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**STAFFING EXPERIENCE FOR OPERATION OF THE PCTR  
PLUTONIUM RECYCLE TEST REACTOR**

By **CONF-243-20**

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**Plutonium Recycle Test Reactor  
Hanford Laboratories Operation**

**General Electric Company  
Richland, Washington**

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**STAFFING EXPERIENCE FOR OPERATION OF THE**

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**INTRODUCTION**

The Plutonium Recycle Test Reactor is a research and development tool supporting the Plutonium Recycle Program and other research activities at Hanford. It first achieved critical in November, 1960, rated design power (70 MW th) in July, 1961, and was declared fully operational in November, 1961. Until November, 1961, a reactor startup council, chairmanned by a project manager, was responsible for overall startup, performance, and operation of the reactor. The group operating the reactor had representation on this council.

The startup council was discontinued when the reactor was declared operational, and major organization changes were effected to operate the reactor in its intended capacity. The organization changes made at that time are still in effect and functioning as desired. The present organization directly associated with PRTR is composed of Operating, Technical Assistance, Maintenance, and Engineering Groups. Liaison with research groups utilizing PRTR facilities is accomplished through the Technical Assistance Group. The other three groups serve PRTR in the manner suggested by the group name.



This paper limits its interest to the staffing experience of the Operating Group.

#### ORIGINAL STAFFING

When the Operating Group was originally staffed, over 140 applications, primarily from other departments at the Hanford Plant, were screened to fill 30 openings. Nine technically trained persons formed the original group by July, 1958, to follow detailed design, construction, and to prepare technical and other material for operator training programs. By October, 1959, 21 non-technical personnel were assembled to receive intensive training for reactor startup and operation.

The initial training for the reactor technicians (operators) extended over 11 weeks, with over 270 hours of classroom instruction. The instructor was generally one of the nine technically trained persons in the Operating Group, although other experts were used frequently for classroom instruction. At the completion of the classroom instruction, the Operating Group assumed a shift operation structure to permit team training and group project work.

By September, 1961, the four shift crews, each composed of a technically trained reactor engineer (supervisor) and five reactor technicians, had completed their required training and testing and were determined to be qualified to control reactivity in the PRTR. Subcritical experiments were performed until November, 1961, the month first critical was achieved.

If it were not for additional facilities related to PRTR, the shift crews as staffed originally would have been adequate for normal test reactor operation. Since the PRTR first went critical, however, five new facilities have been added to the original plant. These new facilities have required advanced training of personnel, preparation of training material, pre-operational tests, and operating procedures. Four of these new facilities are now operational.



## PRESENT STAFFING

With the reactor operational, it is not practical to conduct extensive classroom training for new reactor personnel. It has been necessary to rely heavily on the reactor shift engineer's ability to train newly assigned personnel during normal reactor operation. Depending on work load problems, a reactor technician becomes qualified to control reactivity at PRTR after about 8 to 12 months of on-the-job training. Training reactor shift engineers to assume the responsibilities for shift reactor operation requires about the same length of time.

The addition of new facilities and the increased utilization of PRTR facilities has required an increase in the number of personnel in the operating group from 30 to 40, principally of the technician grade. For the most part, the expansion was orderly, with adequate advanced training programs for new facilities. Coincidental with this planned expansion, however, was a moderate amount of personnel turnover. Since reactor startup, 15 fully trained and 2 partially trained personnel have been transferred from the operating group for one reason or another. This turnover, coupled with the expansion, placed a heavy training burden on the group, and to some degree the burden exists at present. An adequate number of trained personnel has been available to permit routine operation, but work assignments on the shift crews are not as interchangeable as desired. The training goal is to have all operating personnel qualified to perform all duties within their job classification of reactor technician or reactor engineer.

The present organization structure is shown in Figure 1. The staff has nine fully qualified persons capable of performing the reactor shift engineer's function, and at present two technically trained persons are in training for the reactor shift engineer position. There are 30 reactor technicians with 23 fully qualified for all phases of reactor operation.

The remaining seven technicians are at various stages in the training and qualification program.

#### STAFFING PROBLEMS

Since the original Operating Group formed in 1959, 26 technically and non-technically trained personnel have joined the group, and seventeen operating employees have left for reasons as follows: beneficial transfer within General Electric, 9; return to school, 1; employment elsewhere, 4; and new facilities locally, 3. The net effect has been to have an average of six persons in training on a continuing basis.

The complexity, one-of-its kind features, and continually changing research programs of the PRTF have necessitated two levels of training for the shift crews, one for the reactor qualified personnel, and one for never in-training persons. Training techniques have been altered wherever necessary to make training programs more efficient. Written examinations have been broken into two phases to permit more logical training progress. Training meetings are held routinely on all shifts to keep current on changing programs and reactor systems.

