

SYSTEM START UPS

The following projects are a sample of the diversity / complexity of the Control Systems that staff members at TCSI have been involved in either as TCSI employees or in their previous employment. These projects included everything associated with System Commissioning / Start Up; from Installation Supervision through Field Device Calibration, Loop Check, Testing, Tuning and Performance Verification. These projects could include Burner Management Systems, Combustion Control Systems and Balance of Plant Controls. This list will also show a history spanning a vast evolution of Control Systems.

Aramco Ju'aymah Gas Facility

<http://www.saudiaramcoworld.com/issue/198206/foundations-the.keystone.htm>

Saudi Arabia – New Construction - 4 B & W Gas fired 600,000 lb/hr boilers for the process steam on the Gas Desulphurization Plant. This project utilized all Bailey Miniline 500 combustion controls. Services provided: on site Control System Commissioning, Boiler Combustion Testing and Dynamic System Tuning for Performance Guarantee / Customer Acceptance.

ARCO Alaska - Prudhoe Bay



Central Gas Facility - Bailey Network 90 DCS. This project was for the design and build of the operator console graphics.

Boston Edison

Kneeland St. Station is made up of 2 B & W field erected 300,000 lb/hr Boiler firing #6 oil. This project was the fuel conversion of Unit 2 to natural gas. The BMS was an existing Bailey 720 electronic digital system that required additions / modification to allow for the second fuel. The combustion control system was a Bailey Pneumatic (Black Box Relays, Miniline and other bits and pieces) system that required Miniline 520 additions to handle the gas firing.

Colorado – Utah Power



Craig Colorado – New Construction – Unit 3 of 4 - 400 Mw B & W Pulverized Coal Boiler utilizing a Bailey 762 Digital Burner Management System and Bailey 820 Electronic Analog Combustion Control. Responsibilities included system check out, commissioning, start up, dynamic system tuning and performance testing.

DuPont

Towanda, Pa. – New Construction - Extruder System. The selected control system was a Bailey Network 90, PC90, EWS. Services provided included on site technical system support.

Goudey Station



Goudey Station units 11 and 12 are 50 Mw CE pulverized coal units (2 boilers - 1 turbine). This project was a complete retrofit from L&N Speedomax type relay controls to the Bailey Network 90 DCS. The control strategy included an Advanced Coordinated Master and ADS control. The DCS system did not include an EWS, so the whole checkout / startup and tuning was done via the CTM and sometimes via the OIU.

Long Island Lighting Company

Northport Station 300 Mw Oil fired Steam Generating Reheat Unit. This project was the Retrofit of the existing control system to the new Bailey 7000 electronic analog combustion control system.

Niagara Mohawk Power Corp.



Oswego Steam Station - 860 Mw oil fired unit being retrofitted to the Bailey Network 90 DCS. The control philosophy included an Advanced Coordinated Unit Master, EHC and ADS controls. Unit #3 was the next unit to be retrofitted. Unit #3 is an 80 mw Gas Fired Unit utilizing Bailey Net90 DCS for combustion control and BMS. Services provided: on site Control System Commissioning, Boiler Combustion Testing and Dynamic System Tuning for Performance Guarantee / Customer Acceptance.

New York State Electric and Gas



Somerset Station – New Construction - 625 Mw B & W pulverized coal unit utilizing the L & N Max I combustion controls and Bailey 762 digital burner management system. Services provided included on site System Modifications, System Checkout / PreFire Checks, Point to Point wiring verification (> 135,000 wire wrapped points), Startup and Burner Flame Scanner settings.

Stein Industries - SWECC SALINE CONVERSION

Al Jubail, Saudi Arabia – This project consisted of 6 CE Tangential dual fuel units (oil and gas) generating 2.5 mm lb/hr steam used to spin 5 - 150 mw per unit condensing steam turbines. The control system was Bailey 820 electronic analog combustion controls with Forney Engineering BMS.

Utah Power & Light

Huntington Station – New Construction - 400Mw B&W pulverized coal fired reheat unit utilizing Bailey 820 Electronic analog combustion controls and Bailey 762 Burner management. This project was to make the required modifications to the CCS for the directional blocking on F.D / I.D. Fans.

