SCADA/FLEX DISTRIBUTED CONTROL

Overview

Plant Data That Promotes Optimization
- Energy usage computed by degree day
- Efficiency of the plant and each boiler/furnace
- Total steam generated by the plant and each boiler
- Total fuel used by the plant and each unit
- Average cost of steam
- Equipment cycle times and operating hours
- Condensate Temperature to help identify “blown trap”
- Blowdown Monitoring
- Make-up water flow vs. total feedwater or steam flow
- Flue Gas Oxygen vs. Setpoint Monitoring, etc.

Boiler Diagnostics
- Boiler control and flame safeguard alarm and equipment status information are presented both graphically and on alarm and event summaries. This aids in troubleshooting the cause of trips and potential trips
- Remote equipment monitoring allows for preventative maintenance. Problems can be evaluated centrally, allowing technicians to come properly equipped to the remote site

Unsurpassed Availability
- Preferred PCC-III, PWC, FSC, and BMU controllers provide continued plant operation in the event of a Control Network and/or SCADA shutdown
- Multiple SCADA Servers provide continued operation in the Central Control Room in the event of a SCADA shutdown
- Dedicated boiler controllers provide continued remote and local operation of unaffected boilers in the event of a single controller shutdown

Lower Installation and Commissioning Cost
- Controller Tuning Screens and Historical Trending tools help speed commissioning
- Controllers and I/O wiring are located near the equipment to save installation cost

SCADA/Flex Workstation

SCADA/Flex Offers:
- Process visualization (HMI)
- Supervisory Control And Data Acquisition (SCADA)
- Local or remote operating modes
- Historical Trending
- Alarming, alarm management and printing
- Report Generation and Printing (Option ‘-R’)
- High performance networking (Ethernet & Fiber Optic optional)
- Interface to Fireye and Honeywell Flame Safeguards (optional) Quanta-Flame Flame Safeguards
- Development Software allows continued development on site (Option ‘-DS’)

Open Architecture for Third Party Applications (optional)
SCADA/Flex can act as an OPC Server to any standard OPC Client. Alternatively, SCADA/Flex can act as an OPC Client to any standard OPC Server. SCADA/Flex leverages the ODBC Application Programming Interface (API), adding the capability to collect and write real-time secure electronic records to one or more relational databases. Data can easily be moved between a relational database and the SCADA/Flex process database.

Historical Trending
Multi-colored strip charts display any group of eight variables for any length of time. The Zoom feature and a data cursor allow precise readout and comparison of any event. Data may be placed on a server or flash drive for long-term storage and can be reloaded at any time for analysis.

SCADA/Flex is a Robust Plant Optimizing Solution
The ability to monitor and control plant-wide processes from a single location, while also collecting and sharing real-time plant data, has become an invaluable tool for improving the operation of boiler plant equipment. Plant owners around the country have successfully turned to SCADA/Flex from Preferred Instruments. SCADA/Flex helps you turn plant operating data into information, and information into dramatically improved performance.

Overview Graphics
Overview graphics are provided to match the specifics of your plant. Each screen intuitively displays critical information for quick and easy operation. “Soft buttons” provide an intuitive “point and click” interface for navigating between screens, acknowledging alarms, and controlling equipment.
SCADA/FLEX DISTRIBUTED CONTROL
Overview

Report Generation (Option ‘-R’)
Intelligent reports tabulate and summarize to help identify trends in efficiency. Energy use can be compared with previous reports to spot potential waste or to verify the effectiveness of fuel saving strategies. Plant managers can easily run reports on key “performance indices” such as cubic feet of fuel burned per degree day. Careful data tracking coupled with the intelligent control of process systems helps produce significant energy cost savings. Shift, daily, weekly, monthly, and yearly summary reports are automatically generated and can be printed at any time.

Centralized Plant Operation-Local Control
The SCADA/Flex System provides the ease and flexibility of centralized plant operation while ensuring the safety of local control. Workstations can fully operate an entire series of plants, on site or across the country, through dial-up or leased line. SCADA/Flex systems can even be outfitted with laptops so that monitoring and control can be administered while traveling. However, PCC-III and PWC controller local operator interfaces allow plant operation in the event of a workstation and/or data highway malfunction.

