

September 25, 1985

Docket No. 50-320

Mr. F. R. Standerfer
Vice President/Director
Three Mile Island Unit 2
GPU Nuclear Corporation
P.O. Box 480
Middletown, PA 17057

Dear Mr. Standerfer:

Subject: Approval of Reactor Building Decontamination and Dose
Reduction Activities

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We have reviewed your Safety Evaluation Report (SER) for the Reactor
Building Decontamination and Dose Reduction Activities dated February 8,
1985, along with Supplement 1 of your SER dated March 25, 1985. We
conclude that your planned activity is safe and should meet the goal of
providing a work environment for the reactor defueling and disassembly
that is consistent with the ALARA concept. Our safety evaluation of
your SER for Reactor Building Decontamination and Dose Reduction
Activities is enclosed.

Sincerely,

Original signed by
B. J. Snyder

Bernard J. Snyder, Program Director
Three Mile Island Program Office
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc: T. F. Demmitt
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ENCLOSURE

SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REACTOR BUILDING DECONTAMINATION AND DOSE REDUCTION

A. Introduction

On February 8, 1985, GPU Nuclear Corporation (GPUNC) submitted to the staff for review, a Safety Evaluation Report (SER) for the Reactor Building (RB) Decontamination and Dose Reduction Activities. On March 25, 1985, GPUNC submitted Supplement 1 to the SER. The GPUNC SER assesses the safety aspects of the scheduled RB decontamination and dose reduction activities for 1985 and the first quarter of 1986. On July 26, 1985, the staff met with the licensee to discuss the subject SER. On August 7, 1985, GPUNC submitted to the staff a letter attaching the additional information requested by the staff at the July 26, 1985 meeting.

B. Discussion

The subject SER is an update of earlier safety evaluations from GPUNC (Radiological and Safety Evaluation of Ongoing Containment Building Decontamination and Dose Reduction Activities for TMI-2 Recovery, submitted by GPUNC on September 23, 1982 and revised on September 29, 1983). The criteria for planned decontamination activities remain the same as discussed in the earlier safety evaluations, i.e., decontamination and dose reduction activities must either exhibit a net positive man-rem savings or be designated as a desired cleanup endpoint. Since the 1985 projected man-hour estimate indicates that the reactor disassembly and defueling (RD&D) activities will represent the largest expenditure of in-containment man-hours, the 1985 - 1986 reactor building decontamination effort will be concentrated in those areas where the greatest reduction in RD&D

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occupational exposure can be realized. It is also recognized that to achieve the greatest ALARA effectiveness, these decontamination and dose reduction activities should be performed as early in the RD&D activity as permitted by other constraints such as resources and scheduling.

C. Planned Dose Reduction Activities

Areas in the reactor building where large amounts of man-rem exposure are estimated for work associated with RD&D are candidates for decontamination and dose reduction activities. These areas are prioritized for decontamination based on estimation of achieving the greatest net man-rem savings during RD&D activities. Based on current radiological characterization information, GPUNC has identified several sources for planned dose reduction activities. Those major sources are:

- (1) Reactor Building (RB) Air Coolers - The RB air coolers contribute about 50 mrem/hr to the adjacent area on elevation 305' and the floor hatch area on elevation 347'. Shielding of the air coolers is planned to significantly reduce the dose rate contribution. Shielding does not preclude future decontamination and/or dismantlement.
- (2) Floors - Floor contamination contributes to general area dose. In the past, the licensee has successfully reduced surface contamination levels and general area dose rates on elevation 347' by scabbling. Scabbling on the 305' elevation by the enclosed stairwell and

equipment hatch has recently been completed. Scabbling in combination with shielding of the floor hatch will reduce the transit dose to the RD&D workers and improve the access to the 282' elevation for robotic work.

- (3) The open stairwell exhibits high dose rates contributing to transit exposure of the workers. Reshielding of the open stairwell at the 305' elevation is being evaluated. In addition to lowering the transit dose, reshielding may be advantageous in providing access to the basement level for robotic characterization of the area below the reactor coolant drain tank vent line.
- (4) The overhead contamination at the 305' elevation results in an exposure field of 200 mR/hr just below the overheads. Characterization data for the contamination deposited between cables, cable insulation and other surfaces is being obtained.
- (5) The 305' elevation floor hatch area dose rate is about 150 mR/hr following shielding emplacement. This source contributes to worker exposure during lifting activities to the 282' and 347' elevations and further shielding of decontamination may be warranted.
- (6) The D-ring internals and walkways are major sources of contamination contributing to worker dose during RD&D and ex-vessel fuel characterization activities in the D-rings. The licensee plans to evaluate

man-rem expenditure and potential savings prior to implementing dose reduction activities such as water flushing.

- (7) Contamination at several areas such as the refueling canal, the internals indexing fixture (IIF) platform, the main fuel handling bridge, cable trays and the seal table contributes to the general area dose during RD&D activities. The licensee is evaluating dose reduction techniques for these areas in view of the large number of projected man-hours for RD&D.

The dose reduction techniques (i.e., shielding, scabbling, flushing with water, steam and vacuum cleaning and the application of strippable coatings) are methods the licensee has employed since the beginning of the dose reduction program in 1982. This decontamination experience is an important element in the licensee's planning of future dose reduction activities in order to optimize effectiveness, positive man-rem savings, resource utilization and scheduling. The licensee has committed to review and plan all dose reduction activities so as to provide a work environment for the RD&D effort that is consistent with the ALARA concept, thereby maintaining the overall cleanup activity occupational dose ALARA.

D. Occupational Exposure

The total occupational exposure for dose reduction activities in support of the RD&D effort is estimated to be less than 200 man-rem. This estimate is likely to be conservative based on past experience. Because of the

improved environment in the reactor building, many factors such as the decreased airborne contamination levels (such that respirators are not necessary in many instances), and the completion of the Reactor Building Chilled Water System (to decrease the ambient temperatures) will likely result in improvements in worker efficiency. The conservative man-rem estimate is well within the estimated worker exposure for decontamination activities in the Supplement 1 to the Programmatic Environmental Impact Statement (NUREG-0683).

E. Offsite Radiological Doses

Decontamination activities in the reactor building will not significantly increase the airborne particulate activity in the reactor building. In fact, over the long term, airborne particulate activity should decrease as surface decontamination activities progress. Water flushing will be performed using processed accident generated water which contains tritium. Based on past experience, the licensee estimates that the average airborne tritium level in the building atmosphere will increase by a factor of four over the present average concentration during the time when flushing is taking place. The calculated airborne tritium release to the environment is estimated to be about 45 Ci per year. The dose to the maximum exposed offsite individual due to airborne release pathways is estimated to be less than 0.2 mrem (whole body) per year. This is well within the offsite dose limits in Appendix B, Section 2.1 of the TMI-2 Technical Specifications.

F. Conclusion and 50.59 Evaluation

Based on the above discussion, the staff concludes that the licensee's planned effort in continuing the decontamination and dose reduction activities in the reactor building to support RD&D efforts will result in overall man-rem savings and meet the programmatic ALARA goal. The staff also concludes that, based on the criteria of 10 CFR 50.59, the planned activity is not an unreviewed safety issue. The planned activity will not increase the probability of occurrence or the consequences of an accident or malfunction of equipment important-to-safety previously evaluated. It does not create the possibility for an accident or malfunction of a different type than any evaluated previously or reduce the margin of safety.