UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

SEP 11 1979

MEMORANDUM FOR: Jack Roe, Team Leader, NRR Emergency Planning Site Review Group

FROM: George H. Smith, Chief, FFMSB, R1

SUBJECT: COMMENTS ON THREE MILE ISLAND EMERGENCY PLAN AND IMPLEMENTING PROCEDURES

Enclosed per your request are comments on the Three Mile Island Emergency Plan and Implementing Procedures. We strongly believe that these comments must be addressed during the site visit if the response capability upgrading objective is to be met effectively.

George H. Smith
George H. Smith
Chief, FFMSB

Encl
as stated

cc
J. Shiezak

EMERGENCY PLAN - Appendix 13A, Am 65 (5-11-78) of FSAR

General

1. Page 13A-4, General Emergency Conditions. What plant operating conditions (operational parameters) would be indicative of a general emergency?

2. What is the basis for the equivalent of 6.8 E-3 μCi/cc on the liquid effluent radiation monitor as being a general emergency? Does RML-7 read out in μCi/cc? If not, what monitor reading would be equivalent to 6.8 E-3 μCi/cc?

3. What is the significance of >125 mR/hr at the site boundary relative to a general emergency, i.e., what assumptions are made regarding this value in selecting it as indicative of a general emergency? What duration of release is considered, if at all?

4. Page 13A-4, General Emergency, Possible Actions. Under what conditions would offsite monitoring be performed/not be performed?

5. Page 13A-3, Site Emergency, Possible Actions. Why isn't offsite monitoring listed as a possible action?

6. Page 13A-5, para 2.2. What are the projected in-plant consequences of the events listed in the Spectrum of Accidents?

7. Why is Appendix 13A of the FSAR also distributed as another document, i.e., Section 2 of AP 1004?

8. How are changes to Section 2 of AP 1004 incorporated into Appendix 13A of the FSAR? Is there any time lag?

9. When audits of the emergency plan are performed, are the audits performed against Appendix 13A or against Section 2 of AP 1004?

10. Are changes to Appendix 13A and/or Section 2 of AP 1004 reviewed per 10 CFR 50.59 prior to implementation? How are such reviews documented?

11. How and when are changes to Appendix 13A reported to the Commission in accordance with 10 CFR 50.59?

12. Para. 3.1.2, Accident Assessment Personnel. Does accident assessment include assessment of in-plant radiological conditions? If so, by whom? How?

13. Of the accident assessment personnel listed, what are the areas of accident assessment of each? Are the "assignments" meant to indicate lead responsibility? If so, who works for them to gather the data/information?

14. Para 3.1.3. Can the RMI also perform decontamination as well as supervise?

15. The Repair Party Team is composed of Shift Maintenance personnel. Which individuals possess the skills needed to perform operational related activities/corrective actions and under whose direction, control and authority do they operate?

16. Para 3.1.2. The Shift Supervisor is an alternate for 3 positions. Is this a feasible approach considering the nature of the 3 potential duties and the nature of a backshift response?

17. Para 3.1.2. There is no Chemistry Supervisor at TMI. What is the correct title of the individual(s) who can assume these duties? What are the duties?

18. Para 4.2.1, first paragraph, next-to-last sentence. What is a "Unit" emergency? It is not defined as a category of emergency elsewhere in the emergency plan.

19. Para 4.2.2. What type of TLDs are used for this and how many are on site at the perimeter and at offsite locations?

20. Para 4.4.2. Who may authorize the acceptance of an emergency exposure? What conditions must exist to indicate that the need for a particular action in fact should be considered as an emergency action?

21. Para 4.4.2. Where are the offsite decontamination facilities located? Are they equipped for vehicular and personnel decontamination operations? Is there sufficient communications equipment to use at the locations?

22. Para 4.4.5. What is the response time of RMC to provide these services? Is the response time rapid enough to consider the support?

23. Para 5.3. How/what equipment will be transported to the observation center? How long would the transport take? How is the center equipped with communications equipment?

24. Para 5.4. Does the telephone system require an operator to handle multiple calls?

25. Para 5.5.1. Is the met tower vital powered? Are there backup provisions for representative meteorological information?

26. Para 5.5.4. What two vehicles are readily available? Are they always onsite? Where are the keys kept?

27. Para 5.5.4. Are laboratory facilities and spare TLDs readily available?

28. Para 5.6. How familiar are shift maintenance personnel with the facility and various procedures related to operation of systems and their locations?

29. Are they required to participate in training or drills?

30. Para 6.1.1.3. What is a "periodic examination or assignment"? How are the weaknesses defined and identified? If different instructors are used each time, how are weaknesses called to the attention of the next instructor to insure that the weakness is addressed in the training.

31. What does it mean that "lesson plans will be provided"?

32. Para 7.2. Who specifies that a particular action is considered emergency in nature? What if the individual in charge does not have an HP background?

33. The title of Para 7.3 is reentry. This paragraph seems to imply that no reentry will be made until recovery has been entered. How and by whom is access controlled and exposures documented during the emergency?

34. The emergency plan should describe the Metropolitan Edison, GPU and GPUSC positions which will interface with and support the site emergency organization. The general authorities and responsibilities of these positions in relation to the site emergency organization should be specified.

35. The site emergency organization should contain an element for logistical support, i.e., manpower and equipment, and provide for continuous 24 hour per day emergency operations.

36. Para 2.2.2. What dose rates under worse case meteorology, are calculated to be equal to the full range of RMA8, HP-R-214, HP-R-219? Do these procedures also provide for dose rate calculations at the LPZ and nearest resident?

37. What is the objective of initial backshift response?

38. Para 6.1.2.5. How/who makes changes to procedures and the plan that occur before the annual review? How are personnel apprised of changes? Are telephone numbers (procedures) only updated based on drills and training classes?

