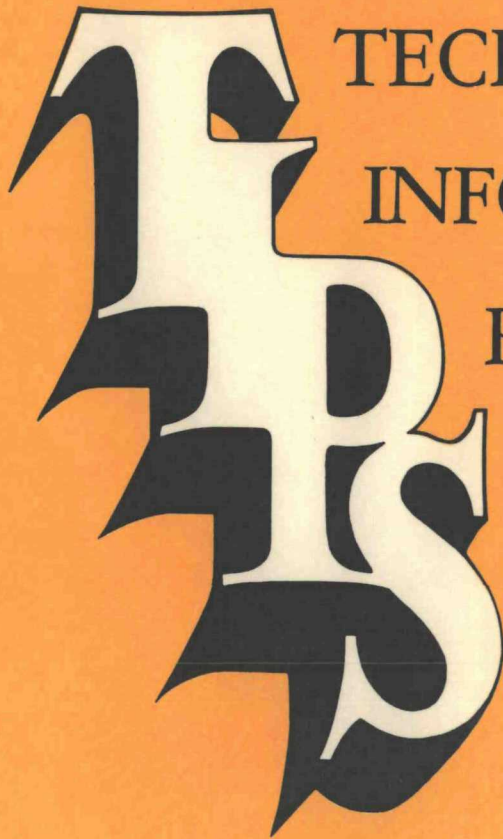


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TECHNICAL
INFORMATION
PROGRAM **MASTER**
SUMMARY

FFTF OPERATOR TRAINING

WESTINGHOUSE HANFORD COMPANY—OPERATING THE HANFORD ENGINEERING DEVELOPMENT LABORATORY FOR THE DEPARTMENT OF ENERGY

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FFTF OPERATOR TRAINING

September 27, 1979

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FFTF operator training

The Fast Flux Test Facility is operated by 115 men and women working as five crews on a rotating shift.

Qualifications

Operations engineer (lead position) -- prerequisite is a college degree with satisfactory completion of technical courses. Appropriate nuclear reactor operations experience can be substituted for this educational requirement.

Reactor technicians (the next level of operators below operations engineer) and operations technicians (the third level) are required to have high school diplomas and at least two years of college with technical courses, or the equivalent in reactor operating experience.

FFTF operators range from 20 to 35 years of age. About half have nuclear operations experience in excess of five years prior to FFTF.

Training

Operators receive 20 weeks of classroom instruction, averaging about four hours in class per day. The curriculum includes reactor physics, electricity and electronics, radiological controls, industrial safety, sodium technology, reactor safety, heat transfer and fluid flow, and FFTF systems.

Early selected operators received about 3 months of hands-on experience at the controls of an operating sodium-cooled reactor -- Experimental Breeder Reactor II -- at the Idaho National Engineering Laboratory near Idaho Falls. This training included operation of the reactor control console, coolant systems, fuel handling and maintenance.

Selected operators also received sodium systems experience in the High Temperature Sodium Facility at the Hanford Engineering Development Laboratory's 300 Area, as well as formal training in the HTSF, which provided in-sodium testing of FFTF components. Before the sodium vessel was decommissioned in 1978, some operators were loaned to the facility for actual operating assignments.

Another training aid at HEDL is the Operator Training Simulator, a computerized mockup of FFTF control room consoles and panels. Operations engineers and reactor technicians -- the control room personnel -- are required to train on the simulator, which permits operators to practice responses to both normal and abnormal situations.

The operators receive training on all plant systems and components, and are tested orally and in the actual operation of each system. They also have prepared operating and test procedures, which provided additional familiarization with systems.

Sodium Fill Training

FFTF operators were required to complete sodium fill qualification before they could begin filling the plant's reactor cooling system with liquid sodium in 1978. To receive sodium fill qualification, an operator had to demonstrate on-the-job ability to operate plant systems and complete detailed qualification cards. The operator also had to pass written and oral examinations which test knowledge of all FFTF systems, sodium technology, sodium safety, industrial safety, and emergency response training.

