SIMULATOR OVERSIGHT

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COLUMBIA GENERATING STATION
BACKGROUND

• 5 years as a Navy Nuke (submarines)
• 8 years in commercial nuclear power (all in the training department)
• SRO Certified at SONGS and Palo Verde
• PWR and BWR Experience
• Worked with three simulator vendors (WSC, CTI, and L3-MAPPS)
  • Simulator and Exam Supervisor at SONGS (2.5 years) (L-3 MAPPS)
  • LORQ Instructor at Palo Verde (2 years) (WSC)
  • Simulator and Exam Supervisor at Columbia (2.5 years) (CTI)
WHY AM I PRESENTING?

• Took a position as Simulator and Exam Supervisor at Columbia without turnover in August 2015.
• In early 2015, station received a finding in simulator fidelity, an UNSAT NRC exam submittal, and high NRC exam failure rate.
• Opportunity to share my experience and recommendations.
• Seen three different stations and three training departments.
• Will stay away from exams, but happy to share later if you have questions.
COLUMBIA GENERATING STATION

- BWR-5 – 3544 MWt (1205 MWe)
- Located in South Central Washington
- Cooled by the Columbia River
- Very large control room…very large simulator
- Simulator vendor is CTI
- I/O is TMI
COLUMBIA SIMULATOR
EXTENSIVE BACK PANEL MODELING
FUSES AND JUMPERS INCLUDED
PRESENTATION

• Fundamental things that have helped me

• Examples from my experience at Columbia and how those fundamentals have helped.

• Why manager level oversight and intrusiveness is important.
As a coach, your high standards of performance, attention to detail and – above all – how hard your work set the stage for how your players perform.

Don Shula
Come Quickly! Daddy's old mouse just laid an egg!
THINGS THAT HAVE HELPED ME

• The simulator **instructors** are your primary customer, not operations.

• The instructors **must** believe in your configuration management process
  - Take the time to train your instructors on the simulator DR resolution process and prioritization process.
  - Invite them to review board meetings as incumbents.
  - Communicate with the instructors when changing software.
  - Communicate your big picture goals with them.

• The instructor is the interface between you and the operators. They know what the operators like and don’t like about the simulator.
THINGS THAT HAVE HELPED ME

• Your instructors keep you out of trouble with INPO and the NRC
  • Thorough scenario validations keep you out of trouble.
  • A low threshold for writing DR keeps you out of trouble.
• The confidence your instructors have in the simulator configuration management process will be seen by the operators.
  • Instructors are leaders. If your instructors speak positively about the simulator, so will OPS.
• Take care of the instructors and they will take care of you.
• Don’t criticize and instructor for writing a DR. Don’t create an adversarial relationship. You are a team.
THINGS THAT HAVE HELPED ME

• Document, Document, Document
  • Have a low threshold for accepting and writing DR
  • Have a solid prioritization scheme to properly prioritize issues.
  • Create simulator differences when appropriate to communicate your issues.

• If you understand and document your issues well, you will stay out of trouble.
  • Your performance indicator may be red, but INPO and the NRC always value the fact that you self identified your issues. A red indicator will help you get support and develop a recovery plan.

• Do not “alter” your DR prioritization scheme to help your improve your performance indicator results.

• I say “write it up” a LOT to both my staff and the instructors.
THINGS THAT HAVE HELPED ME

• A fully featured configuration management database is essential for keeping your documentation in order.

• SimulatorWeb – Web based configuration management utility
  • Utilized by several stations.
  • Establishes transparency in the simulator configuration management process if utilized correctly.
  • Builds trust with the instructors.
  • Useful features that save you time and keep you organized.
  • Built specifically to help manage nuclear power plant simulators.
THINGS THAT HAVE HELPED ME

• SimulatorWeb – Features for the simulator staff
  • Good search features and reports.
  • Associate DR with a pack/configuration/release. Provides a record of what was fixed and when it was fixed.
  • Simulator differences are also tracked in the database
    • Differences are linked to the initiating DR
    • Fields to filter differences that are important to training into a report
    • I have over 10 years of DR in my database. Easy to search and find.

• Contact me if you want more info.
THINGS THAT HAVE HELPED ME

• Version Control Software
  • What I use…
    • Apache Subversion
    • VisualSVN Server
    • Tortoise SVN
  • I have a process document explaining how it is used (happy to share it). This is important.
  • **ALL** simulator files are part of the repository (ICs, Databases, Schedule files)
  • Test results files are also included.
• Great features
  • Tagging/Switching
  • Quick download
THINGS THAT HAVE HELPED ME

• Teach your management
  • Take the time to explain what you are doing to your manager.
  • This takes dedicated effort to hunt them down and force them to listen.
  • A little bit at a time…
  • In the long run, they will appreciate it.
  • They may never fully understand what we face, but they will learn to appreciate what you do and will want to help.
THINGS THAT HAVE HELPED ME

• Treating the simulator like a plant system can go a long way in getting funding.
  • If your station has system health reports, work to make your simulator part of that process.
  • If you can demonstrate to the station that your system is unhealthy, they will provide funding.
  • Make sure a system health color matches your PI color.
  • A life cycle management plan can go a long way to help with this as it will be part of your system health.
  • This was critical for me at SONGS to get funding.
  • Haven’t gotten there yet at Columbia…
THINGS THAT HAVE HELPED ME

• Don’t start a model upgrade project without ensuring and documenting your management commitment to provide you with the necessary resources.
  • Spend a LOT of time up front on the specification and project plan. Get management buy in for resources before starting process.

