs.
  + Does anyone go out and validate the plant is configured the way it is designed.
    - Walk-downs for temp changes by system managers
  + RP and IT adding monitoring without design consideration.