GSE Systems has developed JFlow to meet the increasing need for an easy to use, yet accurate graphical flow and pressure network modeling tool for power plant simulation. The underlying fluid system network solution modeling techniques employed in JFlow have been proven in nuclear and fossil simulators world-wide. As a part of GSE’s JADE environment, JFlow shares our single graphical user interface and offers the portability of a truly platform independent software tool.

JFlow networks can be configured to simulate air, flue gas, steam, and water systems. This tool, integrated with two-phase component models, takes into account mass, energy, and momentum relationships for fluid systems. It has excellent applicability to combined cycle and fossil boiler/turbine processes as well as nuclear balance of plant systems.

**Benefits**

JFlow provides high-fidelity simulation for fluid systems. It supports realistic operator training and effective engineering evaluation. Features and benefits include:

**Simplified development through:**
- Generation of flow/pressure network diagrams from predefined icons
- Raw plant-specific data entry through the graphic interface
- Automatic generation of the database
- Automatic constants calculation for flow admittance and pump characteristic parameters
- Network source code automatically generated, compiled, and executed

**More efficient model testing through:**
- On-line testing and debugging
- Test results dynamically displayed on the graphic network display and trend chart

**Expanded model usability through:**
- JADE’s single GUI which allows system drawings to be viewed on any instructor, trainee, or engineer’s JStation
- Integration capability for boiler, furnace, and turbine component models
- Portability across Microsoft, Linux, and UNIX operating systems
Functionality

JFlow is a software tool with a user-friendly graphical interface designed for fluid networking systems. It accurately calculates throughout the fluid network dynamic parameters such as:

- Flow
- Pressure
- Temperature
- Conductivity
- Activity
- Species concentration

The mathematical approach linearizes all flow and pressure equations to form a matrix solution. This provides a highly efficient real-time flow network simulation.

Implementation

With Windows’ simple drag and drop techniques, users can construct the pressure and flow configuration for the network from the predefined and customized icons that are stored in the library. These icons include:

- Pipe sections
- Pumps
- Valves
- Flow restrictors
- Check valves
- Heat exchangers
- Heat sink/source
- Turbines
- Flow boundaries
- Pressure nodes
- Pressure boundaries
- Leaks
- User-defined

Data Input to a JFlow Object

The design values including flow at each branch, pressure at each node, and pump curves in the flow network are utilized directly for the real-time flow network simulation code generation. The generated code can be compiled, tested immediately on-line, and graphically displayed on the screen.

Summary

As part of GSE’s JADE environment, JFlow graphical flow network modeling software minimizes the engineering effort, enhances the productivity, and improves the quality of work for real-time simulation tasks. It is a powerful software package that allows engineers to easily model and maintain complex fluid network systems.