Intelligent Reports

Plant Overview Display(s)
At-a-glance monitoring of boiler plant

Historical Trending Display(s)
An essential monitoring tool. Multiple (8) pen “Charts”

Alarm Display
Alarm, events and operator actions are logged with time/date stamp and description

Tuning Displays
Tuning parameters are presented along with process variable trends to facilitate commissioning and maintenance

Control Display(s)
Intuitive workstation control mimics local controllers to maximize ease of use

Boiler Overview Display(s)
Faster and improved understanding of boiler operation
SCADA/FLEX DISTRIBUTED CONTROL
Specifications

Hardware
- Processor: Intel Xeon 1.8GHz or better
- Memory: 8 GB RAM
- Drives: 600 GB Hard Drive, DVD ROM Drive
- Monitor: 24" Flat Panel

(Computer hardware offerings will be updated as new equipment becomes available.
A job-specific, detailed proposal will include details on the computer and peripherals.)

Software
- HMI Graphics: Object-oriented
- Platform: Intellution iFIX, Microsoft Windows, Visual Basic for Applications (VBA), Microsoft Excel© for Reports
- Architecture: Real time Client/Server, OLE for Process Control (OPC)
- Integration: SQL/ODBC API, OPC to/from third party OPC Client/Server (optional)
- Security: Configured and synchronized with Windows

Control Network
- Medium: RS485 Standard and Ethernet (Fiber Optic optional)
- Protocol: Modbus (ASCII or RTU mode)

Printers
- Alarms: Dot Matrix
- Reports: Deskjet Graphic (included in Report Generation option)

UPS
- Rating: 800 VA (~30 minutes)

Ordering Information

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<th>Description (select any combination)</th>
<th>Catalog Number</th>
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<td>Chief Dispatcher (specify quantity of Boilers &quot;-#&quot;)</td>
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<tr>
<td>UtilitySaver Burner Control System (specify quantity of UtilitySaver Systems &quot;-#&quot;)</td>
<td>add &quot;-US&quot; suffix</td>
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<td>BurnerMate Boiler Control System (specify quantity of BurnerMate Systems &quot;-#&quot;)</td>
<td>add &quot;-BM&quot; suffix</td>
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<tr>
<th>Optional Features</th>
<th>Catalog Number</th>
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<td>Report Generation (Option includes report deskjet graphic printer)</td>
<td>add &quot;-R&quot; suffix</td>
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<tr>
<td>Development Software (Configuration Software)</td>
<td>add &quot;-DS&quot; suffix</td>
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Additional Ordering Information

Only "basic" system ordering information is provided. Please consult factory for the following:
- Additional Input and Control requirements, Balance of Plant, etc
- Additional SCADA/Flex Servers or Clients
- Remote Site Monitoring
- Ethernet or Fiber Optic Control Networks
- Interfaces to third-party systems or protocols
- SQL/ODBC API Integration
1. Application
Provide a remote Supervisory Control And Data Acquisition (SCADA) system designed to provide remote operation, graphic display of information, alarm message display, report generation, historical trending and remote controller tuning. The SCADA system shall be networked to the boiler control and burner management systems.

2. Equipment Requirements
Communications between the data acquisition system, the individual controllers, and flame safeguards shall be via an industry standard protocol such as Modbus.

3. Equipment Hardware Features
The system shall use standard IBM PC compatible hardware to simplify future expansion, replacement and service requirements. Provide the following workstation hardware at a minimum: Intel Pentium IV micro-processor or newer, 2GB RAM, 80 GB Hard Drive, 32 bit SVGA video controller, 2" Flat Screen Monitor, 3.5" Floppy Drive, DVD ROM Drive, keyboard and Microsoft mouse, tower case for computer, alarm printer, tractor feed 9 pin dot matrix printer, shift report and trend deskjet printer and 1000VA UPS backup power system.

4. Equipment Software Features
The software package shall operate in conjunction with the Microsoft 7 operating system. Reports shall be prepared automatically using standard Microsoft Excel® spreadsheets. Software shall be controlled by mouse based to allow for easy selection of screens, manual/automatic status changes, start/stop functions, setpoint changes, and output changes without any special programming skills. The system shall be expandable in the future to a multi-workstation system via standard Ethernet LAN hardware. Any measured or calculated value shall be available to third party software via standard OLE for Process Control (OPC) Data Exchange as an option. Provide all necessary software to allow field the Data Acquisition system to be modified or expanded in the field, including graphics drawing programs, data base builders, report generators, etc. Systems based on “run time only” programs will not be acceptable

5. Human Machine Interface (HMI) Terminal Operation
The operator, when the local controllers are enabled, shall have remote control of the following functions from the data acquisition terminal: Manual/Auto mode of each controller, Controller setpoint values, Controller output when in the manual mode, PID tuning parameters, Controller analog output values, Controller discrete output values. The HMI display shall provide a facsimile of the local controller and clearly labeled English language and engineering unit display of the control parameters. No special programming skills shall be required for any routine operating sequence.

