EVALUATION OF THE HEALTH PHYSICS/CHEMISTRY ORGANIZATION AT THE THREE MILE ISLAND NUCLEAR STATION UNITS 1 AND 2

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SUMMARY OF EVALUATION OF TMI HEALTH PHYSICS/CHEMISTRY DEPARTMENT

1. OBJECTIVES OF EVALUATION

In a letter to Don Reppert (GPU), dated June 20, 1977, Mr. L. L. Lawyer (ME) requested an independent assessment of the Metropolitan Edison Three Mile Island Health Physics and Chemistry program capabilities and needs in anticipation of the startup of Unit 2 in the near future.

2. METHODS OF EVALUATION

Don Reppert and Tom Potter, a health physicist with Pickard, Lowe and Garrick, Inc., conducted the study. The team spent two days at Three Mile Island reviewing procedures, interviewing supervisory personnel, and observing operations.

The marked variability in the nature of day-to-day program activities and the short period of time available for observation limited the usefulness of the observation technique for our purposes. This limitation was made more severe by perturbations in program activities due to Unit 2 tests currently underway. As a result, although our observations of operations are factored into our conclusions and recommendations, we weighted the results of interviews and reviews of procedures more heavily in reaching our conclusions and forming our recommendations.

We observed a variety of activities and inspected program facilities:

A. Unit 1 HP lab operations
B. Unit 1 primary chemistry lab operations
C. Unit 1 secondary lab operations
D. Solid waste shipment
E. Inspection of areas in which most challenging health physics problems occur
F. Re-qualification training session conducted by HP foreman.

We also conducted thorough private interviews with the following individuals:

A. Dick Dubiel
B. Tom Mulleavy
C. Gary Reed
D. Bob McCann
E. Fred Huwe
F. Pete Velez.

In our interviews, we asked detailed questions about the organization, supervision, and conduct of various tasks. We also obtained each individual's perspectives regarding activities in which resource application tends to be wasteful or inadequate and activities given priorities too high or too low relative to perceived importance. We then weighted these perspectives, one against another, and against our perspectives formed from our observations at TMI and our experiences with other programs. Our conclusions are drawn from that weighting process and our recommendations are drawn from our conclusions.

Although additional recommendations may be drawn from our conclusions, we have limited our recommendations to several we believe to be most important for assuring adequate fulfillment of Health Physics and Chemistry responsibilities with optimimum use of resources.

3. OBSERVATIONS OF EVALUATION

A. General

(1) The Health Physics and Chemistry programs are fundamentally sound, however, the high frequency rotation of technicians between chemistry and health physics activities is probably inefficient.

(2) Recent NRC compliance inspections have not found serious deficiencies in the programs.

(3) The Health Physics procedures are satisfactory.

(4) There is a problem with combining the Chemistry and Health Physics functions. Chemistry is closely related to the reliabilities of plant operation, whereas Health Physics is more of a conscience function. There is a tendency, after the satisfaction of short-term requirements (technical specifications, etc.) to favor Chemistry over Health Physics for allocating technicians. Department personnel are aware of the tendency and feel they balance it reasonably well. We agree, but would caution that the balance needs to be continually assessed.

(5) The Health Physics and Chemistry laboratory facilities appear to be adequate, however, the Unit 2 change facilities are poor.

(6) The Health Physics and Chemistry operations may be expected to smooth out some as new people gain experience. One of the three Health Physics foremen, the Health Physics engineer, and 6 of 24 technicians are new to their jobs.

(7) The Health Physics Department does not review everything that goes through PORC.

B. Work Load

(1) The present 24-man technician staff is probably marginal for routine operation of Units 1 and 2 (not counting outage considerations), and is probably slightly (1 or 2 men) inadequate for Unit 2 startup, but could be satisfied by overtime. However, limitation to 24 technicians for long-term operation of Units 1 and 2 will result in substantial increases in rental tech. usage. Assuming 10 weeks per year outage for Unit 1, 12-hour shifts for technicians, Health Physics/Chemistry and overtime = 8000 hrs/yr. are required for the 18-man complement. After the same overtime rate to the Unit 2 complement of 6 technicians, about 5000 hours of overtime deficit will remain, probably to be filled by rental techs.

(2) Unit 2 has already made an impact on Health Physics/Chemistry technician activities and overtime is currently required even with 24 technicians.

(3) The base Health Physics workload is small, relative to the variable workload. The base workload is more important for Chemistry, but the variable workload is still substantial.

(4) The Chemistry workload does not fall off drastically during outages.

(5) The chlorination analyses require a lot of time to perform (one full-time technician per Unit).

(6) The primary side Chemistry workload will increase by about 50% when Unit 2 goes on line. Some savings may be realized by batching Unit 1 and Unit 2 samples.

(7) The secondary side Chemistry workload will essentially double with two-unit operation.

(8) Escort activities still constitute a significant part of the Health Physics/Chemistry technician workload, despite cutbacks from early TMI-1 practice. (RWP qualification for some operations and maintenance personnel permitted those cutbacks.) There is disagreement as to whether additional cutbacks are possible.

(9) The Health Physics supervisor and his foremen spend a lot of time conducting training sessions.

(10) Emergency planning appears to require a substantial amount of time.

(11) The routine Health Physics workload will increase when Unit 2 starts up, but will not double. The increase will be between 25 and 50 percent.

C. Organization

(1) The high frequency rotation of Health Physics/Chemistry technicians between Chemistry and Health Physics activities is inefficient.

(2) Closer supervision of Health Physics/Chemistry technicians by foremen is desirable.

(3) TMI is one of a growing number of plants performing in-house external dosimetry (TLD). This dosimetry service, which is a repetitive analysis using specialized equipment and requires substantial data processing, would probably be better performed by one person.

(4) The informal arrangement for assigning utility help to Health Physics probably leads to inefficiencies.

4. RECOMMENDATIONS OF EVALUATION

A. Hire Health Physics and Chemistry Foremen as soon as possible and reorganize foremen assignments to provide closer supervision of technicians.

B. Either separate the Health Physics and Chemistry technician job functions or decrease frequency of technician rotation between Health Physics and Chemistry.

C. Assess effeciency gains from reorganization described above and reassess the need for additional technicians. (More technicians may be needed if the efficiency gains are not substantial.)

D. Formal training and emergency drill preparation make substantial demands on Health Physics personnel (and, perhaps more important, other plant personnel). These activities should be assessed and streamlined if possible (i.e., greater use of videotapes in training).