MARINE PROPULSION CONTROL SYSTEMS PROJECTS

The following projects typically would be for the Combustion Control System Tuning, Efficiency Testing and Dynamic System Testing / Tuning, Field Device Calibration and Main Engine Control System Tuning



USNS Vandenberg – US Merchant Ship

H.G. Vesper – US Merchant Ship

SS Freedom– US Merchant Ship

USS Stonewall Jackson– US Merchant Ship

SS J.E. Gasline– US Merchant Ship

USNS Redstone– US Merchant Ship

SS Austral Pilot – US Merchant Ship

Santa Lucia – Brazilian Merchant Ship

US Merchant Ship

Cairo Egypt - Waterman Steamship

SS George Wythe - System overhaul

USNS Gopher State



BAILEY MIGRATION PROJECTS (EPC)

Cornell University

Boiler 5

Project Team consisted of Cornell / TCSI / RA.

The project included the replacement of the BMS/CCS control system. TCSI replaced the Bailey Pneumatic controls and the antiquated Fireye FSS system with Allen Bradley Control Logix utilizing Function Block Programming on the CCS. Cornell University put together an in house team of experts to provide the construction services. TCSI provided all of the Electrical Drawings as part of the Construction Package. TCSI commissioned the unit.

Project completed November 2006.

Eielson Air Force Base

Fairbanks, Alaska

Project Team consisted of MWH / TCSI/ Rockwell / Grasle (electrical sub)

Migrating 6 Boilers / 5 Turbines and BOP from Bailey Infi90/Net90 DCS to Allen Bradley Control Logix utilizing Function Block Programming. The architecture was to pair the Boilers and provide Redundant Processors on each boiler pair and redundant processors on the BOP. TCSI replaced the existing HMI (OpsCon / Intellution) with GE Cimplicity consisting of 2 servers, 1 EWS, 11 clients on a new CAT 6 Backbone. TCSI provided total EPC services with MWH supplying Contract Services between MWH / TCSI and USAF.

Project completed August 2007.

Frito Lay Kirkwood

The Steam Plant Controls Replacement Project was for the migration of the Bailey DCS to an Allen Bradley Control Logix Platform utilizing Function Block Programming. PLC Program the BMS and Combustion Controls. The project also included incorporating the Press Control, a machine that squeezes the water from the waste stream (potato peels) and produces cattle feed, into the WWTP PLC which was then all linked to the HMI network. TCSI upgraded the Wonderware HMI and added additional networked stations / clients. The project also included replacement of all Field Devices.

Project completed March 2005.

Rice University

Houston Texas

Solar Taurus 60 T6500 4500 kW, Ruston TB5000 3100 kW natural gas turbines.

The Bailey DCS was replaced with an AB Control Logix PLC. TCSI was asked to team up with CDM, with TCSI serving as Control Systems Integrator responsible for the Specification, Design, Fabrication, Construction and Commissioning. TCSI provided all of the PLC hardware, PLC system logic development, HMI Graphic modifications, Startup testing and Tuning.

Project completed August 2005.

Control System Integration Services

The following Projects represent more of the Day to Day type Control System Integration Services provided by TCSI.

ANSALDO PANAMA CITY PANAMA

TCSI was contacted by and subsequently contracted by Eltag Bailey Controls Company to provide a Control Systems Engineer for the DCS System Start up services for this 400 MW Combined Cycle unit utilizing Bailey Infi 90 DCS.

Babcock Borsig Power

TCSI was contracted by Babcock Borsig Power to provide Control System Design and Commissioning Services to various Utility customers for the SCR projects BBP had Contracts for. Past services provided by TCSI included Bailey INFI-90 DCS modifications, and additional hardware/logic development for the SCR system control. TCSI reviewed all vendor drawings for construction and final issue. We assisted BBP auxiliary/mechanical engineers with instrumentation locations. TCSI reviewed for approval, the control philosophy for the coal unloading control system and witnessed the Factory Acceptance test in Pittsburgh, PA. TCSI was onsite to assist with loop checks, startup, commissioning and debugging the new coal unloading control system. TCSI also programmed (2) Allen Bradley PLC 5 systems (redundant) for the ammonia E-Stop system at Belews Creek. Supervised panel fabrication at OMNI Control Technologies, Whitinsville, MA. The two control panels were connected to BBP's simulator and TCSI conducted the Factory Acceptance Test for these control panels. Project duration 1 year 6 months.