39. What provisions exist for inventorying and operationally checking emergency equipment?

40. Para 8.0. How are these agreements updated?

41. What provisions (other than drills) are there for auditing the emergency planning program.

42. Para 7.3, last sentence. Access must be documented.

43. What general types of radiological assessment/protective instrumentation and supplies are available?

EMERGENCY PLAN IMPLEMENTING PROCEDURES

General Comments

The IMI emergency plan implementing procedures are too general in approach. The philosophy has been that "you can't put everything in a procedure" and that "our people are trained in the details and do surveys, etc. every day."

While procedures should not be overly detailed, they must highlight the important details so that the user may refer back to the procedure if he is unsure of what to do.

There is a certain amount of unnecessary introductory material in the procedures that is of a philosophical nature. This type of information is best placed in the plan and not in a procedure.

Procedure 1670.1

Para	Comment/Question
3.1	Are the "monitors" area monitors? process monitors? or both?
3.2	What is a "significant increase"?
3.3	There is an * after the word spill. What does it mean?
4.1.3	Who would be notified if a backshift, holiday, weekend or other period when there is no Rad Protection Foreman/ Supervisor present onsite?
4.2.2	Since it is assumed that operations personnel will be following the procedures in paragraph 4.2, why isn't the basic text of the announcement included in the procedure? Where should people assemble if the ECS is the affected area?
4.3.1	The appropriate procedures should be referenced. Under whose direction?
4.4.1	Should reference the "On-Site Medical Emergency Procedure," 1670.11.

Procedure 1670.2

3.1	What monitor readings constitute 100 times the set points for RMA8 and HP-R-219? Is the "set point" referred to the alert or alarm set point? Is there an alarm associated with the 100 times value? To what site boundary/LPZ dose rates do these values correspond?

3.2	What is the significance of 125 mR/hr? Does this mean exactly 125 mR/hr or can it be 124 mR/hr? Shouldn't there be a range since paragraph 3.2 of procedure 1610.3 specifies action level of >125 mR/hr? Are these values β, βγ or γ? Are there different levels if the dose rate is due to β radiation? Why are they only at the security fence?
3.3	What is considered to be a "loss of primary coolant pressure"? How is the control room made aware of "high reactor building sump level"? What is considered to be "high" reactor building pressure?
	What projected dose(s)/dose rate(s) or nuclide air concentrations (and at what locations) constitute a Site emergency?
	What other operational parameters, i.e., process radiation monitors may be indicative of a site emergency?
4.1.4 4.1.6	Who performs these communications activities? How do they record the results of the notification effort?
4.1.7	Who?
4.1.8	Who?
4.1.9	Aren't the teams dispatched by personnel in the ECS?
4.1.10	When is it necessary? Who notifies GPU?
4.1.13	Why not evacuate non-essential personnel as a matter of course and get them out of the plant? This will eliminate the need to devote valuable HP resources to monitoring assembly areas and "keep track" of conditions and people.
4.2	Accident Assessment Personnel - In this whole section, operations personnel are not directed to assess the potential for a release or evaluate the anticipated duration of a release which may be occurring.
4.2.1.5	Auxiliary Operators are directed to assume duties on the Emergency Repair Party. Would they be repair party monitors or would they be assigned to perform operational actions? They are not assigned as repair party team members anywhere else in the plan or procedures and are not trained as repair party team members. (See procedure 1670.9, page 7.0, para 3.1.5.2; Emergency Plan, page 13A-10, para 3.1.6) It is, however, desirable for them to be members of the emergency repair team.

4.2.5.2	How are these readings recorded? Is there a form for this purpose? What is done with data once it is recorded?
4.2.6	Who supervises the in-plant radiological assessment activities and radiation protection program?
4.2.8	There is no Chemistry Supervisor at TMI. Who performs this duty? If he "supervises" the performance of chemistry activities, who actually does the work? With whom does he coordinate and report his activities and manpower needs? Why isn't he included in emergency plan training?
4.2.10.1	Don't they report to the Emergency Control Center?
4.4.1.2	Couldn't there be activities other than repair? How does he determine if repairs are necessary (who does he coordinate with/take direction from)?
4.5.1.3	Announcements do not reflect the correct assembly area locations.
4.6.4	Can this be done with existing security procedures? Are there any contingency procedures for security, accountability, etc.? Functional titles indicative of the emergency duties should be used, i.e., ECS Director rather than Radiation Protection Supervisor, etc.
Emergency Organization, page 11.0	The Radiation Protection Supervisor has too broad a span of control. There is no Chemical Supervisor at TMI. The chart shows the Radiation Protection Supervisor reporting directly to the Emergency Director. No one is shown as working with or for the Supervisor Radiation Protection and Chemistry. No one is shown as working for the Chemistry Supervisor. Radiation Protection Foreman does not have any assigned primary duties in an emergency.

Procedure 16/0.3

3.1	What is the basis for >8 R/hr? Is this an HP-R-214 meter reading value or an actual containment value once the meter reading has been corrected for shielding of the detector?
3.2	What is the basis for selecting >125 mR/hr? This is at the site boundary whereas the value for a site emergency is the security fence. Are they the same? Is this a β, $\beta\gamma$, or γ value?
3.3	What is rationale for >6.8 x 10^{-3} µCi/cc on RML7? Is this a set point?
3.4	Should be greater than or equal to 25 and 5 rem respectively. Is this for an infant, child, or adult?
	What radionuclide concentrations in air constitute a general emergency?
	What if RMAG or HP-R-219 are offscale?
	What operational parameters, if any, would be indicative of a general emergency?
4.1.5	To whom is this recommendation made? Who in the TMI organization is authorized to make the recommendation?
4.2	The duties during a general emergency may not be the same as for a site emergency, particularly in terms of the sequencing of events. Offsite monitoring will probably not be as significant in the initial stages since PAG's may be exceeded before the first results of environmental surveys can be obtained and evaluated.
	Procedure is generally weak.