• Don’t get isolated. Benchmark.

• Be wary of having the same NRC inspector year after year.

• Be wary of having the same peer visit year after year.
I don't know which cloud my stuff is in.
EXPERIENCE AT COLUMBIA

• Same NRC inspector year after year
• Same folks supporting self assessments
• No regulatory issues...
• Different NRC inspectors for ILC-21 exam.
• Early 2015, reality sets in...(finding for sim fidelity, UNSAT exam submittal)
  • Things weren’t as good as advertised...
EXPERIENCE AT COLUMBIA

• Simulator Differences List
  • Lost/Incomplete.
  • Only had the “Training Differences List”
  • Was able to find a couple of Training Needs Assessments (TNA), but for a simulator as large as mine, I knew I was missing a LOT of differences.

• Solution
  • Implemented SimulatorWeb (has features to track simulator differences and TNA).
  • Toured the control room and documented all obvious and major differences.
    • Wrote TNA and routed them through the Review Board. 22 long term differences.
  • Have kept careful records going forward.
EXPERIENCE AT COLUMBIA

• Transient Testing Records
  • Historical binders showed inconsistent results from fuel cycle to fuel cycle
  • Explanations for differences between baseline and simulator were not accurate
  • Records flip flopped
  • Guy that knew was gone
  • Unable to pull up old software to confirm cause of problems
  • Unable to tell when pack updates were made and what DR were corrected
  • Electronic records incomplete or non-existent

• Solution
  • Developed new baseline with explanations and references to plant events and analysis data.
  • Incorporated recent plant data.
  • Implemented version control software (tags allow me to go back in time)
  • Tags associated with SimulatorWeb software configurations (can see what SR might have caused a change).
EXPERIENCE AT COLUMBIA

• Steady State Test Records
  • Long standing plant issues with instrumentation not incorporated into model
  • Resulted in failed tests.
  • Previous approach was to claim it was a plant problem year after year.

• Solution
  • Simulated long standing issue
EXPERIENCE AT COLUMBIA

• Culture not healthy
  • Instructors didn’t know how to access DR records.
  • Only way to initiate a DR was via paper.
  • Didn’t bother to write DR because they didn’t get fixed.
  • DR numbers very low (both initiated and fixed)

• Solution
  • SimulatorWeb
  • Communication and encouraging instructors to write up problems.
  • Evaluating and fixing problems in a disciplined manner.
  • Many SR generated and fixed in the last two years.
EXPERIENCE AT COLUMBIA

- Containment Model Upgrade Incomplete
  - Started in 2012

- Electrical Model Upgrade Incomplete
  - Started in 2013

- Compiler Upgrade Incomplete

- Double work for my engineer to keep training load and new load in synch

- Solution
  - Keeping these models in the versioning software as a branch allows me to switch between them easily. Makes comparison with old and new MUCH easier.
  - Hoping to implement in July.
IMPORTANCE OF MANAGER LEVEL OVERSIGHT

• Management was unaware of the problems with the simulator records.
• Same NRC inspector year after year. No problems or findings...
• Don’t be the hands off manager. The simulator will get you in regulatory trouble very quickly and is fundamental to your training programs.
• Things you need to know are healthy as a manager
  • Software configuration management and control (including differences)
  • Test records
  • Culture for writing and accepting DR.
  • Projects and resources
• If you let these things decay, then you may not be able to recover in time for an inspection or may get a finding.
**IMPORTANCE OF MANAGER LEVEL OVERSIGHT**

- Even if you don’t review test records, have someone knowledgeable review them. Someone OUTSIDE the simulator group, but who really knows your plant. A good person would be a technically strong RO/SRO.

- **Understand the configuration management process and audit some records.**
  - Look at DR closure records. Are they detailed. Is the process being followed.
  - No different then reviewing training materials.

- **Demand a detailed project plan and specification for projects.**
  - Hold a challenge meeting before the specification leaves the site to ensure all desired features are included.
  - Ensure proper resources are set aside and get management buy in.
IMPORTANCE OF MANAGER LEVEL OVERSIGHT

• If you commit to a project. Support your simulator staff until it is complete. Provided the resources needed.

• Don’t start a project unless your staff is willing.

• Don’t spend money just because you have it.
WARNING SIGNS

• Same NRC inspector year after year
• Same folks supporting self-assessments year after year
• Distracted employees? (health, family issues, other problems?)
• Disgruntled instructors
• Disgruntled operators
• Long standing plant issues not accounted for
• Instructors use overrides?
• Healthy culture (ask the instructors)?
QUESTIONS?