PART 925—GRAPES GROWN IN A DESIGNATED AREA OF SOUTHEASTERN CALIFORNIA

1. The authority citation for 7 CFR part 925 continues to read as follows:

Authority: Secs. 1–19, 48 Stat. 31, as amended; 7 U.S.C. 601–674.

2. A new § 925.209 is added to read as follows:

§ 925.209 Expenses and assessment rate.

Expenses of $27,825 by the California Desert Grape Administrative Committee are authorized, and an assessment rate of $0.003 per 22-pound container of grapes is established for the fiscal period ending December 31, 1990. Unexpended funds may be carried over as a reserve.

Dated: February 13, 1990.

Robert C. Keeney,

Deputy Director, Fruit and Vegetable Division.

[FR Doc. 90–3702 Filed 2–15–90; 8:45 am]

BILLING CODE 3410–02–M

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 50 and 70

[Docket Nos. PRM–50–31, PRM–50–45, and PRM–50–46]

Emergency Preparedness at Nuclear Power Plants; Denial of Petitions for Rulemaking

AGENCY: Nuclear Regulatory Commission.

ACTION: Denial of petitions for rulemaking.

SUMMARY: The Nuclear Regulatory Commission is denying three petitions for rulemaking concerning emergency preparedness at nuclear power plants. These petitions were submitted by the Citizens Task Force of Chapel Hill, North Carolina; the Department of Attorney General, State of Maine; and an individual, Kenneth G. Sexton, Ph.D. The Citizens Task Force petition (PRM–50–31) requested that (1) the emergency planning zone radius around nuclear power plants be extended from 10 miles to 20 miles, (2) independent radiological monitoring systems operated by local communities be established, and (3) mandatory utility funding of the emergency preparedness efforts of local communities be required. The petition submitted by Mr. Sexton (PRM–50–45) requested that the size of the plume exposure pathway EPZ be determined on a site-specific basis, using the most up-to-date methodologies and that the size of the EPZ be reevaluated at least every five years. The petition submitted by the State of Maine (PRM–50–46) requested (1) expansion of the emergency planning zone for both plume exposure pathway and for the ingestion pathway; (2) requiring that emergency planning be done before any construction of a nuclear facility is permitted and that the governor or governors of any affected state approve the emergency plans as a precondition to construction; and (3) requiring that offsite emergency preparedness findings be made before any fuel loading or low power operations are permitted.

The Commission considers that these three petitions have a common theme thus warranting simultaneous evaluation. Additionally, the State of Maine formally requested that ". . . the Maine Petition consolidated with the so-called Sexton Petition . . ." In denying the petitions, the Commission concludes that its present regulations on emergency preparedness are adequate to protect public health and safety.

ADDRESSES: Copies of all NRC documents are available for public inspection and copying for a fee at the NRC Public Document Room at 2120 L Street NW. (Lower Level), Washington, DC. Copies of NUREG documents may be purchased from the Superintendent of Documents, U.S. Government Printing Office by calling (202) 275–2060 or by writing to the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013–7082. Copies are also available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

FOR FURTHER INFORMATION CONTACT: Michael T. Jamgochian, Severe Accident Issues Branch, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555 (301–492–3918).

SUPPLEMENTARY INFORMATION:

PRM–50–31: A petition filed before the Commission on December 21, 1981 by the Citizens Task Force of Chapel Hill, NC, requested the Commission to amend its emergency preparedness regulations in 10 CFR part 50, "Domestic Licensing of Production and Utilization Facilities," and part 70, "Domestic Licensing of Special Nuclear Material." The petition requested the Commission to amend the regulations to require that the present 10-mile emergency planning zone (EPZ) radius for nuclear power plants be extended from 10 miles to 20 miles and include any towns bordering on or partially within this EPZ, that towns within the EPZ with a population in excess of 5,000 persons operate their own radiological monitoring equipment, and that utilities be required to finance the emergency preparedness efforts of the towns around the nuclear power plants.

A notice of filing the petition, Docket No. PRM–50–31, was published in the **Federal Register** on March 24, 1982 (47 FR 12639). Public comments were requested by May 24, 1982. The comment period was extended to March 9, 1987 (51 FR 40335; November 6, 1986).

