Knowledge Transfer and Retention in the D.C. Cook Simulator Group

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Agenda:

- D.C. Cook Simulator Overview
- Our strategies at D.C. Cook
- Software Tools
- Future Challenges
My Goals for Today:

- Provide a personal perspective of knowledge transfer and retention as a new member of a simulator group.
- Discuss some tools and techniques that have helped with the knowledge transfer and retention process.
D.C. Cook Simulator Overview

- Located in Bridgman, Michigan
- Dual unit, four loop, Westinghouse PWR plant
- Dual unit simulator
- Windows Operation System
Staffing

- Supervisor – 30 Years of simulation experience
- Test Operator – 32 years of simulation experience
- Hardware Technician – 35 years of simulation experience
- Sr. Software Engineer – 34 years of simulation experience
- Software Engineer – 5 years of simulation experience

... Everyone is very... Experienced.
D.C. Cook Simulator Strategies

- Methodologies discussed in D.C. Cook Knowledge Transfer and Retention Procedure
- Example Transfer Methods
  - Mentoring
  - Interviews
  - On the job training (OJT)
- Example Retention Methods
  - Database mining
  - Desktop guides
  - Self capture
D.C. Cook Simulator Strategies

- Multi-faceted approach
  - Initial training with simulator staff
  - SRO certification
  - Configuration Control
  - Documentation

- The process is ongoing
Training – Items Covered

- Core simulation concepts
  - Explanation of simulation
  - How the simulator works
  - General Software and Hardware processes
  - Discrepancy report system
- Ongoing mentoring – process is never complete
- Educational work assignments
- Work scheduling for self study
- Test operator workshop
- SCS conferences
SRO Certification...

- Allows for testing of DRs within simulator group (Test Operator)
- Allows time to be spent on problem at hand, not learning plant
- Increases work efficiency of simulator staff
SRO Certification

The following individuals are SRO certified or have been licensed:

- Supervisor
- Test Operator
- Software Engineers
- Contract software support personnel (for major capital modifications)
Documentation

Biggest question in knowledge transfer and retention at D.C. Cook – “How do we capture – and retrieve - simulator information?”

Simulator operating instructions, software development techniques, hardware maintenance information, vendor documentation, etc.
Documentation and Configuration Control

- Room for improvement with documenting techniques, software, DRs, etc.
- If captured, documentation was often difficult to find
- Found need to improve the following:
  - Documentation quality
  - Documentation accessibility
Software for Documentation and Configuration Control
Documentation and Configuration Control

Various software products are employed:

- Microsoft Access – DR database and hardware database
- KeePass – Passwords
- Git – Configuration control
- BeyondCompare – Configuration control
- MediaWiki and XAMPP – Simulator wiki
DR Database – limited documentation

DR Description: “Malfunction RD11 does not function with RCI. Update RD11 to work with RCI.”

Resolution: “Updated SRD101 to allow RD11 to function with Unit 1 RCI”
DR Database – good documentation

DR Description: “Recorder 1-AC-1 value for output voltage differs from panel meter. In reference unit values match. Check and adjust values as required.”

Resolution: “Adjusted code in module SEGI03, equation 03150. Changed calculation of variable ZAO2AC1_U1, which is the variable which drives the recorder voltage value. Updated code so that ZAO2AC1_U1 is now driven directly by transmitter variable U1_xm_genmetpt, which is then divided by span of recorder (150 Vac). Also removed use of unused chart recorder drive variable U1_YM:YPR01.”
Hardware Database

- Tools and spare parts stored in several hundred drawers and cabinets
- Database allows individuals to find spare parts when hardware technician is not available
<table>
<thead>
<tr>
<th>Unit</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinet Number</td>
<td>10</td>
</tr>
<tr>
<td>Drawer Number</td>
<td>1</td>
</tr>
</tbody>
</table>
| Equipment Description | SB-1 escutcheon plates  
                       | SB-1 switch handles  
                       | SBM switch handles  
                       | Cutler Hammer switches  
                       | Electroswitch switch  
                       | Cutler Hammer legion plates  
                       | Spare H2 Recombiner power adjust pot |
KeePass - Password Management

