

U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION I

RO Inspection Report No.: 50-289/73-17

Docket No.: 50-289

Licensee: Metropolitan Edison Company (ME)

License No.: CPPR-40

P.O. Box 542

Priority: --

Reading, Pennsylvania 19603

Category: B.1

Location: Three Mile Island Unit No. 1 (TMI)
Middletown, Pennsylvania 17057

Type of Licensee: B&W 871 MWe (PWR)

Type of Inspection: Special-Announced (Emergency Planning)

Dates of Inspection: October 2-5, 1973

Dates of Previous Inspection: September 27-October 3, 1973

Reporting Inspector: *Charles O. Gallina*
C. O. Gallina, Ph.D., Radiation Specialist

12/5/73
Date

Accompanying Inspectors: *J. P. Stohr*
J. P. Stohr, Senior Environmental Scientist

12/10/73
Date

Other Accompanying Personnel: NONE

Reviewed By: *J. P. Stohr*
J. P. Stohr, Senior Environmental Scientist

12/10/73
Date

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SUMMARY OF FINDINGS

Enforcement Action

None

Licensee Action on Previously Identified Enforcement Items (Emergency Planning)

None Identified

Design Changes

None

Unusual Occurrences

None

Other Significant Findings

Current Findings

No violations were identified.

Status of Previously Reported Unresolved Items (Emergency Planning)

None Identified

Management Interview

On October 5, 1973 a management meeting was held at the Three Mile Island Nuclear Station (TMI) in Middletown, Pennsylvania. The following individuals were in attendance:

Dr. C. O. Gallina, Radiation Specialist, USAEC - RO:I
Mr. J. P. Stohr, Senior Environmental Scientist, USAEC-RO:I
Mr. J. G. Herbein, Assistant Plant Superintendent, TMI
Mr. J. J. Colitz, Station Engineer, TMI
Mr. R. S. Deakin, Radiation Protection Supervisor, TMI
Mr. R. L. Summers, Assistant Engineer, TMI

During this meeting the following items were discussed:

A. Review of Emergency Implementation Procedures

The licensee stated that emergency implementation procedures would be reviewed and upgraded where applicable. The licensee also stated detailed procedures providing for the review of the TMI Emergency Planning package on a routine basis would also be developed.
(Paragraph 3)

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B. Area Maps and Overlays

The licensee stated that area maps had been developed which encompassed the areas surrounding the TMI site, including nearby population centers. These maps, located in the Control Room and in the Emergency Control Station, would be modified to include specific monitoring sites for use by area monitoring teams in the event of off-site releases. In conjunction with these area maps, the diffusion overlays previously constructed would be modified to provide information which could be utilized over a broader scope of potential accident conditions at the TMI site. These overlays when coupled with other decisional aids would enable rapid determination of the extent, magnitude, and area of maximum deposition in the event of radioactive releases off-site. (Paragraph 4)

C. First Aid Training

The licensee stated that the status of first aid training at the TMI site would be evaluated in detail in order to ensure that there would be an adequate number of individuals at the TMI site with a sufficient depth of training in this area to provide proper coverage over a wide range of potential accidents. (Paragraph 5)

D. Letters of Agreement

The licensee stated that an effort would be made to provide the remaining letters of agreement as soon as possible. This effort would include a followup of those letters previously requested as well as an initial request to various other organizations utilized by the licensee to implement the TMI Emergency Plan. (Paragraph 6)

E. Toxic Releases

The inspector noted that toxic liquids such as acids and caustics required for water treatment processes were utilized at the TMI plant, and any inadvertent releases of this material could require some emergency action on the part of plant personnel. The licensee stated that detailed procedures would be developed in this area and included in the TMI Emergency Plan with other procedures relating to non-radiological emergency actions. (Paragraph 7)

F. On-site Release Rate

The licensee stated that an effort would be made to develop procedures which would allow the estimation of on-site release rates from the PWR units under emergency conditions. (Paragraph 8)

G. Accounting Procedures

The licensee stated that specific detailed procedures would be developed to account for all plant personnel in the event of an emergency. The licensee also stated that these procedures would cover the accountability of construction personnel during the construction phases of TMI Unit No. 2. (Paragraph 9)

H. Search and Rescue Procedures

The licensee stated that detailed search and rescue procedures, including the uses of special equipment if applicable, would be developed. The licensee stated that consideration would be given to the utilization of a three-man search and rescue team to facilitate this operation. (Paragraph 10)