Babcock Ultrapower

30 MW Circulating Fluidized Bed - Wood Fired

TCSI provided Control System Maintenance / Improvements on the Bailey N90 DCS. As a Design / Build project, TCSI provided the services of DCS Configuration as the plant control system was evolving.

CAYUGA ENERGY – CARTHAGE and SOUTH GLENS FALLS

The initial projects were for the migration of the Bailey MCS / OIS / OIU consoles to a Windows based HMI system. TCSI replaced the 4 Bailey MCS consoles with 4 OpsCon consoles and provided 2 EWS consoles.

CAYUGA ENERGY – South Glens Falls

TCSI was contracted to develop the control strategy for the Automatic Voltage Control (AVC) as part of the Automatic Generation Control (AGC) that was moving forward for the Frame 6 Combine Cycle – 63MW plant at South Glens Falls, NY. TCSI developed the control strategy, configured the control logic into our Bailey DCS system located in our facility and performed a full function simulation with HMI consoles attached. This provided a 100% FAT. TCSI then loaded the configuration on site and commissioned the system.

CAYUGA ENERGY – Carthage

TCSI was contracted to develop the control strategy for the Automatic Voltage Control (AVC) as part of the Automatic Generation Control (AGC) that was moving forward for

the Frame 6 Combine Cycle – 63MW plant at Carthage, NY. TCSI developed the control strategy, configured the control logic into our Bailey DCS system located in our facility and performed a full function simulation with HMI consoles attached. This provided a 100% FAT. TCSI then loaded the configuration on site and commissioned the system.

Cayuga Energy – South Glens Falls

STG Replacement Project

TCSI was contracted to provide Bailey DCS Hardware, DCS System Design, Procurement and System Configuration that would allow for the Turbine Water Induction Protection System (TWIPS) to be installed on the new STG installed to replace the STG that failed due to Water Induction. TCSI developed the control strategy, configured the control logic into our Bailey DCS system located in our facility and performed a full function simulation with HMI consoles attached. This provided a 100% FAT. TCSI then loaded the configuration on site and commissioned the system.

Cardinal Glass FG

Portage, WI

Cardinal Glass is one of the leading manufacturers of glass for residential windows and doors. Wisconsin is home to one of Cardinal Glass's research and development centers. Turnkey Control Solutions was brought on board to centralize the control system and provide a much needed redundancy scheme. TCSI engineers consolidated the six SCADA servers and thirty-seven SCADA clients into an Intellution Terminal Server central control platform. This provides the plant with a higher level of redundancy and a more robust system. TCSI implemented additions and modifications into the system, performed software upgrades and patch deployments, and also provided management and software support; this has created a more streamlined, accelerated and simplified system. Installations and updates that previously took months to download on individual desktops are reduced to mere hours. Also, this platform provides end-to-end visibility for IT teams. TCSI migrated the INFI90 DCS to an Ethernet based protocol consisting of two (redundant) SCADA servers and three terminal server boxes. There are a total of sixty con-current clients running with load balancing across the three terminal server boxes. TCSI also set up redundant iHistorian servers.

Central New York Oil and Gas

Owego, New York

Stagecoach is a “High Performance, High Deliverability” storage field capable of several injection and withdrawal cycles per year. The total available gas storage volume of the Stagecoach Facility is approximately 12 billion cubic feet (enough to supply 150,000 households with gas for a year).

TCSI migrated their existing Factory Link HMI SCADA system to a GE Proficy HMI SCADA system. TCSI supplied two SCADA servers (for redundancy) and three client stations. The new system also includes an enhanced alarming notification system utilizing Win911 and an enhanced reporting system utilizing XLReporter.

Currently TCSI is under contract for engineering service on the Phase Two – HMI SCADA engineering:

This project includes the drilling of 7-10 additional storage wells in the four reservoirs along with approximately 7 miles of additional pipeline and appurtenant facilities. The proposed expansion may also connect to the Millennium Pipeline through the addition of

approximately 10 miles of connecting pipeline. Connecting to Millennium will give Stagecoach access to supplies of natural gas originating in Canada further diversifying and optimizing supply choices for its customers. The existing Compressor Station and Power Line will be utilized to support the expanded well and pipeline facilities.