A total of 74 comment letters were received. Twenty-three of the letters were from individuals, of whom 15 favored the petition and eight opposed it. Thirteen letters were from environmental, nuclear, or energy oriented citizen activist groups. Of these, 12 favored the petition and one opposed it. Twenty-nine letters were from utilities, their law firms, or other companies associated with the nuclear industry. All 29 opposed the petition. Seven letters were received from state or local emergency preparedness agencies. All seven opposed the petition. A letter from a political club and a letter from a county commission were received, both favored the petition.

PRM–50–45: A petition filed before the Commission on August 6, 1986 by Mr. Kenneth G. Sexton, requested the Commission to amend its emergency preparedness regulations in 10 CFR part 50, "Domestic Licensing of Production and Utilization Facilities." The petition requested the Commission to amend 10 CFR 50.47(c)(2) for nuclear power plants to require that "the plume exposure pathway EPZ for all nuclear power plants shall consist of an area to be determined by the NRC on a site-specific basis, after allowing for review of the determination report by interested parties. The report shall list, describe, and reference all input data and methodologies used and all other factors considered. The NRC shall use methodologies and procedures which are generally accepted as reasonably current and appropriate by recognized professional groups in each supporting field (including the American Meteorology Society (AMS) and Environmental Protection Agency (EPA). Likewise, best available estimates for model input (such as source terms) shall be used. This distance shall be reevaluated at least every five years, using latest techniques and information, unless petitioned earlier by the NRC, another professional group (such as the EPA or AMS), or the general public. Generally, the models shall be at least as complex and realistic as described in NUREG–0654 for Class B models. Meteorological submodels shall

consider all factors which can have an effect on the impact of the release of radioactive materials to the environment. The exact size and configuration of the EPZ surrounding a particular nuclear power reactor shall be determined in relation to local emergency response needs and capabilities as they are affected by such conditions as power plant specifics (type, power output, age, etc.), local meteorology (including data from both the power plant site and local national weather service), demography, topography, land characteristics, access routes, jurisdictional boundaries, and proximity of seats of local government."

A notice of filing of the petition, Docket No. PRM–50–45, was published in the **Federal Register** on October 6, 1986 (51 FR 35518). Public comments were requested by December 5, 1986.

A total of 314 comment letters were received of which 278 favored the petition and 14 opposed it. Two hundred thirty-five of the letters were from individuals. Four letters were from environmental, nuclear, or energy oriented citizen activist groups. Of these, three favored the petition and one opposed it. Ten letters were from utilities, their law firms, or other companies associated with the nuclear industry. All ten opposed the petition. Seven letters were received from local government emergency preparedness agencies, of whom four favored the petition and three opposed the petition.

PRM–50–46: A petition filed before the Commission on October 14, 1986 by the Attorney General, State of Maine, requested the Commission to amend its emergency preparedness regulations in 10 CFR part 50, "Domestic Licensing of Production and Utilization Facilities." The petition requested that the Commission amend 10 CFR 50.47(c)(2) for nuclear power plants to (1) expand both the emergency planning zone for the plume exposure pathway and for the ingestion pathway; (2) require that emergency planning be done before any construction of a nuclear facility is permitted and that the governor or governors of any affected state approve the emergency plans as a precondition to construction; and (3) require that offsite emergency preparedness findings be made before any fuel loading or low power operations are permitted. Subsequently, the State of Maine, Department of the Attorney General, in a letter dated February 13, 1987 requested ". . . that the Maine Petition be consolidated with the so-called Sexton Petition, Docket No. PRM–50–45, 51 **Federal Register** 35518 (October 6, 1986) . . ."

A notice of filing of the petition, Docket No. PRM–50–46, was published in the **Federal Register** on December 30, 1986 (51 FR 47025). Public comments were requested by March 2, 1987.

A total of 37 comment letters were received. Seven of the letters were from individuals, all favoring the petition. Five letters were from environmental, nuclear, or energy oriented citizen activist groups. Of these, four favored the petition and one opposed it. Twenty-two letters were from utilities and law firms. Of these, four favored the petition and sixteen opposed the petition. One letter was received from a state and favored the petition.