I. Emergency Training Exercises

The licensee stated that emergency training was in the process of being conducted at the TMI site and that a major training exercise incorporating as many phases of the overall Emergency Plan as applicable would be conducted at the site prior to licensing of TMI Unit No. 1. The licensee also stated that procedures would be prepared to cover the various aspects of emergency training exercises with respect to planning, execution and review. (Paragraph 11)

J. Facility Plot Plan

The licensee stated that a facility plot plan would be constructed and be made available in the Control Room and in the Emergency Control Station. Delineating various critical areas of the TMI site, the plot plan would enable rapid assessment of radiation hazards by having dose rates plotted in critical areas as information is supplied by site monitoring teams. (Paragraph 12)

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DETAILS

1. Personnel Contacted

Mr. J. G. Herbein, Assistant Plant Superintendent, TMI
Mr. J. J. Colitz, Station Engineer, TMI
Mr. R. S. Deakin, Radiation Protection Supervisor, TMI
Mr. R. L. Summers, Assistant Engineer, TMI
Mr. K. L. Miller, Health Physicist, Hershey Medical Center
Captain J. Everly, Commanding Officer, Troop H-Harrisburg,
Pennsylvania State Police
Lt. F. McCann, Troop H-Harrisburg, Pennsylvania State Police
Ms. M. A. Reilly, Chief, Environmental Radiological Surveillance
Section, Office of Radiological Health, Commonwealth of Pennsylvania

2. General

Areas examined during this inspection included a detailed review of the licensee's Emergency Plan with associated implementation procedures for the TMI site. The Emergency Plan is set forth as Appendix 12A is the subject facility's FSAR, with the latest revision submitted on October 24, 1972. The emergency implementation procedures are set forth in a document prepared by Metropolitan Edison Company (ME), entitled "Three Mile Island Emergency Plans and Procedures". This latter document is divided into two volumes, the first volume dealing with radiological emergencies and the second volume dealing with non-radiological emergencies.

The Emergency Plan and associated implementation procedures were reviewed to determine the overall adequacy of the licensee's emergency planning.

All apparent deficiencies discovered with respect to the emergency planning, whether factual (based on completed available procedures) or conceptual (based on discussions with the licensee) were discussed with management personnel. The apparent deficiencies range from minor items such as the use of non-specific terms in defining various action levels, to major items involving the omission of critical procedures. After discussion with the inspector, the licensee agreed to initiate a review and upgrading program with respect to all deficiencies discovered in all areas of emergency planning. Details of these deficiencies follow in Paragraphs 3 thru 14.

An in-plant inspection was conducted in order to review the status of emergency planning at the TMI site. Areas covered included the Control Room and associated equipment and instrumentation, Emergency Control Station, evacuation routes, emergency communications and survey equipment available at the time of the inspection.

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In addition to the above review, meetings were conducted by the inspector with the Commonwealth of Pennsylvania, Department of Environmental Resources, Hershey Medical Center, and the Pennsylvania State Police. Details of these meetings are summarized in Paragraph 15 thru 17.

3. Emergency Implementation Procedures

The inspector reviewed the licensee's emergency implementation procedures and noted that the action levels selected by the licensee in order to classify potential radiation emergencies in certain instances involved excessive subjective decision making, and in other cases, provided criteria which potentially could initiate unnecessary emergency actions. Following detailed discussion between the inspector and the licensee, the licensee stated that this entire area would be reviewed in detail and upgraded as necessary in order to ensure that the utility could meet all potential contingencies at the TMI site. The licensee also stated that the pre-determined criteria would be re-evaluated so that the Emergency Plan would be implemented as effectively as possible under all potential emergency conditions. Although no specific timetable was discussed with the inspector, the licensee stated that this review and upgrading of the emergency implementation procedures would be initiated immediately and completed prior to the licensing of TMI Unit No. 1.

The inspector also noted that the emergency implementation procedures, although containing some provisions for the routine review and revision of the Emergency Plan and associated procedures did not provide details in the following areas: Providing specific authority and responsibility for conducting these functions; provisions for routine review by both plant and upper management personnel; periodic recontact with off-site agencies; updating of phone lists; distribution of revised material and other related responsibilities. The licensee stated that this matter would be reviewed and procedures modified as necessary to cover these areas.