DAK Americas

Cape Fear, North Carolina

Resins Expansion Project

Provide ABB / Bailey Infi90 DCS Hardware

Hardware Configuration, Installation and Commissioning Services

Contracted to provide Hardware and Control System Engineering

Support to 3 DAK Facilities

Dartmouth College

Hanover, NH

Control System / Philosophy Reconfiguration of Unit 1 – Bailey N90

Unit 2 Control Up Grade – Bailey Net90

Data Acquisition - Emissions Monitoring

Bailey Net 90 Control System – Balance of Plant

Dartmouth College

Hanover, NH

Bailey Net 90 Technical Training

Instrumentation / Control Seminar

Dartmouth College

Hanover, NH

System reconfiguration of Unit 2

Combustion testing and tuning. Bailey N90

Deer Island - Boston Harbor Project Thermal Power Plant

TCSI was contracted to provide services during the construction (design/build) for the Deer Island Treatment Plant Thermal Power Plant. The plant consisted of:

2 - Zurn Dual Fuel 175 klb/hr boilers (Methane Gas and #2 oil)

2 - Gas Turbines, 1- Steam Turbine and the Balance of Plant Equipment including gas compressors and scrubbing system. The Control System is Bailey Infi 90 DCS (6 PCU cabinets). TCSI's tasks included Control System Design / Combustion Control Strategy development / Instrumentation Calibration, Loop Check / Start up / Testing and Tuning and MMI Graphic Development on three OIS 20 consoles. Project duration 2 years 7 months.

Deer Island - Boston Harbor Project Cryogenics Plant

TCSI was contracted to provide services during the construction for the Deer Island Treatment Plant Cryogenics Plant. TCSI was subcontracted by Kaiser Engineering to serve as part of their Construction Management Team. This included interfacing with and supervising numerous equipment vendors and acting as liaison between the vendor and the engineering firm/customer. TCSI was tasked with construction scheduling, witness all testing, calibration, loop check and startup/commission of a cryo plant. TCSI also assisted

in interfacing Allen Bradley PLC's and Bentley Nevada systems to the Bailey INFI 90 System. The HMI consisted of 2 Bailey OIS 41's. TCSI also assisted with the graphics and tag data base system design and implementation.

The plant consisted of:

3 - Atlas Copco compressors, chillers, and filtration systems

2 - Lotepro Cold boxes. (Manufactured in Germany)

Additional auxillary systems.

Project duration 8 months.

EASTERN ASIAN ENERGY

TCSI was contracted to Eltag Bailey Controls Company to provide an experienced Controls Engineer as a team member to the consortium that was formed after President Marcos was replaced with President Ramos. The consortium was formed in order to develop a proposal to the Government in an attempt to privatise the power production throughout the nation of the Phillipines. TCSI provided the services to complete an in country Due Dilligence Survey on all the power plant control systems life expectancy and costs to upgrade.

ECO Springfield – Energy Answers

Bondi Island, Springfield Mass

Develop and configure the control philosophy for the Sludge Combustion Project.

Modified the RDF train logic to accommodate sludge combustion. The control system is Bailey N90 / Infi90. HMI is Wonderware by TCSI.

ECO Springfield

Soot blower logic control modifications

Bailey DCS configuration changes to allow for Operator selection of various

Soot blowing sequences from a menu

Frito Lay Kirkwood

HVAC / Heat Exchanger project

Allen Bradley PLC 5 Logic development and Wonderware HMI Graphics development for two new heat exchanger systems including pump, damper and steam valve control utilizing PID programming. TCSI provided field devices such as flow meters, Temperature & pressure transmitters, instrument calibration, field supervision, loop checks and startup services.

Frito – Lay

Kirkwood, New York

Develop PC based Man Machine Interface to the Bailey Net 90 Distributed Control System for the Steam Plant. Specify and procure Hardware / software. Develop graphics, reports, shift logs, trending and historical data collection / archieving and maintenance logs. Wonderware software running on Acer computer system.