Procedure 1670.4

4.2	What provisions exist if the tower is inoperable?
4.9.1-4.9.5	Who determines that the listed accidents have occurred? What action levels are indicative of each?
Enclosures 1 and 2	Are the charts for containment source terms applicable to the range of containment pressures up to the pressure upon which the containment leak rates are determined?

Is it feasible to add the containment projected source term to the source term of the vent (especially in Unit 2)?

What about containment/meter readings >12 R/hr?

Pages 22, 23 — What guidance exists for use of these graphs?

Procedure 1670.5

General — Neither this procedure (or any others) address on-site, in-plant radiation surveys.

The GE series survey points are not referenced nor is there a map and data sheet with the procedure.

Functional titles applicable to the emergency organization should be used throughout the procedure.

2.1.2 — If inventories are performed properly on a routine basis and the kit are provided with tamper proof seals, an inventory by the team would not be necessary. This wastes valuable time.

Where is the walkie talkie to be obtained? Why isn't there a radio kept at the ECS?

2.1.3 — How is the monitoring team identified during radio communications? Where does the team get a radio? The procedure only directs them to obtain a radio for the ECS.

A communications check should be performed.

Are operational check of instruments should be performed before departure.

2.1.4 — The procedures for performing the dose rate surveys should be specified and referenced. Data to be recorded should be specified.

3.0 — There should be no basic difference between monitoring during a site or general emergency.

3.2
3.3
3.4
3.5 — These should all be separate procedures with greater detail, to include data sheets and survey methods. These sections relate to procedures 1670.8, 1670.11.

The procedure does not address in-plant surveys.

3.2.1	The instrument type should be specified. Action levels should be specified.
3.3.1	There is also an assembly area at the North Warehouse.
3.3.3	Who determines which washdown area will be used.
3.5.2	By whom? What will they be told? Who can authorize the entry? Who will record the entry and monitor exposure?
3.5.3	How can communications be maintained if individuals are masked?

Procedure 16/0.6

General	Functional titles should be used throughout.
1.0	During a general emergency, the team may not be able to provide assessment information until too late. Radiation levels may be low for a long period as in the case of a 30 day course of accident LOCA. Speed is not always a realistic objective.
2.1.3	Monitoring map and data sheet should be included as part of the procedure. Instruments should be checked for operability prior to departure.
2.1.4	The survey method must be specified, i.e., window open/closed, height above ground, etc.
2.1.6	How is air sampler operated if powerverter does not function?
2.1.8	Is a prefilter used?
2.1.9	15 ft^3 - 4.25 x 10^5 cc, not 5 x 10^5 cc. What is the residence time at this flow rate? What is the MDA? Why no background count?
2.1.15a	Where are the spare TLDs? Are they of the same type? Are they annealed? Who at FCS will analyze the TLDs?
2.1.15d	What types of TLDs are used? Are they available? What does "sufficient" mean?
2.2.2	How are samples marked?

2.2.3	Gross activity? y isotopic?
2.3	This belongs in a separate procedure. This part of the procedure is much too vague. What is done with runoff? What equipment is available? What provisions exist for personnel decontamination? In procedure 1670.5 personnel found to be contaminated are sent to the washdown areas. Is there any communication between the assembly area monitors and washdown area monitors? What are the release levels for personnel? How are survey/decontamination results documented?

Procedure 1670.7

General	This procedure is out of date. See NUREG 0600. Functional titles should be used throughout. No provisions for continued accountability or site access control. No compensatory security measures specified in the event of evacuation of island.
2.7	Who are search and rescue team members?
4.1	This is not a true statement. How will Met-Ed make this recommendation? Who from Met-Ed will make it? To whom will the recommendation be made?

Procedure 1670.8

2.1	The "repair team" should have some members from the operations discipline. Not all actions will be "repair" per se.
2.2	Replace job title, Radiation Protection Supervisor, with a functional emergency organization title.
4.0	The term "should" is used. This would imply that they "may". Who can authorize it?
4.3	By whom?

Procedure 1670.9

Break this into two separate procedures, one for training and one for drills.

3.0	Does the Supervisor of Training really do this? How are weaknesses identified? How can they be corrected? What assurance is there that corrective action is adequate?
3.1.1	This assigns Supervisor Rad Protection/Chemistry as the instructor or his designee. Para 3.0 states that Supervisor of Training assigns instructor. Isn't this contradictory?
3.1.2.2	At the time of an emergency how is it known "who has received the appropriate training? Is a listing of qualified people kept up to date?
3.1.3.1	This team will also perform in-plant assessment (radiological and chemistry) as well as protective functions in the radiation protection area.
3.1.8	Division support is much broader in scope than portrayed here. What Met Ed, GPU, GPUSC people will provide assistance. What will their training consist of? The training should be required - more than just an invitation. Course content for Group 2 Accident Assessment does not reflect their duties. There are no test/assignments, or "hands on" with equipment.
3.5	What about key consultant groups; Porter-Gertz, RMC, PP&L, etc.
4.1.4.1	What qualifications/familiarity do the observers for the areas have to have?
4.1.5.4	Does the Supervisor of Training really do this? Under whose authority are the items tasked? Who follows tasks to completion? Is an end date for completion of the corrective action assigned along with the task?
4.1.5.9	How is this review documented? Who really does the review?
4.2	Why is this drill the responsibility of Supervisor, Radiation Protection and Chemistry?