Each of the three petitioners requested, among other things, a fundamental change to the NRC emergency planning regulations that would or could change the size of the plume exposure pathway EPZ. Each petitioner provided a different rationale to support its request and many comment letters surfaced additional reasons to either support or oppose the petitioners requests. Sixteen separate issues have been identified in the petition and comments. Issues 1 through 11 focus on this common theme, to change the size of the EPZ, while addressing different rationales. Issues 12 through 16 focus on emergency planning areas of tangential concern. Each issue with accompanying rationale is fully discussed and evaluated followed by a Commission response to that particular concern.

Issue 1. Extend the emergency planning zone radius from 10 miles to 20 miles because the most severe accidents were not adequately considered

The rationale used for expressing the opinion that a 10-mile EPZ is inadequate is that following a core-melt accident which results in an atmospheric release of radiation, large does of radiation could occur outside the 10-mile radius. The petition filed by the Citizens Task Force of Chapel Hill, NC, quoted the joint NRC–FEMA report NUREG–0654.[1]

On the other hand, for the worst possible accidents, protective actions [evacuation of the population] [2] would need to be taken outside the planning zones [of 10 miles]. NUREG–0654 Rev. 1 at 11.

The petitioner argued that the size of the EPZ should be based on the worst-case core meltdown accident stating, "It is disturbing that the evacuation preparedness EPZ zone is limited to 10 miles despite the clear recognition that in a worst-case accident, evacuation would need to be taken outside the zone." The petitioner further argued that evacuation should be taken only to avoid "immediate life threatening doses" but other severe adverse health risks as well.

Several commenters supported the idea that the EPZ should be based on the worst-case accident: an accident involving a core-melt, a major breach of containment resulting in an atmospheric release of large amounts of radioactivity especially during adverse weather conditions. These commenters said that people beyond 10 miles were in danger from such an accident. For example, the Union of Concerned Scientists said:

> Although the NRC alleged in NUREG–0396 [3] that it considered accidents beyond the traditional design basis, the consideration given such accidents was minimal at best.
>
> It is clear that the 10-mile plume EPZ was not directed toward accidents in which the containment fails either concurrently with a core-melt or consequent to a core-melt. It is precisely such accidents which dominate the risks to the public from the operation of nuclear power plants.

Commenters cited large consequences from a severe accident. For example, Pollution and Environmental Problems, Inc., said:

> The Reactor Safety Study [4] estimates that a core-melt could cause 48,000 fatalities; 285,000 non-fatal illnesses and 5,000 genetic injuries. These consequences—as bad as they are—assume that most peole downwind of an accident within a 45 degree sector extending 25 miles from a plant could be evacuated within a few hours. The NRC requires—only a 10-mile evacuation zone—so it must be assumed that NRC is willing to accept a larger number of deaths and injuries than the Reactor Safety Study assumes.

Commission Response to Issue 1

The Commission dealt extensively with the issue of the adequacy of the 10 mile EPZ in the context of severe accidents, in its decision in Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1) CLI–87–12, 26 NRC 383

[1] NUREG–0654, Rev. 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, November 1980.

[2] Note that the words in brackets, (evacuation of the population), were added to the quote by one of the petitioners. The words change the meaning intended in NUREG–0654, wherein protective action includes other actions besides evacuation, such as seeking shelter indoors.

[3] NUREG–0396, Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants, December 1978.

[4] WASH–1400 (also numbered NUREG–75/0014), Reactor Safety Study, often called the "Rasmussen Report" or WASH–1400," October 1975.

(1987). The discussion in that case summarizes the Commission development of the 10 mile EPZ concept and it is appropriate to quote extensively from it in response to the petitions here. The Commission noted that,

For design-basis/loss-of-coolant accidents (DBA/LOCA), the Report [NUREG–0396] concluded, among other things, that for most plants the 25-rem (thyroid) and 5-rem (whole-body) EPA protective action guides [5] would not be exceeded beyond 10 miles from the plant, even using conservative assumptions and analyses. Report, Appendix I at 4–6. As for serious Class 9 accidents involving core-melt and containment failure, the Report [NUREG–0396] concluded that these protective action guides generally would not be exceeded beyond 10 miles unless the containment failed catastrophically and there was a very large release of radioactive material . . . [and] that even for very large releases, emergency actions such as sheltering or evacuation within 10 miles would result in significant reductions in deaths and early injuries. Id. at 6–7. From a probability standpoint, the Report concluded that the probability of large doses from core-melt accidents drops off substantially at about 10 miles from the reactor. Id. at 37.