Cold Plant Qualification

Following completion of sodium fill in December 1978, the operators began cold plant qualification -- certification that permits them to operate the plant during and after reactor startup. This final phase in reactor training emphasizes reactor operation principles, procedures that could not be performed prior to sodium fill, and control room training with the Operator Training Simulator. Every operator has to complete cold plant qualification cards and during this phase, the operators also attended refresher courses in radiation safety and criticality control. Extensive emergency training was conducted for each operating crew and the Facility Emergency Organization.

Written, oral and operational examinations, including a test on the simulator for control room operators, are requirements to obtain cold plant certification. The written and oral exams require knowledge of basic nuclear theory, reactor operation principles, FFTF design features, general operating characteristics, instrumentation and control systems, safeguard and emergency systems, normal and recovery procedures, radiation control and safety.

Supervisory Requirements

Supervisory personnel (operations engineers) must meet all of the requirements of reactor operators and successfully complete comprehensive written, oral and operating examination. They are required to have more knowledge of reactor theory; radioactive material handling, disposal and hazards; fuel handling and core parameters; administrative procedures and limitations.

Operator Positions

Each operations crew at FFTF consists of between 21 to 23 operators.

Heading each crew is a shift operations manager and operations supervisor. An operations engineer is responsible for work control, work releases, etc. In the control room are the chief operator, reactor operator, closed loop systems and dump heat exchanger operators, and the control room auxiliaries operator.

The chief operator is responsible for the actions of all the operators throughout the plant. The reactor operator has direct control over the reactor, control rods, and flow of the primary and secondary reactor cooling system coolant. Closed Loop System operators control the temperature and sodium flow of the FFTF's closed loops. (Two closed loops in the plant provide temperature and flow conditions separate from the main reactor for testing purposes.)

The dump heat exchanger operator is responsible for operation of the dump heat exchangers, which dissipate reactor heat from the plant to the atmosphere.

All control room personnel are qualified on their particular watchstations. The third group -- operations technicians -- includes 2 containment operators, 3 service systems operators, 4 heat transport systems operators, and refueling personnel.

Containment operators are stationed in the reactor containment building, where they operate refueling and various cooling and preheating systems. The service systems operators, stationed in auxiliary equipment buildings east and west, operate cooling systems, electrical distribution systems, the Radioactive Argon Processing and Cell Atmosphere Processing systems, plus associated heating, ventilating, and fire protection systems.

Heat transport system operators, located in the HTS and dump heat exchanger buildings, are responsible for operation of the secondary HTS auxiliary systems, for obtaining samples of primary and secondary system sodium, for cover gas monitoring, and manual emergency operation of the dump heat exchangers as well as helping with the exchangers' normal operation.

One relief operator, for vacation and sickness coverage, and two trainees are also part of each operations crew.

Requalification Training

FFTF operator training is a continuous process. Operators will be required to requalify at their operation levels every two years. The five-crew rotation at FFTF permits up to four days out of every 35 for training per operator.

Retraining will emphasize changes in plant procedures, areas in which the operator indicates deficiencies, and areas of the plant to which the operator is not exposed on a routine basis. X

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There will be an on-going lecture series to review seldom-used safety-related procedures and systems, and basic fundamentals for operator proficiency. Operators are to be re-examined annually on procedures for handling abnormal plant conditions and emergencies. Every two years, examinations are scheduled on all other subjects.

In addition to the formal lecture program and re-examination series, the requalification program includes on-the-job operating performances demonstrating that the operator possesses skill with reactivity control systems, an understanding of the operation of equipment according to procedures, knowledge of facility design and procedural changes, and skill in handling infrequent and recovery procedures.

Recertification

If an operator hasn't requalified two years after qualification, he or she no longer can be considered certified and cannot function as an operator at his or her present level. Recertification of operators will be based on operating records and operating experiences during the past certification period, and successful completion of the retesting and retraining program.

Operator certification and recertification is granted by Westinghouse Hanford Company's FFTF Operations. Requirements for certification meet Department of Energy standards and they meet or exceed Nuclear Regulatory Commission standards, even though this is not a requirement for FFTF operation.

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