Control System Assessment

The purpose of the control system assessment is to determine level of need for a control system migration. A typical assessment would include the following:

System Capacity Evaluation: System capacity restrictions can hamper plant O&M by making it impossible to add or modify DCS control logic, alarming, or monitoring functions.

Interviews with O&M personnel: A questionnaire is a useful tool to quickly assess the system hardware configuration. Interviews with operators and maintenance staff can help identify areas which need improvement.

Plant Walk-down and Drawing Collection: A thorough review of the DCS process graphics is performed in conjunction with a plant walk-down to gain familiarity with the plant systems. Master red-line drawings (SAMA, P&ID, Elec. Schematics) are collected, and the software server configuration is documented and backed up for future reference along with custom trend groups and any third party software licenses, etc.

Analysis of Historical Data: Operations logs and historical data can be used to identify areas where the control system should be optimized or upgraded to improve availability, efficiency, and/or emissions.

Ovation System Definition

There are several choices to be made when defining the Ovation hardware and software configuration.

Migration Tool –vs- Redraw: Migration using a software tool to convert WDPF source code directly to Control Builder SAMA logic requires a one-to-one DPU change-out. With a redraw of the SAMA sheets, DPUs which are physically located side-by-side can be combined into one controller. While the software implementation cost of a redraw is higher than with the migration tool, the hardware cost of a redraw can be significantly less, since fewer controllers are required.
A simulator model for the total plant can be developed to facilitate debugging of the software design and implementation. The “loop-back stimulator” reads the outputs from the control system, simulates the process response, and writes the inputs to the control system.

A detailed test procedure is another invaluable tool which helps maximize the simulation time and assure nothing is missed. While the purpose of the software validation test is to validate the software design and implementation, by the end of the testing process, the engineering development of the simulator will also be complete. Maintaining the simulator at the plant for operator training and as an engineering tool may be an attractive option.

Software Validation Testing

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Solaris –vs- Windows: The Ovation system software can run on a Sun Microsystems Unix workstation running Solaris or on a Windows PC. Users who are familiar with Unix and are concerned about network security might favor Unix, while users who want easy connectivity and inexpensive MMIs might favor Windows.

Other Unix strong points:
- WDPF HSR data can be maintained
- WESStation recovery via “boot net – install”
- X-Windowing via Hummingbird Exceed

Other Windows strong points:
- Expanded Engineering Toolbox

Network Layout: Fiber optic runs between buildings and turbine enclosures provide isolation from EMI and eliminate grounding issues, and 10-BaseT connections make for flexible system architecture. The number and physical location of fiber runs and network switches need to be determined.

AS BUILT Termination Lists: AS BUILT termination lists and Q-Line Card slot assignments and addressing are required documentation which need to be generated and validated.

Software Design Preparation: The starting point for the software design is an AS BUILT SAMA LOGIC drawing review. The drawings are compared to DPU source code and brought up to date, then, logic modifications or additions can be reviewed and included. I/O additions or modifications need to be reflected in the I/O termination lists, and process graphic modifications or additions need to be specified. After a final design review, all documentation, along with the Software Server back-up tape, will be submitted for implementation.