4. Area Maps and Overlays

The inspector noted that although area maps were being provided at the TMI site both at the Control Room and Emergency Control Station, specific monitoring locations had not been delineated on these maps. In reviewing the diffusion overlays which had been constructed for use in conjunction with these area maps, the inspector noted that the information obtainable from these overlays had been limited due to the use of specified accident variables. The inspector noted that the overlays were in fact isodose curves to both whole body and thyroid resulting from a DBA, two hours after the occurrence. The inspector discussed with the licensee the desirability of maintaining diffusion overlays as isopleths delineating dispersion factors (X/Q) for various meteorological conditions. The inspector stated that in this way information could be obtained on a real-time basis and would not be "locked in" to a definite set of accident conditions. The licensee stated that this area would be reviewed in detail with area maps and diffusion overlays modified accordingly.

5. First Aid Training

The inspector reviewed the status of first aid training at the TMI site and noted that although the majority of employees had been given basic first aid training, a limited number of individuals were available at the site with any form of intensive training in this area. The inspector noted that the utility's medical consultant was located in Pittsburgh, Pennsylvania and would not be available to respond on short notice at the plant. The inspector pointed out that some form of medical treatment or evaluation is often required on site before an accident victim can be transported to a hospital for professional attention.

The licensee stated that this entire area would be reviewed in detail and the deficiency would be corrected as soon as possible, either by providing more intensive training to plant personnel or making arrangements with physicians located in closer proximity to the plant.

6. Letters of Agreement

The inspector reviewed the status of the letters of agreement received by the licensee from off-site agencies used by the licensee to implement emergency planning at the TMI site. The inspector noted that there were missing letters of agreement which fell into one of three categories: (a) Letters which had been requested but not received, (b) Letters which had not been requested, (c) Organizations mentioned in the licensee's Emergency Plan, which subsequently were dropped from consideration by the licensee. The licensee stated that those organizations in the latter category would be re-evaluated and that letters would either be requested from them or their names would be deleted from the Emergency Plan.

At the time of the inspection, the following letters of agreement were considered outstanding:

- a. Hershey Medical Center
- b. Middletown Fire Department
- c. Middletown Police Department
- d. Penn Central Railroad
- e. Civil Defense (Middletown, Pennsylvania)
- f. General Public Utilities Corporation
- g. USAEC - RO:I
- h. Goldsboro Fire Department*
- i. Goldsboro Constable*
- j. York Haven Police Department*
- k. York Haven Fire Department*

*Organizations which may be deleted from Emergency Plan by TMI.

7. Toxic Releases

The inspector noted that the TMI Emergency Plan and implementation procedures did not contain procedures relating to the releases of toxic chemicals (gaseous or liquid) at the site. The inspector noted that considerable amounts of toxic liquids such as acids and caustics required for water treatment processes were utilized at the plant and that any releases of this material would require some emergency action on the part of plant personnel. The licensee stated that this matter would be considered further and that procedures would be provided to handle this contingency.

8. On-Site Release Rate

The inspector and licensee discussed the need for the emergency implementation procedures to contain provisions for a detailed determination of the on-site release rate from the facility during emergency conditions which subsequently could be used to estimate off-site thyroid and whole-body exposures. The licensee stated that this area would be evaluated and that the feasibility of determining on-site release rates would be investigated further with appropriate procedures developed accordingly.

9. Accounting Procedures

The licensee stated that procedures relating to the accountability of plant personnel would be developed and incorporated into the emergency planning for the TMI site. The inspector questioned the licensee as to whether accounting procedures had been provided for construction personnel at TMI Unit No. 2. The licensee stated that construction personnel operated under their own emergency plan and that personnel accountability was handled by their "sign-in board". This board provides the construction watchman with comprehensive information as to which workers are at the site at any time. In the event of an emergency, personnel accountability is performed by each worker leaving his tag on the board as he leaves. The licensee stated that although construction personnel have never participated in any emergency exercises it was his (licensee) belief that the accounting procedures for construction personnel would work effectively during an emergency. The inspector asked if any evaluation had been made of the interface of these two procedures (plant personnel/construction personnel) so that the Emergency Coordinator at the Emergency Control Station would know if any construction personnel were unaccounted for at the site. The licensee stated that this aspect of the procedures would be evaluated in addition to those aspects relating to the monitoring of construction personnel upon evacuation. Subsequent to this evaluation, procedures would be modified accordingly.

10. Search and Rescue Procedures

The inspector reviewed medical emergency procedures and noted that they covered various potential emergencies at the TMI site. The inspector noted, however, that provisions had not been made for those instances where plant personnel had been injured but could not be located. The licensee stated that these procedures would be reviewed from a standpoint of search and rescue teams and upgraded accordingly. The inspector noted that in the case of search and rescue teams, a third member would be advisable to accompany the team to the site of the injury, provide assistance in putting on equipment, removing debris, opening doors, and timing the rescue team in order to minimize exposure inside highly contaminated areas. The licensee agreed and stated that search and rescue procedure would be developed utilizing a three man team, but the definition of the team might state that it would be made up of a "minimum" of two individuals.

