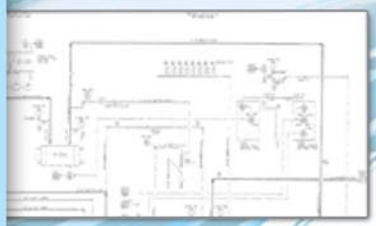
Chemical Plant Firewater System

with

Design Flow Solutions®

Chemical Plant



Alarms at a chemical plant indicated a blockage in the underground firewater system. Design Flow Solutions (DFS) was used to model the FW system to determine the blockage point.

The underground firewater system operates at 150 PSIG and contains 55 pieces of fire fighting appliances. The constant pressure is maintained by 3 different electric pumps with 1 diesel backup pump. Water from two different city water mains is supplied to the system and alarms are monitored by the city safety department.

DFS provides the engineer with the tools needed to model expected pressure drops and flowrates through the firewater system. Comparing these values to test data allows the engineer to pinpoint the blockage point.

DFS gives the engineer the ability to:

- Determine the pressure drops and flowrates for the simultaneous flowpaths of a large network.
- Analyze pump performance to eliminate possibility of pumps being root cause for alarm.
- Analyze valve and hydrant lineups.
- Analyze pump and valve lineups for emergency or maintenance scenarios

1. Create Header Model in DFS

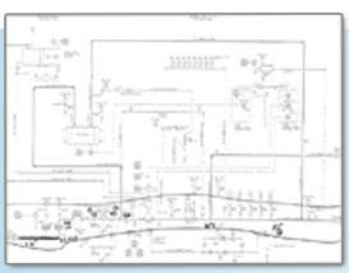
- Enter piping geometry of underground piping from original construction schematics
- Enter pipe specifications, diameter, valves, fittings, size changes, elevation changes

2. Model Hydrants in DFS

- The discharge ports are regulated by fire hydrants with a complicated geometry
- Company tests provide data for a Flow Dependent Custom Component in DFS which takes into account the change in Cv with flowrate

3. Create Pump Lineup

- Create custom pump components for operating and backup pumps using vendor supplied data
- Create pump discharge piping geometry
- Insert pump components into model

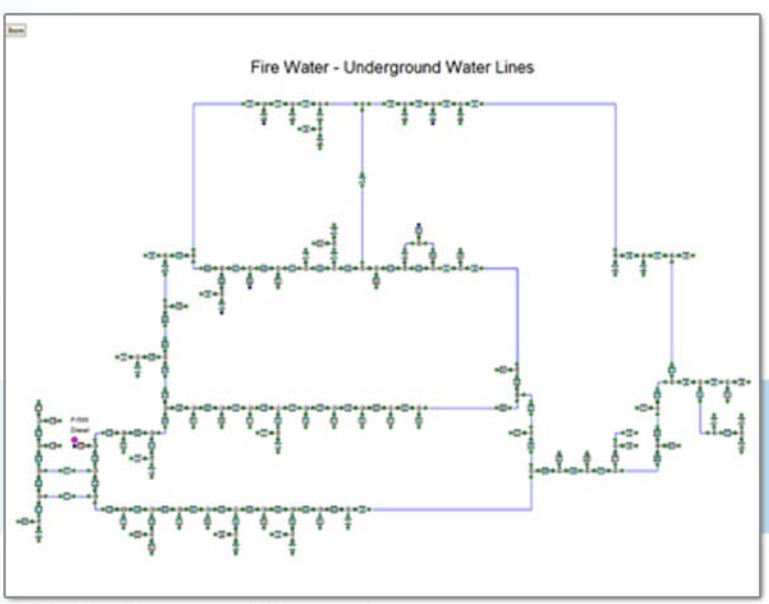


Construction Piping Schematic

Vendor Supplied Pump Curves

4. Evaluate Assumptions & Operating Conditions

- Model assumptions must be evaluated to determine sources of error
- Evaluate simplifying assumptions in fitting geometry and get more detailed data as needed
- Ensure unavoidable assumptions are conservative
- Evaluate model based on current operating condition of the system



DFS Model of Underground Firewater System

5. Analyze System & Check Flow Rates

- Find pump operating point, power usage
- Determine flow rates, pressure drops through operating hydrants and underground piping
- Compare to design specifications
- Model pump lineups, print reports

DFS Reports

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