

Campus Steam System Redesign Moves Forward After Data Matches AFT Arrow™ Model

CASE STUDY

Campus Steam System

Campus & Educational Facility Distribution Industry



Schuyler Engineering

Lindenhurst, New York, USA

Platinum Pipe Award Winner - Correlation to Test/Field Data

Michael Martino, project engineer at Schuyler Engineering, was asked to confirm a previous study recommending that the existing medium-pressure steam supply could be converted to a low-pressure system for space heating, domestic hot water, kitchen steam kettles, humidification and sanitizing for the Rockland Psychiatric Center (RPC) in Orangeburg, New York.

Since the recommended modifications would cost more than \$1 million, Martino performed a low-pressure throttling test to verify the results of the AFT Arrow model, giving further confidence to the previous study.



Rockland Psychiatric Center

“The steam pressures recorded were within 5% of the results of the AFT Arrow analysis.”

The Central Steam Plant at RPC dates from the late 1920s. At one time the plant supplied steam to nearly 100 buildings of various sizes, construction, use, and occupancy. The buildings were located at various points on more than 240 acres of RPC campus. Since the 1970s the RPC campus has been steadily downsized. More than half of the buildings once supplied from the plant are no longer used or have been demolished.

As the campus consolidates, the operating conditions on the plant and steam distribution system have changed significantly. Although the original system was designed for medium-pressure steam, the reduction in steam demand as the campus consolidated sparked the idea to operate the piping system with low-pressure steam.