11. Emergency Training Exercises

The inspector noted that the TMI Emergency Plan stated that emergency exercises would be conducted annually and the detailed implementation procedures have not been provided whereby these drills were planned, reviewed by management, conducted, observed and evaluated. The inspector stated that due to the complexity of the TMI Emergency Plan and the interaction of various implementation, communication, and documentation phases of the drill, that it would be desirable to hold a full scale drill in order to determine the adequacy of emergency planning at the site. The licensee stated that plans would be initiated to conduct a large scale emergency exercise prior to the licensing of the TMI Unit No. 1 which would incorporate as many phases as appropriate of the licensee's emergency planning with possible inclusion of selected off-site agencies.

12. Facility Plot Plan

The inspector and licensee discussed means which could be provided to assist the Emergency Coordinator at the Emergency Control Station in determining the extent and the magnitude of radiation dose levels at the TMI site. The licensee stated that the concept of the facility plot plan would be evaluated. This plot plan would designate all critical areas on the TMI site so that the Emergency Coordinator could write in the various radiation dose levels in these areas as they are reported to him by the site monitoring teams. Located in the Control Room as well as the Emergency Control Station or emergency kits, these plot plans would provide an instantaneous and comprehensive evaluation of all on-site radiation hazards.

13. Environmental Sample Collection

The inspector reviewed the licensee's emergency procedures which covered the rapid collection and evaluation of environmental samples currently being utilized on a routine basis around the TMI site. The inspector noted that these samples would be collected out of sequence only in event of a general emergency, that is, an emergency with known off-site releases. Following discussions with the inspector, the licensee stated that the procedures would be modified so that these samples would also be collected following a site emergency to ensure that radioactive material had not been released beyond the limits of the TMI site boundary.

14. Other Areas of Emergency Planning

The inspector reviewed various other areas as they pertain to emergency planning at the TMI site. These areas included the status of emergency equipment inventories, status of emergency training at the TMI site; TLD systems, emergency vehicles, evacuation routes, communications, emergency documentation, emergency area monitoring, and other aspects of emergency implementation procedures.

15. Meeting with Hershey Medical Center

The TMI Emergency Plan utilizes the Hershey Medical Center (HMC) as its primary medical treatment facility for injuries at the TMI site. The licensee also stated that although HMC could handle injuries involving massive overexposures or critical injuries requiring special surgical procedures, that the facilities of the Hospital of the University of Pennsylvania, under the management of Radiation Management Corporation (RMC) were also available, if for some reason the facilities at HMC could not be used. The meeting was held with a representative of HMC on October 3, 1973 in Hershey, Pennsylvania. This representative stated that contact had been initiated and maintained by the licensee and that the responsibility of HMC during an emergency had been clear to them as well as all notification procedures and the associated criteria utilized to implement those procedures. The inspector noted that a letter of agreement had not been received from HMC as of the date of this meeting. The representative of HMC said that there was no problem in this area and that the letter of agreement would be sent to the TMI site in the very near future. HMC stated that a treatment room had been set aside for use in treating contaminated patients and in conjunction with equipment supplied by the licensee, patients could be effectively segregated with a minimum of contamination to other areas of the hospital. HMC said that all emergency vehicles were provided by organizations near the TMI site and that monitoring and protective equipment required during transfer from the site and subsequent treatment

at the hospital was provided by the licensee and in part by HMC. The inspector noted that emergency equipment at the hospital for use in treating injuries at the TMI site had not yet been supplied by the licensee. The licensee stated that equipment inventories were currently in the process of being completed and would be available at the hospital prior to licensing of TMI Unit No. 1. The representative of HMC stated that the hospital contained approximately 250 beds and approximately 12 emergency treatment rooms which could handle several personnel provided that there was no gross contamination. The representative from HMC stated that there were 80 physicians on staff and approximately 400 nurses (RN and LPN). HMC stated that 8 physicians had received training in radiation procedures and were familiar with treating injuries to contaminated patients. The representative of HMC stated that notification of a radiological emergency by the licensee would be by telephone. HMC stated that although training in Health Physics procedures had been given to several members of the HMC staff, no major drills had been held to date with the licensee. The representatives from HMC stated that these drills would be undertaken subsequent to the completion of the equipment inventories.