To maintain a high level of competence in the reactor personnel, specific attributes are sought when screening personnel for hire. A significant consideration is a person's ability to learn and work with engineering and scientific concepts. Education in engineering or sciences above the high school level are reasonable measures of this attribute; and in the Operating Group, the average education of the 30 technicians is 1.3 years of college level science or engineering. This academic strength has been a positive factor in the Operating Group's overall competence. All but one technically trained person in the group has a Bachelor of Science Degree. It is the opinion of the author that this level of educational background should be maintained to cope with the continuously changing features of the test reactor.



As suggested above, considerable time is devoted to screening candidates for the PRTR Operating Group. At present, a moderate record of possible candidates has been developed to permit prompt but considered decisions when replacement personnel are needed. Replacement personnel are obtained soon enough that some overlapping in personnel replacements occurs.

*PLUTONIUM RECYCLE TEST REACTOR*

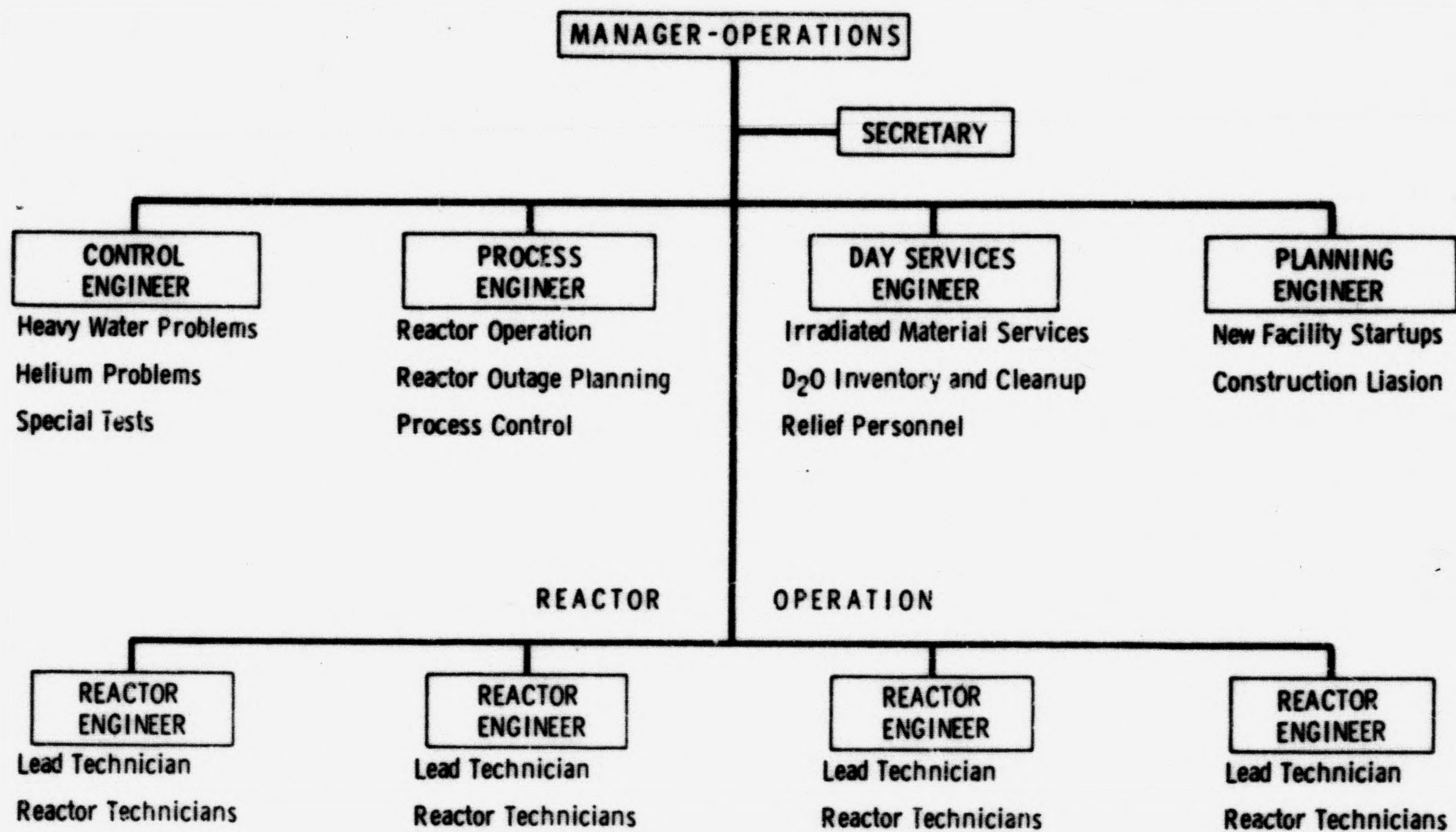


FIGURE 1

**END**