Training and Plant Improvement

JADE™ High-Fidelity Simulators

Power plant operators have traditionally learned how to operate a plant by working with an experienced operator until plant management feels confident that they can control the plant by themselves. The problem with this method is that the instruction of the student is limited to those situations that are experienced during the time of training.

When this new operator encounters a new situation or problem, they are left to operation by trial and error. The error can result in not so minor costs such as operation at a reduced output, a unit trip, or worse, equipment damage that leaves the unit off line for a period of repair.

Why Simulation?

Simulation presents the operator with a means of learning unit operation without touching the unit. This strongly complements the value of “on the job” and classroom training.

A modern simulator consists of an operator interface that replicates the workstations in the plant and a computer that runs mathematical models which duplicate unit performance. With a prescribed course of training, the new operator can start with normal operations such as unit load changes, unit startup from cold conditions to full load, and unit shutdown from full load to cold iron. Then the student can experience malfunction conditions such as pump trips, turbine trips, faulty instruments and controls, and tube leaks to full steam line ruptures.

Simulation is not limited to new operators. It provides the ability to keep the skills of experienced operators fresh. Operators can practice infrequent evolutions and faulted conditions on the unit. Practice can make the difference between keeping the unit on line or losing the unit during a plant upset.

Who Buys Simulators?

Almost every plant can benefit from improved operator training, which includes the use of a plant specific simulator.

Upgrading your control system?

One very large group of simulator users are plants that are undergoing a major control system upgrade. In some cases, the plant is moving from hard panel controls to a Distributed Control System (DCS); others are changing DCS vendors.

In either case, the interface that the operator uses to control the unit will be different. Rather than a “sink or swim” method of operation while gaining experience on the new control system, these customers have elected to use a simulator to help accelerate the learning curve.

The simulator also helps the plant confirm process control approaches and find “bugs” in the control system logic. This can help contain budget costs by saving valuable time during commissioning as well as improving overall
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plant reliability. While the ROI may seem hard to initially quantify, you only need to seek the voice of real world experience...from those who used a simulator...and those who wish they had.

**Having plant availability or reliability problems?**

A second set of simulator users are power plants with availability and reliability problems. Frankly, it doesn’t take many unit trips related to operator error to convince plant management that there is a training problem. A review of resulting lost generation sales can often directly support financial justification. In response to a changing electric marketplace, simulators are also an excellent tool for developing unit operating procedures where alternate operating strategies can be tested without threatening the unit.

**Building a new power plant?**

New power plants are the third major category of simulator users. One would think that the decision to add a simulator is simply “common sense” given the financial return justified by the above cases. But with the rush and financial pressure to design, build, and start-up a new steam or CCGT power plant, training of the operators...the very individuals that will ultimately control the success of that investment...is often left to late planning and secondary importance.

A simulator provides real benefits, and it provides the extra visibility regarding the issue of operator training, readiness, and qualification for the job. While the initial investment helps a new plant to achieve a shorter, smoother start-up, the simulator remains in place to provide more detailed operator training on plant process relationships and malfunction recognition and response.

**Why GSE Systems?**

GSE Systems is the most experienced simulation company in the world with hundreds of installations in over 35 countries. We have built more nuclear plant simulators than all of our competitors combined. Our fossil fueled simulators include a wide variety of plant configurations from boiler-turbine to gas fired combined cycle to complex cogeneration units.

Using state-of-the-art technology and a design approach that features extensive, forward thinking simulation user input, GSE’s JADE™ environment delivers the flexibility and ease of use to meet all your simulator needs. Combining our modeling technology and proven implementation methodologies, we bring true high-fidelity power plant simulators to users worldwide. With a staff of over one hundred dedicated to power plant simulation, we bring the size, management skills, and experience to assure schedules and budgets are met.

We have been building power plant simulators for over 40 years, operating under the corporate names of Singer-Link, S3 Technologies, General Physics International, and now GSE Systems. While our name has changed, our commitment to simulation and our customers has remained firm.

Whether you have a plant with new controls, a plant with reliability issues, or you just want to improve the skills of your operators, GSE Systems can help.