GAS TECHNOLOGY INSTITUTE

TCSI has been selected to provide the Engineering Analysis and National Marketing Assessment for the Partial Oxidation Gas Turbine (POGT) that is currently under development. TCSI has also entered into an agreement With GTI to provide Control Systems Design for the POGT System.

Goulds Pumps

Seneca Falls, New York

Retrofit 2 Power Boilers to Microprocessor based control, split the jack shafts and implement O2 trim. Complete system design, installation, calibration and start up. Design, implement ladder logic to allow for SCADA system for Boiler Lead Lag and BOP operation Hardware / Software - Bailey ICCS combustion controls Rosemount Transmitters, Jordan Valves, Chessel recorders, Square D PLC and PCIM MMI.

Goulds Pumps

Seneca Falls, New York

Develop a new SCADA package utilizing iFix. Develop all the operational Graphics, Trends and reports. Set up the Win 911 auto paging system

Goulds Pumps/ ITT

Air compressor monitoring system, square processor, update iFix graphics, Symax

Goulds Pumps

Dust collector monitoring/control system

Alarm modification

INDUSTRY AND ENERGY ASSOCIATES

TCSI was contracted to assist with the design/build of a 50 MW BioMass Fueled Gasification Project at McNeil Station, Burlington, VT (a Federal Government Funded Project). TCSI specified, ordered and supervised the installation of all field devices, pumps, motors, transmitters, and control valves. TCSI also supervised the electrical and mechanical installation, loop check, startup and commissioning. TCSI provided the Bailey INFI90 hardware and developed all the control philosophies for the process. The HMI consisted of Wonderware on two servers and one client
Project duration 1 year 4 months.

JF WHITE – Boston Harbor Project

TCSI was contracted to provide PLC programming on the Demineralization Control System Redesign. The Logic as developed by the OEM did not provide the proper sequencing to allow the best operation of the Demin System. The PLC platform is Allen Bradley PLC5. TCSI developed the new control logic, configured tested and commissioned the system.

Leeds & Northrup

Provided startup engineers on:

Long Island Lighting - Long Island , NY - L&N Max 1000 DCS

Ballylumford Power - Northern Ireland - L&N Max 1000 DCS

Lockheed Martin

Owego, New York

Boiler Controls Upgrade that converted three existing Westinghouse 1500 CCS & Coen relay logic BMS to AB Micro Logix Burner Management System & Compact Logix Combustion control system. TCSI developed PLC logic for CCS and networked it in with the Coen Micro Logix BMS system, developed BMS & CCS control graphics on the FIX 32 platform, created the I/O tag database, fabricated & installed the CCS panel including termination of field wiring, loop checks, testing, startup, training and PLC loop drawings. Mounted in each CCS panel was a 15" touch screen PC HMI.

Lockheed Martin Owego

Feedwater pump lead/lag – Converted the Square D Sy/Max feedwater control system to AB and incorporated the control logic into each of the three boiler Combustion Control Systems. Each boiler now has a dedicated pump, but in the event of a pump failure the system will auto start the backup pump. Developed PLC logic (RSLogix 5000) and FIX 32 graphics, installed new PLC hardware, performed field terminations, loop checks and startup services.

Mass Water Resource Authority

On Site Thermal Power Plant, Annual System Maintenance, Combustion Control, System Tuning, Plant Optimization DCS Tuning / Maintenance.

MWRA Ancillary Modification Project

TCSI provided engineering services for the existing Bailey DCS system. The tasks included modification of the existing logic, develop new logic per the specifications, and provide the necessary Bailey INFI90 hardware. We also developed the foreign device interface for an Allen Bradley SLC 5/03 (controlling a vacuum system) to the DCS. Other services include instrumentation installation supervision, supervision of the mechanical and electrical installation, calibration, loop check, startup and commission. The project site consists of over 80 PCU cabinets located throughout the island. Project duration: 2 years.

Occidental Petroleum – Qatar

Provide ABB / Bailey DCS Test Bed consisting of the Assembly, Configuration and FAT Of the system comprised of INICI03s, BRC 100s, BRC 300s.

Schoeller Technical Papers

Pulaski, New York

Integrating WWTP and BOP into the plant wide SCADA System. Developed a complete "Turnkey" System, Concept through Commissioning.

