Overview

Simulator Operations

10 operating CANDU reactors
2 sites: Pickering and Darlington
4 full-scope control room simulators
3 fuel handling simulations
13 classroom simulators
100+ network / desktop simulators
46 years of simulator history
ALITHYA: COMPANY OVERVIEW

> North American strategy and digital technology leader
> Specialized in designing and building innovative and efficient digital Engineering and IT solutions for complex business challenges
> 2,000 professionals
> Activities and offices in Canada, the United States and Europe
> Founded in 1992
> Stock symbol: TSX: ALYA, NASDAQ: ALYA
Overview: Darlington (4 units)

4-Unit CANDU plant located on Lake Ontario
Tritium Removal Facility indicated
Located behind Darlington

Performs D2O (heavy water) cleanup for OPG, Bruce Power, and international customers. Why do we do this?

Note: 360kg/h feed rate, moderator for 1 unit is 237 Mg to 311 Mg
Project

Components

(ordered by cost)

1. ABB Control System
2. Model port / Integration
3. Room Construction
4. Virtual Control panels
   - Graphics
   - Monitors
   - Physical wall
Simplified Overview of Process

...additionally: the station D2O upgrader is at the TRF
Control System

ABB providing hardware and software.

AC800M controllers (emulation).

HMI Operator and Engineering workstations.

Simulator capabilities including Store/Restore/Freeze/Unfreeze.

Treated as black box in simulation.

Re-tuning of PID controller parameter may be required.
Modeling

Phase 1:
• Port old engineering test bed software (Pascal -> C/C++)
• Drive Control Room Light Panels
• Basic malfunctions

Phase 2:
• Improve fidelity
• Add more malfunctions

Challenges:
• Understanding the TRF processes
• Maintaining real-time response

Old “Simulator”, Engineering Test Bed
Modeling – Clean up of Heavy Water

Vapour Phase Catalytic Exchange
Modeling – Removal of Tritium

Low Tritium Distillation Column
Modeling - Cryogenic Refrigeration System
Control Panel (Graphics)

Physical Control Panels obsolete

4K Commercial Displays

Scalar Vector Graphics (SVG) used with custom-written browser for “Light Panels”

DataViews used for 5 traditional control panel sections and instructor schematics
Control Panel (Mounts)

Custom designed and built by A&C Tool (Bowmanville)

Try to mimic look & feel of real control room.

Is it a classroom?
Or is it a full-scope?
Training Centre
Facilities Modification

“The hardest part of any nuclear simulator project is the construction of the room it is located in.”

Cost of facility space: very high!
Facilities Modification

Scheduled start: Oct 9th
Actual start: Dec 6th

Delays:
Drawing Errors
Construction Island
Isolations
Work Protection
HVAC
Real TRF is currently in Outage
Simulator Installation: April?
Project Completion: Year End
People: OPG
People: Alithya
People: Kemp Construction

Joe from Kemp represents
About 30 people in this pic.
Wrap up & Questions

Risks: TRF ... is need justified? Yes. Maybe.

What is the regulatory basis?
What is the regulatory basis?
WANO perception?
Regulator perception?