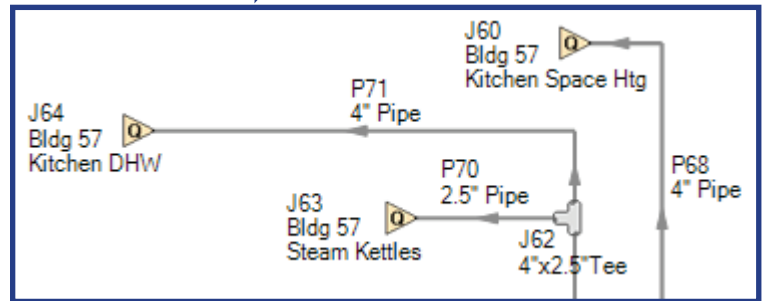
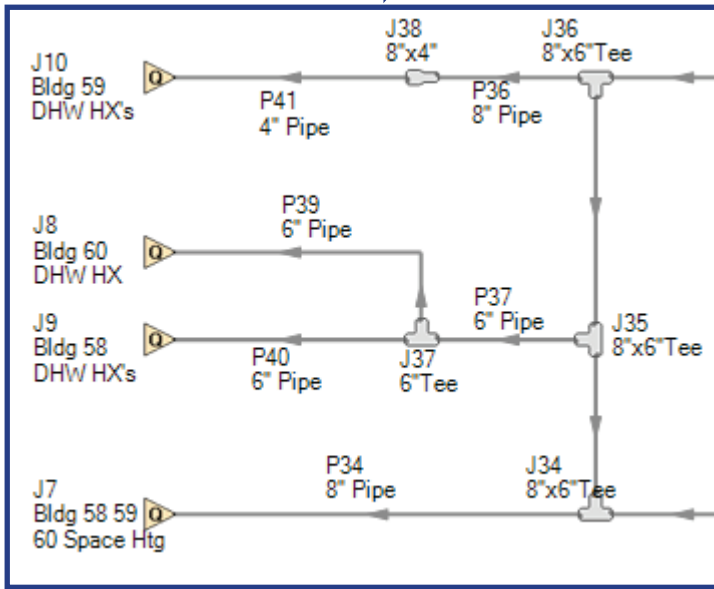
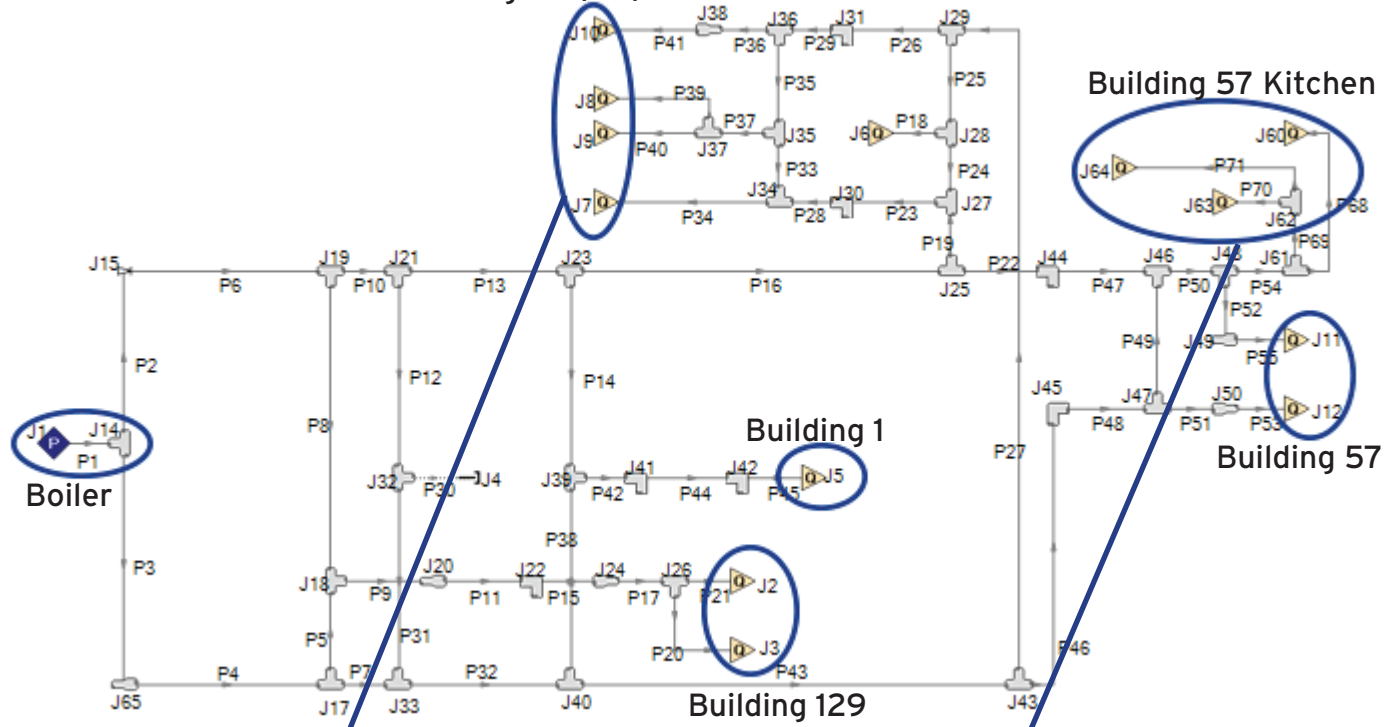
Field Testing

The existing system was throttled to 12 psig (83 kPa-g) and model predictions were compared to pressure measurements at the most distant buildings. The throttling test was performed in January 2013, with an outside temperature of 13°F (-10°C). The steam pressure at the location of the future Central Plant was 11 psig (76 kPa-g).

Test results confirmed the findings of the original low-pressure steam study and showed that the steam distribution system can adequately meet the campus heating loads when supplied with steam at 12 psig (83 kPa-g) (see Table 1). The steam pressures recorded were within 5% of the results of the AFT Arrow analysis. Since the analysis closely matches the results of the throttling test, the conversion to low-pressure steam is proceeding.

Schuyler Engineering is a professional consulting firm specializing in the evaluation, engineering, design, permitting, and construction supervision of heating plants, chiller plants, district heating & cooling systems, cogeneration and power plants of any size.

Buildings 58/59/60



AFT Arrow Model - Rockland Psychiatric Center, East Campus

Building	Calculated Steam Pressure psig (kPa □g)	Recorded Steam Pressure psig (kPa □g)	% Difference
1	9.3 (64)	11 (76)	18%
57	8.3 (57)	7.9 (54)	- 5%
57 Kitchen	8.3 (57)	7.5 (52)	- 10%
58/59/60	7.3 (50)	7 (48)	- 4%
129	9.8 (68)	10 (69)	2%

Table 1 - Model results vs. recorded data at building entrance