Schoeller Technical Papers

Powerhouse automation / SCADA project. TCSI is designing, providing all hardware and software, developing the complete construction package, providing Mechanical and Electrical sub contractors. TCSI is providing all start up and commissioning services.

Siemens Energy and Automation

TCSI has signed Commercial Terms with Siemens. TCSI will be providing Bailey DCS Legacy Systems Support Service to Siemens Clients for the migration to Siemens.
PCS7 HMI / DCS

Springfield Resource Recovery

Agawam, Mass

RDF Plant - Bailey N90 DCS, System Modifications to allow, Auto Start / Stop of new, Secondary Burners, Develop all Logic and Configure / Test

Springfield Resource Recovery

Operator Console System Design / Replacement, Replace Bailey OIU's with PC's running WONDERWARE, Design System / Develop Graphics / Reports

TIAWAN POWER COMPANY

Contracted to Eltag Bailey Controls Company

Provided Control System Commissioning / Dynamic Tuning, 375 MW Oil Fired CE, Tangential – 30 Burners Reheat Unit, Boiler Follow, Turbine Follow & Coordinated Control Modes. Eleven days to completely tune Boiler / Turbine and Aux Control Loops.

TOSHIBA

AB PLC Logic Development and Programming of 5 new Skids to control the Dionized Water System in Manufacturing.

TOSHIBA

WWTP SCADA System design, Hardware / Software procurement Construction Package Development, Project Management, Installation Supervision, Customized Customer Training. This system was made up of AB PLCs, Remote I/O, Intellution (iFix) HMI and Toshiba VFD DH 485 (27 Drives).

TOWN of VESTAL WATER DEPARTMENT SCADA SYSTEM

TCSI provided the system design/installation/electrical drawings and provided the mechanical and electrical installation supervision, start up and commissioning of 43+ water and sewage remote sites using Square D Modicon and Momentum PLC communicating via MDS radios. All data collection and control was accomplished at the Central water office using an HMI system running FIX Intellution connected to the master radio. TCSI designed the 43 control panels, did the graphic development, radio telemetry, testing and commissioning of the entire system. The new SCADA system modifications enabled the town to save on annual electrical costs.
Project duration 1 year 6 months.

TUCUMAN, ARGENTINA

Contracted to Eltag Bailey Controls Company. TCSI provided Control System Start up Engineering on a 480 MW Combined Cycle – Infi 90 DCS.

TYCO Healthcare Mallinckrodt

PLC Monitoring and Control System for new pharmaceutical production line. Develop logic and graphics for operator system control utilizing Allen Bradley ControlLogix™ and RSVIEW Machine Edition™. Calibration, loop checks, loop drawings and start-up. Panel fabrication was completed for new high purity water system. AB SLC 504 PLC with Panelview 550 HMI. Modified existing program (RSLogix 500) for use in new system. Performed field termination, loop checks, startup services and PLC loop drawings.

WPS – Beaver Falls

TCSI was contracted to develop the Automatic Generator Control (AGC) strategy to allow the remote dispatching of the unit MW load. TCSI developed the control logic, graphics for both the OIS consoles and the OpsCon consoles. TCSI implemented the logic into the Bailey Infi90 DCS and provided Commissioning and Testing / Tuning services along with operator training

WPS Beaver Falls, NY and WPS Solvay, NY

TCSI was contracted to provide HMI / SCADA services to these facilities. Upon arrival at these sites it was determined that the original HMI / SCADA System developer was lacking in the design and implementation of the new Software and the proper interface to the existing Bailey INFI90 DCS. TCSI undertook a complete review and audit of the HMI / SCADA system, made recommendations to the owner and implemented these recommendations to provide a more complete, reliable and accurate system.

WPS Niagara Falls, NY.

Upload and document 12 existing PLC's by various manufactures and provide documentation packages to the customer. The I/O was verified from the Field Device through the DCS and out onto the Data Historian. The existing documentation was found to be 12+ years old and never maintained. Provide hard and soft copies of all ladder logic programs. Perform complete backup and documentation of the existing Yokogawa DCS. The plant now has an up to date and useful backup copy of all configurations, graphics, and ladder programs.

WPS – Niagara Falls

TCSI integrated a Standalone Intellution HMI machine collecting realtime data from their existing Johnson Yokogawa DCS.