No critique forms, followup. Why doesn't the same corrective action mechanism exist for medical emergency drills?

4.3 Why is drill administered by SS of Operations? Scenarios are developed without management involvement.

4.3.5 Inadequate. It only lists the participants of that particular drill. Followup is loose.

It is intended that any of the above may be a part of the Site/General Emergency Drill and still meet the requirement?

No observers used for drill other than rad emergency. No critiques, etc.

Procedure 1670.11

No decon guidance or procedure.

Procedure 1670.12

Specify minimum operable. Have spares.

3.3. If it's not complete what time frame is allowed to correct deficiencies?

3.4 Quarterly?

Inventory Checklist

How does person performing the inventory know what procedures are to be in the books and what revisions are current?

CP-100 cartridges - should use CP-200.

What type of TLDs are these and what are they used for?

What is a "high range dosimeter"?

ACTION PLAN FOR PROMPTLY IMPROVING

EMERGENCY PREPAREDNESS (SECY 79-450)

EMERGENCY PREPAREDNESS IMPROVEMENTS

AND COMMITMENTS REQUIRED FOR OPERATING PLANTS AND NEAR TERM OL'S

Provide a implementation schedule for the following items:

Item	Implementation Category[1/]
1. Implement certain short term actions recommended by Lessons Learned task force.	A
2.1.8(a) Post-accident sampling	
Design review complete	A
Preparation of revised procedures	A
Implement plant modifications	B
Description of proposed modification	A
2.1.8(b) High range radioactivity monitors	B
2.1.8(c) Improved in-plant iodine instrumentation	A

Item	Implementation Category[1/]
2. Establish Emergency Operations Center for Federal, State and local Officials.	
(a) Designate location and alternate location and provide communications to plant	A^1
(b) Upgrade Emergency Operations Center in conjunction with in-plant technical support center	B
3. Improve offsite monitoring capability	A^1
4. Conduct test exercises (Federal, State, local, licensee)	
(a) Test of licensees emergency plan	A^1
(b) Test of State emergency plans	A^1
(c) Joint test exercise of emergency plans (Federal, State, local, licensee)	
New OL's	B
All operating plants	within 5 years

[1/] Category A: Implementation prior to OL or by January 1, 1980 (see NUREG-0578)
Category A^1: Implementation prior to OL or by mid 1980.
Category B: Implementation by January 1, 1981.

Additional Staff Questions

Describe the principle and alternative locations for briefing the news media.

Provide a schedule of implementation for upgrading the emergency plan, procedures and equipment.

July 23, 1979

SECY-79-450

For: The Commissioners

Thru: Executive Director for Operations FOR L.V.G

From: Harold R. Denton, Director, Office of Nuclear Reactor Regulation

Subject: ACTION PLAN FOR PROMPTLY IMPROVING EMERGENCY PREPAREDNESS

Purpose: To inform the Commission of the staff's plans to take immediate steps to improve licensee preparedness at all operating power plants and for near-term OL's.

Discussion: While the emergency plans of all power reactor licensees have been reviewed by the staff in the past for conformance to the general provisions of Appendix E to 10 CFR Part 50, the most recent guidance on emergency planning, primarily that given in Regulatory Guide 1.101 "Emergency Planning for Nuclear Power Plants", has not yet been fully implemented by most reactor licensees. Further, there are some additional areas where improvements in emergency planning have been highlighted as particularly significant by the Three Mile Island accident.

The NRR staff plans to undertake an intensive effort over about the next year to improve licensee preparedness at all operating power reactors and those reactors scheduled for an operating license decision within the next year. This effort will be closely coordinated with a similar effort by the Office of State Programs to improve State and local response plans through the concurrence process and Office of Inspection and Enforcement efforts to verify proper implementation of licensee emergency preparedness activities.

The main elements of the staff effort, as listed in Enclosure 1, are as follows:

(1) Upgrade licensee emergency plans to satisfy Regulatory Guide 1.101, with special attention to the development of uniform action level criteria based on plant parameters.

(2) Assure the implementation of the related recommendations of the NRR Lessons Learned Task Force involving instrumentation to follow the course of an accident and relate the information provided by this instrumentation to the emergency plan action levels. This will include instrumentation for post-accident sampling, high range radioactivity monitors, and improved in-plant radioiodine instrumentation. The implementation of the Lessons Learned recommendation on instrumentation for detection of inadequate core cooling will also be factored into the emergency plan action level criteria.

(3) Determine that an Emergency Operations Center for Federal, State and local personnel has been established with suitable communications to the plant, and that upgrading of the facility in accordance with the Lessons Learned recommendation for an in-plant technical support center is underway.

(4) Assure that improved licensee offsite monitoring capabilities (including additional TLD's or equivalent) have been provided for all sites.

(5) Assess the relationship of State/local plans to the licensee's and Federal plans so as to assure the capability to take appropriate emergency actions. Assure that this capability will be extended to a distance of 10 miles as soon as practical, but not later than January 1, 1981. This item will be performed in conjunction with the Office of State Programs and the Office of Inspection and Enforcement.

(6) Require test exercises of approved Emergency Plans (Federal, State, local, licensees), review plans for such exercises, and participate in a limited number of joint exercises. Tests of licensee plans will be required to be conducted as soon as practical for all facilities and before reactor startup for new licensees. Exercises of State plans will be performed

in conjunction with the concurrence reviews of the Office of State Programs. Joint test exercises involving Federal, State, local and licensees will be conducted at the rate of about 10 per year, which would result in all sites being exercised once each five years.