16. Meeting with Pennsylvania State Police

The TMI Emergency Plan utilizes the Pennsylvania State Police (PSP) as primary traffic and site access control, emergency transportation for the Pennsylvania Office of Radiological Health (ORH) and other emergency functions. A meeting was held with representatives of Pennsylvania State Police on October 5, 1973 at the TMI site. PSP stated that contact had been initiated and maintained by the licensee and that a detailed review of various aspects of the Emergency Plan had been held by the licensee. The representative stated that all notification procedures and associated criteria utilized to implement those procedures had also been reviewed but that normal contact with PSP by the licensee would be through ORH or a Civil Defense Duty Officer located in Harrisburg, Pennsylvania. PSP stated that a patrol car could reach the TMI site within minutes of the initial notification of emergency conditions with slightly longer times resulting from an emergency during off-hours. PSP stated that upon recommendation from various agencies with the authority for ordering evacuation, PSP would coordinate all evacuation efforts in accordance with established procedures of the Commonwealth of Pennsylvania. PSP stated that definite procedures had been developed for the utilization of primary and secondary contingency routes at the TMI site as well as the designation of critical intersections which would be used in order to limit access to the site by the general public. PSP also stated that no problems were anticipated in this area in that all officers both of Troop H in Harrisburg and surrounding areas were very familiar with the area surrounding the TMI site. Communications network utilized by PSP would be the standard State Police communication's network with a backup system provided by the State Council of Civil Defense.

PSP stated that should any problems arise in the area of notification of local inhabitants surrounding the TMI site in that some individuals in this area do not have any means of external communication (telephone, television or radio), a State Police helicopter with public address equipment would be utilized. In addition, inhabitants of islands surrounding the TMI site could also be evacuated by means of boats if required. The same system of air and sea capability could be utilized to control river traffic in the area adjacent to the TMI site.

PSP stated that no specific drills had been held to date with the licensee but that it planned to observe a major drill at the TMI site prior to the operation of TMI Unit No. 1. PSP did state, however, that it believed some additional training in the area of radiation and radioactivity would be beneficial. The licensee stated that this matter could be handled by the licensee if so desired. The inspector stated that training also might be available for PSP by members of the Defense Civil Preparedness Agency (DCPA).

17. Meeting with the Commonwealth of Pennsylvania

The agency with the responsibility of off-site radiological health protection at the TMI site is the Office of Radiological Health (ORH) of the Department of Environmental Resources of the Commonwealth of Pennsylvania. A meeting was held with a representative of this agency (ORH) on October 5, 1973 at the TMI site. Representatives of TMI and PSP were also in attendance. The representative of ORH stated that contact had been initiated and maintained by the licensee. The representative also stated that the organization for responding to an emergency at the TMI site would be dependent on the Governor of the Commonwealth of Pennsylvania. If the emergency was of such magnitude as to result in an official declaration of a "State of Emergency" by the Governor, then operations would be coordinated through the State Counsel of Civil Defense (SCCD), with ORH being the primary agency involved. In all other emergencies, ORH under the authority of its Director, would coordinate all activities at the TMI site. ORH stated that around-the-clock coverage is provided at present through SCCD. ORH stated that SCCD provides a 24-hour duty officer and that calls received by this officer would be relayed to ORH for action. ORH stated that all notification procedures and associated criteria utilized to implement those procedures had been reviewed and final details of notification were resolved with the licensee.

ORH stated that a representative of that agency would normally require from one to two hours to reach the TMI site depending on the time of day at which the emergency was initiated. ORH also stated, however, that this time would be reduced greatly if the State Police helicopter were utilized. ORH stated that the

the operational center in the event of an emergency at the TMI site would be the Civil Defense Headquarters located in Harrisburg, Pennsylvania. The primary communications network utilized would be the standard State Police and Civil Defense System.

From the standpoint of authority to order protective measures such as evacuation, the representative of ORH stated that they could only recommend evacuation but that the actual authority rested with SCCD, the Department of Environmental Resources, and the Governor.

ORH stated that they could utilize State Police to conduct local evacuations if conditions warrant it, although their primary responsibility was one of recommendation. ORH stated that no formal drills had been conducted with the licensee to date but that ORH has responded to several emergency situations in the past in relation to other incidents at various locations within the state. The representative from ORH expressed a desire to attend and observe the full scale emergency drill scheduled at the TMI site prior to the licensing of TMI Unit No. 1.

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