CONTROL ROOM OPERATORS

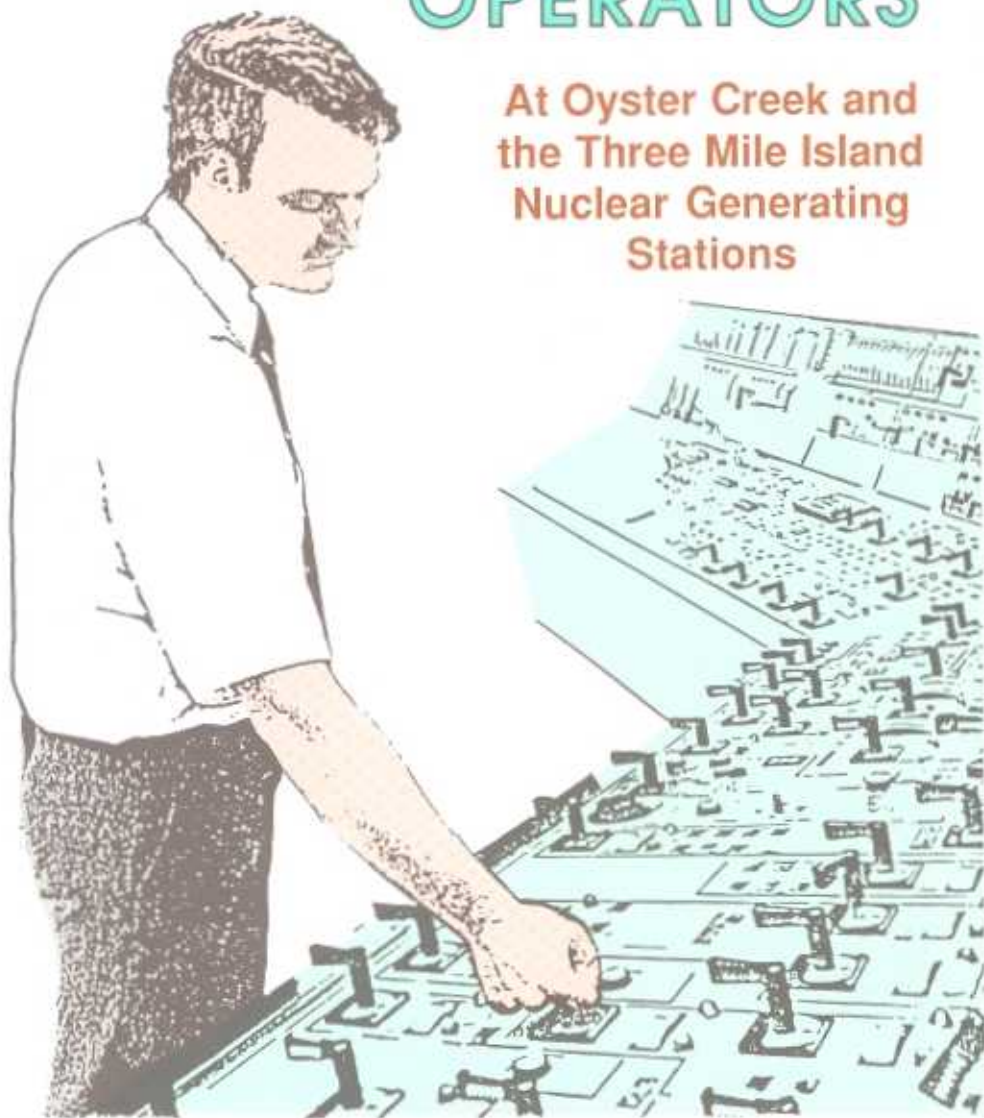## At Oyster Creek and the Three Mile Island Nuclear Generating Stations

GPU Nuclear

GPU Nuclear

MEETING THE ENERGY CHALLENGE WITH LEADERSHIP AND INTEGRITY

Introduction

Control room operators perform a vital role in the operation of a nuclear power plant. They constantly monitor and respond to plant needs from a highly sophisticated nerve center called a control room, which is connected - by miles of electrical cable and computers - to the heart of the plant, the reactor, and to other important parts of the powerstation. Together, this man/machine interface controls the plant.

Operators train on the TMI-1 replica simulator.