The staff review will be accomplished by about 6 review teams, similar to the concept used to assure suitable implementation of the physical security provisions of 10 CFR 73.55. As a minimum, the teams will consist of a team leader from NRR, a member from Los Alamos Scientific Lab (LASL) and, at least for field visits, a member from the IE Regional office. LASL will be used as the source of non-NRC team members because of the expertise gained and familiarity with the plants acquired during the physical security reviews. The Division of Operating Reactors will have the responsibility for completing these reviews for both operating reactors and near-term OL's. J. R. Miller, Assistant Director, DOR will be responsible for implementation of the program. General policy and technical direction will be provided by Brian Grimes, Assistant Director, DOR.

The first sites to be reviewed by the teams will be those scheduled for operating licenses within the next year and those sites in areas of relatively high population. Major milestones for the program are being developed and will include regional meetings with licensees to discuss the program, site visits by the review team, and meetings with local officials.

Coordination: This action plan has been discussed with the Task Force on Emergency Planning and the Task Force Chairman, T. F. Carter, has advised that the Task Force deliberations to date have indicated no reason why NRR should not proceed. The Office of State Programs concurs in this plan. The Office of Inspection and Enforcement concurs in the plan.

NRR expects to perform this task without augmentation of resources beyond those authorized for FY79 and FY80.

Harold R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosure:
Emergency Preparedness Improvements
for Operating Plants and Near
Term OL's

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ENCLOSURE NO. 1

EMERGENCY PREPAREDNESS IMPROVEMENTS AND COMMITMENTS REQUIRED FOR OPERATING PLANTS AND NEAR TERM OL'S

Item	Implementation Category 1/
1. Upgrade emergency plans to Regulatory Guide 1.101 with special attention to action level criteria based on plant parameters.	A[1]
2. Implement certain short term actions recommended by Lessons Learned task force and use these in action level criteria. 2/	
2.1.8(a) Post-accident sampling	
Design review complete	A
Preparation of revised procedures	A
Implement plant modifications	B
Description of proposed modification	A
2.1.8(b) High range radioactivity monitors	B
2.1.8(c) Improved in-plant iodine instrumentation	A
3. Establish Emergency Operations Center for Federal, State and local Officials	
(a) Designate location and alternate location and provide communications to plant	A[1]
(b) Upgrade Emergency Operations Center in conjunction with in-plant technical support center	B

1/
Category A: Implementation prior to OL or by January 1, 1980 (see NUREG-0578).
Category A1: Implementation prior to OL or by mid-1980.
Category B: Implementation by January 1, 1981.

2/
The implementation of the Lessons Learned task force recommendation item 2.1.8(b), instrumentation for detection of inadequate core cooling, will also be factored into the action level criteria.

Item	Implementation Category
4. Improve offsite monitoring capability	A[1]
5. Assure adequacy of State/local plans	
(a) Against current criteria	A[1]
(b) Against upgraded criteria	B
6. Conduct test exercises (Federal, State, local, licensee)	
(a) Test of licensees emergency plan	A[1]
(b) Test of State emergency plans	A[1]
(c) Joint test exercise of emergency plans (Federal, State, local, licensee)	
New OL's	B
All operating plants	Within 5 years

BASIS FOR EMERGENCY ACTION LEVELS FOR NUCLEAR POWER FACILITIES

This document is provided for interim use during the initial phases of the NRC effort to promptly improve emergency preparedness at operating nuclear power plants. Changes to the document can be expected as experience is gained in its use and public comments are received. Further, the Commission has initiated a rulemaking procedure, now scheduled for completion in January 1980 in the area of Emergency Planning and Preparedness. Additional requirements are to be expected when rulemaking is completed and some modifications to this document may be necessary.

Four classes of Emergency Action Levels are established which replace the classes in Regulatory Guide 1.101, each with associated examples of initiating conditions. The classes are:

Notification of Unusual Event

Alert

Site Emergency

General Emergency

The rationale for the notification and alert classes is to provide early and prompt notification of minor events which could lead to more serious consequences given operator error or equipment failure or which might be indicative of more serious conditions which are not yet fully realized. A gradation is provided to assure fuller response preparations for more serious indicators. The site emergency class reflects conditions where some significant releases are likely or are occurring but where a core melt situation is not indicated based on current information. In this situation full mobilization of emergency personnel in the near site environs is indicated as well as dispatch of monitoring teams and associated communications. The general emergency class involves actual or imminent substantial core degradation or melting with the potential for loss of containment. The immediate action for this class is sheltering (staying inside) rather than evacuation until an assessment can be made that (1) an evacuation is indicated and (2) an evacuation, if indicated, can be completed prior to significant release and transport of radioactive material to the affected areas.

The example initiating conditions listed after the immediate actions for each class are to form the basis for establishment by each licensee of the specific plant instrumentation readings which, if exceeded, will initiate the emergency class.

Some background information on release potential and expected frequencies for the various classes is provided in this material. Note that there is a wide band of uncertainty associated with the frequency estimates. The release potential given reflects the amount that could be released over a long time period or under favorable meteorological conditions without exceeding the exposure criteria of a more severe class. Release of these amounts in a short time period under unfavorable meteorological dispersion conditions might trigger the criteria of a more severe class.

Class

Notification of unusual event

Class Description

Unusual events are in process or have occurred which indicate a potential degradation of the level of safety of the plant.

Purpose

Purpose of offsite notification is to (1) assure that the first step in any response later found to be necessary has been carried out, (2) provide current information on unusual events, and (3) provide a periodic unscheduled test of the offsite communication link.

Release Potential

No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Expected Frequency

Once or twice per year per unit.