- Used for maintaining simulator passwords
- Open Source
- Run at Cook from single database
- Available from http://keepass.info
Example of KeePass interface

Image from keepass.info
Git

- Version control software
- Open source
- Used to maintain configuration control of individual computer systems (PPC, RMS, Annunciators, etc.)
  - Maintain simulator configuration
  - Easy to backtrack if there is a problem
- Available from git-scm.com
Git Extensions Interface
Beyond Compare

- Compares files and folders
- Used to compare code, configuration files, or entire directories
- Was found to significantly decrease time spent on comparisons
- Available from scootersoftware.com
Beyond Compare file comparison interface

Image from scootersoftware.com
Beyond Compare folder comparison interface

Image from scootersoftware.com
MediaWiki / XAMPP

- Used to capture and retrieve simulator information not in procedure or desktop guides
- MediaWiki is a free server-based software, licensed under the GNU General Public License (GPL). It is used to create a website that allows collaborative editing of its content and structure by its users.
- Same software that is used to run Wikipedia
- XAMPP is a free and open-source web server solution stack which contains components which can be used to run MediaWiki (Apache and mySQL).
MediaWiki – Simulator Group Use

- Used to capture often used simulator information
- Easier to find and retrieve information
- Low barrier for data entry
- Examples of information:
  - General tips and tricks
  - Core change guide
  - Process for starting up and shutting down the simulator
  - Troubleshooting steps for simulator issues
Main Page

Welcome to the Simulator Wiki!

Click here for the Simulator Operational Guideline.

Click here for the simulator troubleshooting matrix

Contents [hide]

1. Helpful Links
2. Newest Pages
3. Recent Changes
4. Getting started

Helpful Links

A list of all pages can be found here.

A list of recent changes can be found here.

If you cannot find what you are looking for by searching then create it. Some tips for starting a new page can be found here.

Newest Pages

1. Standalone executives
2. Block data files
3. Debugging
Simulator Operational Guideline

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PURPOSE AND SCOPE
The purpose of this guideline is to provide instructions for the training staff to perform routine administrative tasks to support training needs when the simulator staff is not available.

Students may use this guide for basic operation of the simulator during self-study operations.

This document is of similar content, but not equal to, desktop guide TDG-SIM-007, Simulator Operational Guideline.

DEFINITIONS AND ABBREVIATIONS
TSM/Annunciator

If an annunciator screen touch bezel is not responding (i.e. unable to move mouse to position to acknowledge alarm) proceed to Annunciator touchscreen troubleshooting.

If any of the following are being exhibited, then proceed here:

- Annunciator alarms are not sounding
- Alarms are not appearing on an annunciator panel
- There are one or more purple annunciator panels
- There is some other type of behavior to indicate that the annunciator system is failed.

This page is part of the troubleshooting matrix for instructors.

Category: Troubleshooting matrix
You do not have permission to edit this page, for the following reason:
The action you have requested is limited to users in the group: Users.

You can view and copy the source of this page.

If an annunciator screen touch bezel is not responding (i.e. unable to move mouse to position to acknowledge alarm) proceed to [[Annunciator touchscreen troubleshooting]].

If any of the following are being exhibited, then proceed """"[[TSM/PPC-ANN Reboot]here]]"":"  
* Annunciator alarms are not sounding  
* Alarms are not appearing on an annunciator panel  
* There are one or more purple annunciator panels  
* There is some other type of behavior to indicate that the annunciator system is failed.

{[tsm]}
Challenges

- Quantity of information
- Growing digital system scope
- Continued rigor and diligence with documentation
Summary

- Allotting time for training / knowledge transfer of all types is very important, and pays dividends later
- Documentation of all types of simulator information is important for past, present, and future simulator group staff
- Find the best software tools to help streamline work
Questions?