

Low Water Pressure Creates a High-Pressure Situation

By Chuck Carey

The town of Erwin, Tenn., is a small rural community located on the state's upper northeast border, in the valley between Asheville, N.C., and Johnson City, Tenn. Erwin is home to a number of businesses, including the world headquarters of NN, Inc. (formerly NN Ball & Roller).

A fire sprinkler protection system gets a flow boost from a new pumping station

On March 12, 2000, NN had a fire at its plant, resulting in a loss of \$17 million. The company had no internal fire sprinkler protection system installed at the time of the fire and the "soft side" of the plant was a total loss. NN's insurance underwriter gave notice that either NN must install a fire sprinkler system or have their fire insurance coverage dropped.

Under Pressure

NN's senior management became concerned when they discovered that the current water pressure could not support the fire sprinkler system they needed to install. The water pressure at that time showed a static pressure

be used for fire protection and would not provide any other benefit to the plant or surrounding community.

Initially, Erwin Utilities did not think it would be able to solve the problem, and there was even some discussion of the possibility that NN would need to relocate its entire operation outside the Erwin area. The mayor of Erwin was under pressure because he realized that the town could lose not only the plant but also hundreds of jobs. This would have a big economic impact on this small community. The mayor presented the pressure problem to Howard Brown, Erwin Utilities' general manager. Brown, a professional engineer with many years of experience, said he thought that he may be able to provide a solution to the problem.

Developing a Plan

Brown met with people at NN to understand what the requirements were for a new sprinkler system. As he set about designing this new booster pump station, he realized that four different problems could be solved with the one new booster station:

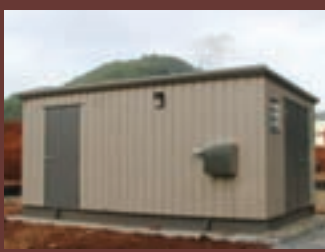
- The fire flow requirements for the NN plant could be met;
- An old booster pumping station used for filling an existing 50,000-gal water storage tank could be retired;
- The new booster station could be used to pump water to a new storage tank that Howard was planning to build to upgrade the water pressure south of town; and
- The water pressure on Tipton Street and in its vicinity could be upgraded by connecting the area to the line going to the 50,000-gal tank.

Brown created a working computer model of his design so that he could demonstrate to NN, the insurance underwriter, mayor and state that his design would work. The computer model demonstrated how the booster pumping station could provide the fire flow requirements for the NN plant and pump water to storage tanks in two different areas of the water system.

It also showed how it would work under different conditions (i.e., power outages and fluctuating water demand loads on the system). Brown wanted to make sure that in the case of a power outage, the control valves would automatically open so that there would still be water pressure from the two storage tanks to provide fire protection to the plant.

Awarding a Contract

Once the state approved Brown's design, he put the drawings and specifications out for bid. SynchroFlo, Inc., Norcross, Ga., was the successful bidder and was awarded the contract to build the new booster pumping station. SynchroFlo is a pump station manufacturer with more than 25 years experience in delivering pump systems for commercial, industrial and municipal systems.



(no flow) of 39 psi and a maximum flow of 920 gal per minute (gpm), whereas the insurance underwriter's requirements were 131-psi static pressure and 1,500-gpm maximum flow to provide the pressure necessary to support an effective fire sprinkler system.

The water pressure problem was due to the plant being located at the highest elevation permitted in the low-pressure zone of the Erwin water system. The water pressure is determined by the difference in elevation between the water surface in the storage tank and the elevation of the customer's facilities, minus any pressure loss due to the water flowing through the pipes and fittings. This created the problem for NN, Inc. The existing tanks for the low-pressure zone were not able to provide the increased water pressure needed to support the required sprinkler system.

NN considered building its own water storage tank with fire pumps to provide the pressure needed for the sprinkler system. However, this would have been costly to build and maintain and if the fire pumps failed to operate, there would be no water available for fire protection. Plus, water in the tank could only