Licensee Actions

1. Promptly inform State and local offsite authorities of nature of unusual condition as soon as discovered
2. Augment on-shift resources
3. Assess and respond
4. Close out with verbal summary to offsite authorities; followed by written summary within 24 hours

   or

5. Escalate to a more severe class

State and/or Local Offsite Authority Actions

1. Provide fire or security assistance if requested
2. Standby until verbal closeout

   or

3. Escalate to a more severe class

EXAMPLE INITIATING CONDITIONS: NOTIFICATION OF UNUSUAL EVENT

1. ECCS initiated

2. Radiological effluent technical specification limits exceeded

3. Fuel damage indication. Examples:

   a. High offgas at BWR air ejector monitor (greater than 500,000 uci/sec; corresponding to 16 isotopes decayed to 30 minutes; or an increase of 100,000 uci/sec within a 30 minute time period)
   b. High coolant activity sample (e.g., exceeding coolant technical specifications for iodine spike)

   c. Failed fuel monitor (PWR) indicates increase greater than 0.1% equivalent fuel failures within 30 minutes.

4. Abnormal coolant temperature and/or pressure or abnormal fuel temperatures

5. Exceeding either primary/secondary leak rate technical specification or primary system leak rate technical specification

6. Failure of a safety or relief valve to close

7. Loss of offsite power or loss of onsite AC power capability

8. Loss of containment integrity requiring shutdown by technical specifications

9. Loss of engineered safety feature or fire protection system function requiring shutdown by technical specifications (e.g., because of malfunction, personnel error or procedural inadequacy)

10. Fire lasting more than 10 minutes

11. Indications or alarms on process or effluent parameters not functional in control room to an extent requiring plant shutdown or other significant loss of assessment or communication capability (e.g., plant computer, all meteorological instrumentation)

12. Security threat or attempted entry or attempted sabotage

13. Natural phenomenon being experienced or projected beyond usual levels

    a. Any earthquake

    b. 50 year flood or low water, tsunami, hurricane surge, seiche

    c. Any tornado near site

    d. Any hurricane

14. Other hazards being experienced or projected

    a. Aircraft crash on-site or unusual aircraft activity over facility

    b. Train derailment on-site

    c. Near or onsite explosion

    d. Near or onsite toxic or flammable gas release

    e. Turbine failure

15. Other plant conditions exist that warrant increased awareness on the part of State and/or local offsite authorities or require plant shutdown under technical specification requirements or involve other than normal controlled shutdown (e.g., cooldown rate exceeding technical specification limits, pipe cracking found during operation)

16. Transportation of contaminated injured individual from site to offsite hospital

17. Rapid depressurization of PWR secondary side.

Class

Alert

Class Description

Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant.

Purpose

Purpose of offsite alert is to (1) assure that emergency personnel are readily available to respond if situation becomes more serious or to perform confirmatory radiation monitoring if required, (2) provide offsite authorities current status information, and (3) provide possible unscheduled tests of response center activation.

Release Potential

Limited releases of up to 10 curies of I-131 equivalent or up to 10^4 curies of Xe-133 equivalent.

Expected Frequency

Once in 10 to 100 years per unit.

Licensee Actions

1. Promptly inform State and/or local authorities of alert status and reason for alert as soon as discovered
2. Augment resources by activating on-site technical support center, on-site operations center and near-site emergency operations center (EOC)
3. Assess and respond
4. Dispatch on-site monitoring teams and associated communications
5. Provide periodic plant status updates to offsite authorities (at least every 15 minutes)
6. Provide periodic meteorological assessments to offsite authorities and, if any releases are occurring, dose estimates for actual releases
7. Close out by verbal summary to offsite authorities followed by written summary within 8 hours

or

8. Escalate to a more severe class

State and/or Local Offsite Authority Actions

1. Provide fire or security assistance if requested
2. Augment resources by activating near-site EOC and any other primary response centers
3. Alert to standby status key emergency personnel including monitoring teams and associated communications
4. Provide confirmatory offsite radiation monitoring and ingestion pathway dose projections if actual releases substantially exceed technical specification limits
5. Maintain alert status until verbal closeout

or

6. Escalate to a more severe class

EXAMPLE INITIATING CONDITIONS: ALERT

1. Severe loss of fuel cladding

   a. High offgas at BWR air ejector monitor (greater than 5 ci/sec; corresponding to 16 isotopes decayed 30 minutes)

   b. Very high coolant activity sample (e.g., 300 uci/cc equivalent of I-131)

   c. Failed fuel monitor (PWR) indicates increase greater than 1% fuel failures within 30 minutes or 5% total fuel failures.

2. Rapid gross failure of one steam generator tube with loss of offsite power

3. Rapid failure of more than 10 steam generator tubes (e.g., several hundred gpm primary to secondary leak rate)

4. Steam line break with significant (e.g., greater than 10 gpm) primary to secondary leak rate or MSIV malfunction

5. Primary coolant leak rate greater than 50 gpm

6. High radiation levels or high airborne contamination which indicate a severe degradation in the control of radioactive materials (e.g., increase of factor of 1000 in direct radiation readings)

7. Loss of offsite power and loss of all onsite AC power

8. Loss of all onsite DC power

9. Coolant pump seizure leading to fuel failure

10. Loss of functions needed for plant cold shutdown

11. Failure of the reactor protection system to initiate and complete a scram which brings the reactor subcritical

12. Fuel damage accident with release of radioactivity to containment or fuel handling building

13. Fire potentially affecting safety systems

14. All alarms (annunciators) lost

15. Radiological effluents greater than 10 times technical specification instantaneous limits (an instantaneous rate which, if continued over 2 hours, would result in about 1 mr at the site boundary under average meteorological conditions)

16. Ongoing security compromise

17. Severe natural phenomena being experienced or projected

    a. Earthquake greater than OBE levels

    b. Flood, low water, tsunami, hurricane surge, seiche near design levels

    c. Any tornado striking facility

    d. Hurricane winds near design basis level

18. Other hazards being experienced or projected

    a. Aircraft crash on facility

    b. Missile impacts from whatever source on facility

    c. Known explosion damage to facility affecting plant operation

    d. Entry into facility environs of toxic or flammable gases

    e. Turbine failure causing casing penetration

19. Other plant conditions exist that warrant precautionary activation of technical support center and near-site emergency operations center

20. Evacuation of control room anticipated or required with control of shutdown systems established from local stations

Class

Site Emergency

Class Description

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public.