1

Control Room Operators

at GPU Nuclear Corporation

GPU Nuclear Corporation has a corps of over 80 highly trained and qualified men and women who operate Three Mile Island Unit 1 and Oyster Creek Nuclear Generating Stations and coordinate the cleanup activities at Three Mile Island Unit 2. They are licensed by the United States Nuclear Regulatory Commission (NRC).

The typical operator at GPU Nuclear is 36 years old, has worked for the company for over ten years, is married with two children and lives close to the plant. They are well-paid professionals who are dedicated to their jobs. They spend thousands of hours in training, including time on computerized replica simulators. Some have served in the nuclear Navy before joining GPU Nuclear, others, mostly homegrown talent, have progressed through the operations ranks to become control room operators.

Oyster Creek operators review procedures in the control room.

The Job of a Control Room Operator

Control room operators are responsible for the safe operation of the plant. They have a detailed knowledge of the plant and possess engineering and scientific knowledge with the ability to apply it to the "nuts and bolts" operation of the plant.

Describing the job of a control room operator, a manager at TMI explained it

TMI-1 operator provides information to a plant worker.

this way: "...control room operators will know more about their jobs than they will about anything else in their lives. The detailed knowledge required is at a different, much higher, plane."

During normal operation a nuclear power plant runs smoothly, with few interruptions. Operators steerthe plant. They perform monitoring and surveillance work. Constant awareness of plant conditions and attention to detail are key elements of the job.

During unexpected plant events such as an unplanned shutdown, the operators take immediate actions to ensure the safety of the plant. Their primary actions are focused on

keeping the reactor core covered with water. They are assisted by computers and automatic safety systems capable of shutting down the plant.

Control room operators also coordinate plant maintenance work. Working with the auxiliary/equipment operators, they perform switching and tagging duties-the job of ensuring that equipment is either in-service or out-of-service for maintenance work. TMI and Oyster Creek have hundreds of pumps and thousands of valves, making this a major job.

Written procedures play an important role in the operation and maintenance of a nuclear power plant. Operators must have a working knowledge of these procedures, and in some cases, must memorize them.

Control room operators' duties change when the plant is shutdown for refueling. Under NRC regulations, only licensed operators, using specially designed equipment, can move and replace the used uranium fuel with new fuel that is used in the plant's reactor.

Qualifications for Control Room Operators

To be eligible to participate in GPU Nuclear's operator qualification training program, a candidate must have a high school diploma with a strong emphasis in mathematics and physics. In addition, the candidate must have previous power plant experience or similar nuclear experience in the Navy. For a candidate with no power plant experience, it takes about three years of classroom and on-the-job training to be eligible to take an NRC control room operator license examination.

After meeting these minimum requirements, a candidate is eligible to participate in GPU Nuclear's Control Room Operator Training Program.

Oyster Creek Control Room Operator ensures plant is operating properly.

TMI-1 and Oyster Creek Operations Organization

TMI-1 is operated by six crews of operators. A crew consists of one shift supervisor, one shift foreman, three control room operators, five auxiliary operators and one shift technical advisor.

Oyster Creek is operated by five crews of operators (a sixth crew will be added in the future). A crew consists of one group shift supervisor, one group operations supervisor, three control room operators, three auxiliary/equipment operators and one shift technical advisor.

Shift Supervisor/Group Shift Supervisor

Is the highest ranking position on shift and has overall responsibility for the operation of the plant; assesses the effectiveness of the crew's actions and provides instruction as needed; requires a senior reactor operator's license from the NRC.

Shift Technical Advisor

This position was created after the TMI-2 accident in 1979; requires a bachelor of science degree, generally in engineering; lends technical expertise and advice to the shift supervisor; by not having responsibility for routine operations, this position is free to analyze plant conditions; although not required, some GPUN shift technical advisors hold NRC operating licenses.

Shift Foreman/Group Operations Supervisor

Is the second highest ranking position on shift and assists the shift supervisor; provides procedural guidance to the control room operators and verifies that the correct actions have been taken; requires a senior reactor operator's license from the NRC.

Control Room Operator

Performs the actual "hands on" duties associated with operating the plant; provides direction to the auxiliary/equipment operators; requires a reactor operator's license from the NRC. Many control room operators go on to earn a senior reactor operator's license and become shift foremen and shift supervisors.

