Innovative Waterfall Implementation at NB Power

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About NB Power

- Located in New Brunswick, Canada
- Approximately 2700 employees
- Diverse Generation (Nuclear, Hydro, Thermal and Wind)
The Challenge

- Complying with NERC Critical Infrastructure Protection (CIP) standards (CIP-002 to CIP-009)
- Ensuring that assets are protected from external threats
The Solution

- To address this, we used Waterfall from Waterfall Security Solutions Ltd
What is Waterfall?

- A one-way (or uni-directional) Security Gateway.
- Because the information can only travel one way, it is impenetrable to external cyber security threats.
- This is ensured by using Waterfall hardware.
- The software is customizable to any protocol.
What is Waterfall?...(cont’d)

- Software agents deployed on both side of the H/W core
- Mediate the integrated solution with the surrounding network
- Mediate the integrated solution with the surrounding applications
The Implementation...(cont’d)
Lessons Learned

- Take time to ensure how the data is transferred between your DCS and PI.
  - Thermal Heat-rate calculations were designed to be written to the DCS from PI
  - This was beneficial because all information was on the DCS while still keeping the same look and feel for the operators
  - By adding Waterfall, the data being written to the DCS was no longer possible.
  - The solution was to add a kiosk type pc to display PI readings from the centralized PI server.
Lessons Learned (cont’d)

- Use PI Performance Monitor with Waterfall
  - Since you cannot directly control servers behind a waterfall (unless you are on the protected side of the network) use PI Perfmon
  - Since PI works with Waterfall, the information related to the servers will still be sent to the centralized server for monitoring.
  - It is helpful to understand the state of the systems while at the same time having no access to it.
Lessons Learned (cont’d)

- Have procedures to document when and why Waterfall has to be bypassed.
  - Sometimes a system needs to be need accessed for various reasons (maintenance, troubleshooting, etc) but with Waterfall, this is not possibly if you are external to the protected network.
- Have procedures to identify who can make a change to the configuration as well as;
  - Anticipated length of time for by-pass
  - Informing appropriate people so that the change is not forgotten
- Use Waterfall Secure Manual Uplink (WF-SMU) to provide a secure temporary bi-directional connection
Conclusion

• The Waterfall solution is a very innovative solution to address external cyber security concerns.
• NB Power Generation is now in compliance with NERC CIP standards
• With a little bit of planning, a Waterfall implementation can be achieved with virtually no impact to users.
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