Purpose

Purpose of the site emergency warning is to (1) assure that response centers are manned, (2) assure that monitoring teams are dispatched, (3) assure that personnel required for evacuation of near-site areas are at duty stations if situation becomes more serious, (4) provide current information for and consultation with offsite authorities and public, and (5) provide possible unscheduled test of response capabilities in U. S.

Release Potential

Releases of up to 1000 ci of I-131 equivalent or up to 10^6 ci of Xe-133 equivalent.

Expected Frequency

Once in one hundred to once in 5000 years per unit.

Licensee Actions

1. Promptly inform State and/or local offsite authorities of site emergency status and reason for emergency as soon as discovered.
2. Augment resources by activating on-site technical support center, on-site emergency operations center and near-site emergency operations center (EOC)
3. Assess and respond
4. Dispatch on-site and offsite monitoring teams and associated communications
5. Provide a dedicated individual for plant status updates to offsite authorities and periodic press briefings (perhaps joint with offsite authorities)
6. Make senior technical and management staff onsite available for consultation with NRC and State on a periodic basis
7. Provide meteorological and dose estimates to offsite authorities for actual releases via a dedicated individual or automated data transmission
8. Provide release and dose projections based on available plant condition information and foreseeable contingencies
9. Close out or recommend reduction in emergency class by briefing of offsite authorities at EOC and by phone followed by written summary within 8 hours

or

10. Escalate to general emergency class

State and/or Local Offsite Authority Actions

1. Provide any assistance requested
2. Activate immediate public notification of emergency status and provide public periodic updates
3. Augment resources by activating near-site EOC and any other primary response centers
4. Dispatch key emergency personnel including monitoring teams and associated communications
5. Alert to standby status other emergency personnel (e.g., those needed for evacuation) and dispatch personnel to near-site duty stations
6. Provide offsite monitoring results to licensee and others and jointly assess them
7. Continuously assess information from licensee and offsite monitoring with regard to changes to protective actions already initiated for public and mobilizing evacuation resources
8. Recommend placing milk animals within 2 miles on stored feed and assess need to extend distance
9. Provide press briefings, perhaps with licensee
10. Maintain site emergency status until closeout or reduction of emergency class

or

11. Escalate to general emergency class

EXAMPLE INITIATING CONDITIONS: SITE EMERGENCY

1. Known loss of coolant accident greater than makeup pump capacity

2. Degraded core with possible loss of coolable geometry (indicators should include instrumentation to detect inadequate core cooling, coolant activity and/or containment radioactivity levels)

3. Rapid failure of more than 10 steam generator tubes with loss of offsite power

4. BWR steam line break outside containment without isolation

5. PWR steam line break with greater than 50 gpm primary to secondary leakage and indication of fuel damage

6. Loss of offsite power and loss of onsite AC power for more than 15 minutes

7. Loss of all vital onsite DC power for more than 15 minutes

8. Loss of functions needed for plant hot shutdown

9. Major damage to spent fuel in containment or fuel handling building (e.g., large object damages fuel or water loss below fuel level)

10. Fire affecting safety systems

11. All alarms (annunciators) lost for more than 15 minutes and plant is not in cold shutdown or plant transient initiated while all alarms lost

12. a. Effluent monitors detect levels corresponding to greater than 50 mr/hr for 1/2 hour or greater than 500 mr/hr W.B. for two minutes (or five times these levels to the thyroid) at the site boundary for adverse meteorology

    b. These dose rates are projected based on other plant parameters (e.g., radiation level in containment with leak rate appropriate for existing containment pressure) or are measured in the environs

13. Imminent loss of physical control of the plant

14. Severe natural phenomena being experienced or projected with plant not in cold shutdown

    a. Earthquake greater than SSE levels

    b. Flood, low water, tsunami, hurricane surge, seiche greater than design levels or failure of protection of vital equipment at lower levels

    c. Winds in excess of design levels

15. Other hazards being experienced or projected with plant not in cold shutdown

    a. Aircraft crash affecting vital structures by impact or fire

    b. Severe damage to safe shutdown equipment from missiles or explosion

    c. Entry of toxic or flammable gases into vital areas

16. Other plant conditions exist that warrant activation of emergency centers and monitoring teams and a precautionary public notification

17. Evacuation of control room and control of shutdown systems not established from local stations in 15 minutes

Class

General Emergency

Class Description

Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.

Purpose

Purpose of the general emergency warning is to (1) initiate predetermined protective actions for public, (2) provide continuous assessment of information from licensee and offsite measurements, (3) initiate additional measures as indicated by event releases or potential releases, and (4) provide current information for and consultation with offsite authorities and public.

Release Potential

Releases of more than 1000 ci of I-131 equivalent or more than 10^6 ci of Xe-133 equivalent.

Expected Frequency

Less than once in about 5000 years per unit. Life threatening doses offsite (within 10 miles) once in about 100,000 years per unit.