Auxiliary Operator/Equipment Operator

Operates and monitors auxiliary plant equipment located outside of the control room; is the control room operator's "eyes and ears" in the plant. Many auxiliary/equipment operators train and advance to control room operator.

A TMI-1 Control Room Operator maneuvers one of the many switches in the plant's control room.

GPU Nuclear's Control Room Operator Trainina Proaram

GPU Nuclear takes a systematic, performance-based approach to its control room operator training program. TMI's and Oyster Creek's operatortraining programs are fully accredited by the Institute of Nuclear Power Operations (INPO). GPU Nuclear is a full member of INPO's National Academy for Nuclear Training, at the time becoming the seventh utility to be admitted. There are 60 nuclear utilities in the U.S.

The initial operator training program involves 12 to 14-months of classroom, simulator and on-the-job training. The training is conducted by licensed operators from GPU Nuclear's training department.

The basic training philosophy is to teach fundamentals, theory and plant systems in the classroom and to use a simulator and on-the-job training to evaluate a candidate's ability to perform the job.

Classroom Training:

Control room operator trainees attend six months of classroom training, which includes courses in nuclear physics, radiological protection, chemistry, and reactor theory. They also take plant systems and procedure courses

TMI employees concentrate on a written examination.

TMI-1 Replica Simulator.

TMI-1 Basic Principles Training Simulator.

that teach the specifics of the plant. Quizzes are conducted weekly. The classroom training provides the basic fundamentals required to be a control room operator.

Simulator Training:

Control room operator trainees at TMI spend about two months training on an $18 million computerized replica simulator of the TMI-1 control room. The simulator is located in the plant's training complex. Oyster Creek has ordered a simulator which is expected to be operational by the middle of 1991. In the meantime, operators there train on a simulator at Nine Mile Point Nuclear Station in New York. Nine Mile Point is similar in design to the Oyster Creek plant.

Simulator training allows the operators to practice what they learned in the classroom. They are able to simulate operating the plant - via computer - on controls identical to those in the control room. This prepares the operators to respond to actual plant events in a timely and decisive manner.

On-Shift Training:

Control room operator trainees spend about five months on-shift in what issimilarin educational theoryto a medical doctor's internship. The trainee works closely with a licensed operator. To successfully complete this aspect of the training program, the trainee must complete requirements listed on a qualification card maintained by the shift supervisor.

Before the trainees can work as control room operators, they must pass company and NRC licensing examinations.

Oyster Creek operators complete daily checklist.

Company Examination:

Trainees must pass this test to be eligible to take the NRC exam. GPU Nuclear's control room operator's examination consists of three parts: a written exam, an oral exam and a simulator exam. An 80 percent overall score with no section lower than 70 percent is required to pass.

NRC Examination:

Trainees must pass this test to be licensed as control room operators. The NRC test consists of three parts: a six-hour written exam, a four-hour plant walk through oral exam and a three-hour simulator exam. An 80 percent overall score with no section failed is required to pass. NRC licenses are good for six years, after which operators must pass a requalification test in order to maintain it. Since 1985, TMI and Oyster Creek employees have achieved better than a 93 percent pass rate on this exam.

The NRC issues two types of licenses: a reactor operator's license and a senior reactor operator's license. The senior reactor operator examination includes additional areas such as emergency planning, technical specifications and administrative controls.

Oyster Creek operator trainees examine a training model with an instructor.

On-Going Training and Requalification

Training never ends for control room operators. TMI and Oyster Creek operators spend over 200 hours annually in retraining, about 60 hours of which are spent training on a simulator.   A major element of this training is to teach each operating crew to perform as a team.

The retraining program also is performance based rather than recall based. The training is focused on what is required on the job. Operators are evaluated on how well they perform their job.

The retraining program keeps up with modifications made in the plant.   Training and plant operations are tied closely together to insure that the training program reflects actual plant conditions.

GPU Nuclear conducts its own requalification program in addition to the NRC's. To stay on shift, licensed operators at TMI and Oyster Creek must be certified on a simulator and pass an oral exam annually and pass a comprehensive written exam bi-annually.

C odes of Conduct

Similar to other professional occupations, control room operators at TMI and Oyster Creek have codes of conduct, known as Commitments to Excellence. They are meant to be yardsticks against which operators can measure themselves.