Lakefront Diffuser

with Design Flow Solutions®

A lakefront diffuser needs to discharge up to 27,000 GPM of cooling water to the lake bottom. The system will consist of multiple parallel pumps, pump discharge piping, piping along the bottom of the lake, and a header with a valve at each discharge point.

Design Flow Solutions (DFS) provides the engineer with a range of computer tools to ensure that the diffuser meets specification.

Lakeside
Natural Gas
Liquification Plant

DFS gives the engineer the ability to:

Determine the flow rates through each of the discharge points along the header to meet specifications.

Determine the resistance and pressure drop of the pump discharge piping.

Find system operating point to size pumps.

Analyze pump and valve lineups for emergency or maintenance scenarios.

1. Create Header Model in DFS
- Enter piping geometry for the discharge header from piping schematics
- Enter pipe specifications, diameter, valves, fittings size changes, elevation changes

2. Model Pinch Valves in DFS
- The discharge ports are regulated by pinch valves
- Use vendor data to make a Flow Dependent Custom Component in DFS which takes into account the change in Cv with flowrate

3. Create Pump Lineup
- Create custom pump component
- Create pump discharge piping geometry
- Insert pump component into model

8" SCH 40 304 SS RISER PIPE
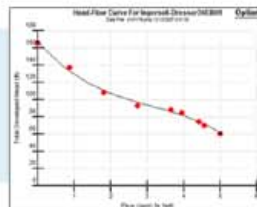
4" PVC BALL VALVE

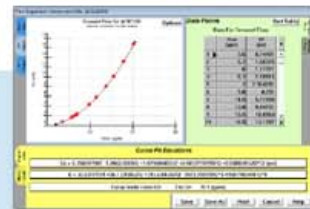36" PCCP DIFFUSER
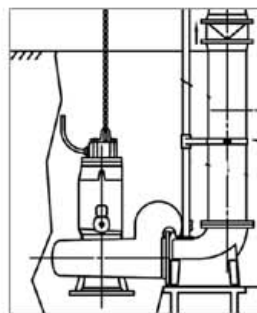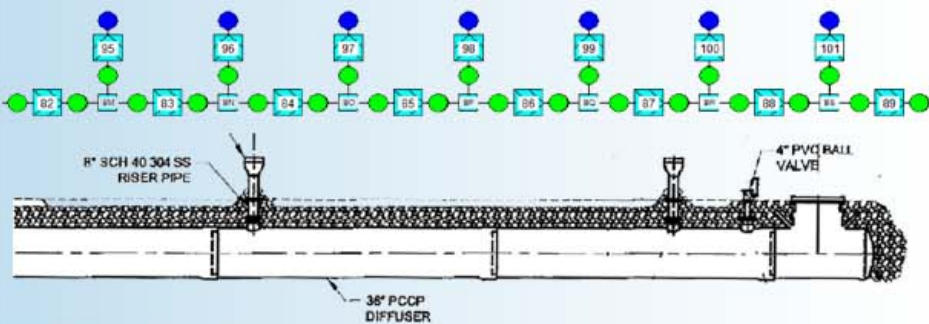
Pump Lineup Geometry
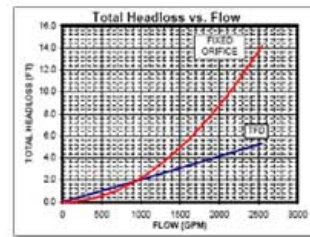
Valve Vendor Data

4. Define System Fluid and Properties
- Define fluid as water and specify temperature
- Specify cooling process hot discharge temperature and pressure

Pump Curve

Flow Dependent Component

5. Analyze System & Check Flow Rates
- Find pump operating point, power usage
- Determine flow rates, pressure drops through discharge ports, valve operating points
- Compare to design specifications
- Model pump lineups, print reports

DFS Reports

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