Licensee Actions

1. Promptly inform State and/or local offsite authorities of general emergency status and reason for emergency as soon as discovered (Parallel notification of State/local)
2. Augment resources by activating on-site technical support center, on-site emergency operations center and near-site emergency operations center (EOC)
3. Assess and respond
4. Dispatch on-site and offsite monitoring teams and associated communications
5. Provide a dedicated individual for plant status updates to offsite authorities and periodic press briefings (perhaps joint with offsite authorities)
6. Make senior technical and management staff onsite available for consultation with NRC and State on a periodic basis.
7. Provide meteorological and dose estimates to offsite authorities for actual releases via a dedicated individual or automated data transmission
8. Provide release and dose projections based on available plant condition information and foreseeable contingencies
9. Close out or recommend reduction of emergency class by briefing of offsite authorities at EOC and by phone followed by written summary within 8 hours

State and/or local Offsite Authority Actions

1. Provide any assistance requested
2. Activate immediate public notification of emergency status and provide public periodic updates
3. Recommend sheltering for 2 mile radius and 5 miles downwind and assess need to extend distances
4. Augment resources by activating near-site EOC and any other primary response centers
5. Dispatch key emergency personnel including monitoring teams and associated communications
6. Dispatch other emergency personnel to duty stations within 5 mile radius and alert all others to standby status
7. Provide offsite monitoring results to licensee and others and jointly assess these
8. Continuously assess information from licensee and offsite monitoring with regard to changes to protective actions already initiated for public and mobilizing evacuation resources
9. Recommend placing milk animals within 10 miles on stored feed and assess need to extend distance
10. Provide press briefings, perhaps with licensee
11. Consider relocation to alternate EOC if actual dose accumulation in near-site EOC exceeds lower bound of EPA PAGs
12. Maintain general emergency status until closeout or reduction of emergency class

EXAMPLE INITIATING CONDITIONS: GENERAL EMERGENCY

1. a. Effluent monitors detect levels corresponding to 1 rem/hr W.B. or 5 rem/hr thyroid at the site boundary under actual meteorological conditions

   b. These dose rates are projected based on other plant parameters (e.g., radiation levels in containment with leak rate appropriate for existing containment pressure with some confirmation from effluent monitors) or are masured in the environs.

   Note: Consider evacuation only within about 2 miles of the site boundary unless these levels are exceeded by a factor of 10 or projected to continue for 10 hours

2. Loss of 2 of 3 fission product barriers with a potential loss of 3rd barrier, (e.g., loss of core geometry and primary coolant boundary and high potential for loss of containment).

   Note: Consider 2 mile precautionary evacuation. If more than gap activity released, extend this to 5 miles downwind.

3. Loss of physical control of the facility.

   Note: Consider 2 mile precautionary evacuation.

4. Other plant conditions exist, from whatever source, that make release of large amounts of radioactivity in a short time period possible, e.g., any core melt situation. See the specific PWR and BWR sequences.

   Notes: a. For sequences where significant releases are not yet taking place and large amounts of fission products are not yet in the containment atmosphere, consider 2 mile precautionary evacuation. Consider 5 mile downwind evacuation (45° to 90° sector) if large amounts of fission products are in the containment atmosphere. Recommend sheltering in other parts of the plume exposure Emergency Planning Zone under this circumstance.

   b. For sequences where significant releases are not yet taking place and containment failure leading to a direct atmospheric release is likely in the sequence but not imminent and large amounts of fission products in addition to noble gases are in the containment atmosphere, consider precautionary evacuation to 5 miles and 10 mile downwind evacuation (45° to 90° sector).

   c. For sequences where large amounts of fission products other than noble gases are in the containment atmosphere and containment failure is judged imminent, recommend shelter for those areas where evacuation cannot be completed before transport of activity to that location.

d. As release information becomes available adjust these actions in accordance with dose projections, time available to evacuate and estimated evacuation times given current conditions.

EXAMPLE PWR SEQUENCES

1. Small and large LOCA's with failure of ECCS to perform leading to severe core degradation or melt. Ultimate failure of containment likely for melt sequences. (Several hours available for response)

2. Transient initiated by loss of feedwater and condensate systems (principal heat removal system) followed by failure of emergency feedwater system for extended period. Core melting possible in several hours. Ultimate failure of containment likely if core melts.

3. Transient requiring operation of shutdown systems with failure to scram. Core damage for some designs. Additional failure of core cooling and makeup systems would lead to core melt.

4. Failure of offsite and onsite power along with total loss of emergency feedwater makeup capability for several hours. Would lead to eventual core melt and likely failure of containment.

5. Small LOCA and initially successful ECCS. Subsequent failure of containment heat removal systems over several hours could lead to core melt and likely failure of containment.

NOTE: Most likely containment failure mode is meltthrough with release of gases only for dry containment; quicker and larger releases likely for ice condenser containments for melt sequences or for failure of containment isolation system for any PWR.

EXAMPLE BWR SEQUENCES

1. Transient (e.g., loss of offsite power) plus failure of requisite core shut down systems (e.g., scram or standby liquid control system). Could lead to core melt in several hours with containment failure likely. More severe consequences if pump trip does not function.

2. Small or large LOCA's with failure of ECCS to perform leading to core melt degradation or melt. Loss of containment integrity may be imminent.

3. Small or large LOCA occurs and containment performance is unsuccessful affecting longer term success of the ECCS. Could lead to core degradation or melt in several hours without containment boundary.

4. Shutdown occurs but requisite decay heat removal systems (e.g., RHR) or non-safety systems heat removal means are rendered unavailable. Core degradation or melt could occur in about ten hours with subsequent containment failure.

5. Any major internal or external events (e.g., fires, earthquakes, etc.) which could cause massive common damage to plant systems resulting in any of the above.

File
TMI-1
Startup

MEETING SUMMARY DISTRIBUTION: METROPOLITAN EDISON COMPANY
EMERGENCY PLANNING FOR TMI-1
SEPTEMBER 24-27, 1979

Docket No. 50-289
NRC PDR
Local PDR
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