

By Amanda Parolise



CARBON FOOTPRINT



Parolise is project manager consultant with BuildingSmart Software LLC. Reach her at amckew@yahoo.com.

Month 1 - The Energy Conservation

Opportunity: Process Heating at an Industrial Building Application

ORIGINAL BASIS OF DESIGN - 1977

Original design intent - Primary hot water system with secondary pumping for building heat, domestic hot water, and process heating serving 200,000 sq ft of industrial space.

System	Capacity	Months online	Hrs. of operation	ATC controls
Primary HW	600 BHP	All	24 hrs/day	Fixed 200°F hot water temp
Secondary-3	90 BHP	All	24 hrs/day	Fixed 190°F hot water temp - process heat

Pumps	Flow	GPM/Unit	Pump head	Balancing valve setting	Motor	Pump flow
Primary HW	2,070 GPM	3.45 GPM/BHP	80 ft	50% open	Original	Constant
Secondary-3	310 GPM	3.45 GPM/BHP	120 ft	70% open	Original	Constant

System	Hot Water Supply	Hot Water Return	Remarks
Primary HW	200°F HWS	170°F HWR	Fixed hot water temperature
Secondary-3	190°F HWS	170°F HWR	Fixed hot water temperature

Update of Design

Continuation of the September energy retrocommissioning with new, improved condensing boiler system, improved variable water flow, occupied-unoccupied systems, and improved process heat exchanger controls.

NEW BASIS OF DESIGN - 2013

Primary hot water system with secondary pumping for building heat, domestic hot water, and process heating serving 200,000 sq ft of industrial space. New design to save electrical energy, gas energy, and demand side management.

System	Capacity	Months online	Hrs. of operation	ATC controls
Primary HW	400 BHP	All	24 hrs/day	Fixed 190°F hot water temperature
Secondary-3	90 BHP	All	Based on work shift	Fixed 190°F hot water temp - process heat

Pumps	Flow	GPM/Unit	Pump head	Balancing valve setting	Motor	Pump flow
Primary HW	690 GPM	1.7 GPM/BHP	25 ft	100% open	VFD	Variable
Secondary-3	310 GPM	3.45 GPM/BHP	70 ft	100% open	VFD	Variable

System	Hot Water Supply	Hot Water Return	Remarks
Primary HW	190°F HWS	150°F HWR	Fixed hot water temperature
Secondary-3	190°F HWS	170°F HWR	Fixed hot water temperature

Energy Retrocommissioning Report/Recommendation/Implementation

Energy Conservation Measure (ECM) Opportunities

- ECM1:** Reset HWS temperature set points and increase HWS-to-HWR temperature differential for primary heating system and secondary building heating system to reduce the size of new pumps (Primary HW and Secondary-1) and associated pump horsepower.
- ECM2:** Open the discharge pump balancing valves to 100% to remove the artificial system resistance in each hot water system.
- ECM3:** Replace antiquated 3-way automatic controls at the (19) process heat exchangers with 2-way, more current digital controls and remote Internet access to the primary-secondary control system.
- ECM4:** Add 7-day, 3-shift occupied-unoccupied building automation to the building system and in particular the process heating system.