6. Graphic Display
Information shall be displayed on the HMI as part of an easily understood pictorial representation of the process. At minimum, the following pictorial “screens” shall be available for observation: for example, a typical steam generator would display (when available): steam drum pressure, steam flow for each boiler, steam temperature, drum water levels for each boiler, flame failure, fuel flows, combustion air temperature, flue gas temperature, boiler efficiency (by ASME “losses” method), Air flow, Flue gas recirculation damper position, Outlet damper position, Controller Faceplate Grouping for each boiler, Trend Screens for each group of controlled and process variables as relates to each controller in the system. All values shall be displayed in engineering units adjacent to the pictorial point of measurement.

7. Remote Tuning
Each controller in the system shall be capable of remote tuning of gain, reset, rate and other important parameters via the SCADA System. Tuning the controllers shall be a “menu driven” operation and shall not require special programming skills. When each controller is placed in the remote tuning mode, a real time trend chart of controller inputs shall be displayed on the HMI to aid the technician in setting the proper parameter values. This function shall be password protected for security.

8. Alarm Generation
Where applicable, alarm status shall be displayed on the monitor generated process pictorials. In addition, all alarms shall be printed as they occur on the alarm printer, and displayed on the lower portion of each HMI display. The alarm log, as generated at the printer, shall indicate the time at which the alarm occurred, the time at which the alarm was acknowledged and the time at which the value returned to normal status. In addition to alarm conditions, this log shall also document status changes such as a transfer from automatic to manual, setpoint change, etc. so that the resultant printout is a true and complete log of plant operating conditions.

9. Report Generation
The log sheet printer shall print out: on demand, shift, daily, weekly, monthly, and yearly plant operating reports for evaluation by the plant manager. As an example, for a steam generator application, a report would list (when available):
1. Total steam generated by the plant and each boiler
2. Total fuel used by the plant and each boiler
3. Average cost of steam
4. Input-Output efficiency of the plant and each boiler
5. Items 1 through 4 shall also be reported on a “per degree day” basis where applicable
6. Combustion efficiency (by ASME “By Losses” Method) for each boiler
7. Make-up water flow in pounds and also as a percent of steam flow
8. Hours of operation for each boiler
9. Steam flow to each of the distribution headers
10. Historical Trending
The system shall be capable of storing the values from all transmitters as well as system computed values (such as efficiency and compensated flow rates) to hard disk at selected intervals. Stored data can be downloaded to an internal hard drive to archive or reload into the system for analysis. All data stored in the system shall be available on HMI or paper plot displays as strip chart records with up to eight channels per display. The horizontal and vertical axes of the trend displays shall be variable to provide the degree of overview or fine resolution required for each specific analysis. The software package shall be pre-programmed to give the operator a “menu” of standard trend displays. If a custom display is required, the user shall be able to generate the required display via help messages and a “fill-in-the blanks” menu. No special programming skills shall be required.

11. Flame Safeguard Interface
The SCADA system may have dedicated communications between the computer and the Flame Safeguard systems so as to allow all alarms to be graphically represented on the monitor. The system must be capable of displaying and recording the following statistics: burner limits, individual lockouts, burner operation hours, total burner cycles, burner status, last six lockouts, total lockouts, and flame signal strength.

12. Data Acquisition System Compatibility
The SCADA System may be expanded to cover other plant utilities. It is therefore essential that the SCADA System supplied for this project be “open” and easily adaptable to other brands of controllers, sensors and I/O hardware. At minimum, the system supplied under this contract must be able to communicate with 3 separate communication links simultaneously. The system must have available communication drivers for Fireye and Honeywell flame safeguards and Preferred Instrument PCC III and PWC Controllers. The system must not be proprietary or dedicated to a single brand of controller or I/O hardware.

13. Quality Assurance
All control functions shall be accomplished within the individual Boiler Control and Burner Management controllers and shall be monitored by the SCADA system so that the integrity of the control system shall not be dependent on the status of the SCADA system or the interconnecting network (In the event of a control network and/or a SCADA shutdown, local controllers must continue monitoring and controlling the plant). The SCADA system shall be a Preferred Instruments, Danbury, CT, SCADA/Flex.