Based on these considerations, the Report concluded that:

Emergency response plans should be useful for responding to any accident that would produce offsite doses in excess of the PAGs. This would include the more severe design-basis accidents and the accident spectrum analyzed in [the Reactor Safety Study] RSS. After reviewing the potential consequences associated with these types of accidents, it was the consensus (sic) of the Task Force that emergency plans could be based upon a generic distance out to which predetermined actions would provide dose savings for any such accidents. Beyond this generic distance it was concluded that actions could be taken on an ad hoc basis using the same considerations that went into the initial action determinations.

The Task Force judgment on the extent of the Emergency Planning Zone is derived from the characteristics of design basis and Class 9 accident consequences. Based on the information provided in Appendix I [of NUREG–0396] and the applicable PAGs a radius of about 10 miles was selected for the plume exposure pathway and a radius of about 50 miles was selected for the ingestion exposure pathway as shown in Table 1. Although the radius for the EPZ implies a circular area, the actual shape would depend upon the characteristics of a particular site. The circular or other defined area would be for planning whereas initial response would like involve only a portion of the total area. *Report at 16.* 26 NRC at 393 (brackets not in the original).

[5] "Protective action guides are units of radiation doses which, if projected to be received by an individual, would warrant protective action." 26 NRC, at 393 N. 18 (1987), citing Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, EPA–520/1–75–001 (September 1975).

A reading of the Report [NUREG–0396] indicates clearly that the margins of safety provided by the recommended 10-mile radius were not calculated in any precise fashion, but were qualitatively found adequate as a matter of judgment. Given the uncertainties in estimations of Class 9 accident probabilities and consequences, there was no other feasible choice in this regard. The EPZ's shape could be somewhat different than the 10-mile circular radius implies, without compromising emergency planning goals. Indeed, the Report [NUREG–0396] is explicit that "judgment . . . will be used in determining the precise size and shape of the EPZs considering local conditions such as demography, topography, and land use characteristics, access routes, local jurisdictional boundaries and arrangements with the nuclear facility operator for notification and response assistance." These are, of course, the considerations later cited in § 50.47[b][2] with regard to determining the "exact size and configuration" of the EPZ.

Nothing in the Report [NUREG–0396] or in any other material in the emergency planning rulemaking record compels a finding that EPZ adequacy is especially sensitive to where exactly the boundary falls, and any such conclusion would seem to be at odds with the overall thrust of the Report [NUREG–0396]. In particular, the task force's analysis indicates that "adequate protective measures" in the context of emergency planning is not a precisely defined concept. 26 NRC at 394 (brackets not in the original).

The concept of "adequate protective measures" as used in our emergency planning regulations is explained in Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), CLI–86–13, 24 NRC 22, 30 (1986), as follows:

This root question cannot be answered without some discussion of what is meant by "adequate protective measures." Our emergency planning regulations are an important part of the regulatory framework for protecting the public health and safety. But they differ in character from most of our siting and engineering design requirements which are directed at achieving or maintaining a minimum level of public safety protection. See, e.g., 10 CFR 100.11. Our emergency planning requirements do not require that an adequate plan achieve a preset minimum radiation dose saving or a minimum evacuation time for the plume exposure pathway emergency planning zone in the event of a serious accident. Rather, they attempt to achieve reasonable and feasible dose reduction under the circumstances; what may be reasonable or feasible for one plant site may not be for another.

As the Commission has made clear:

It is implicit in this concept of "adequate protective measures" that a determination that a particular EPZ size will provide "adequate protective measures" does not in fact mean that emergency planning will eliminate, in every conceivable accident, the possibility of serious harm to the public. If this were actually the criterion, it would be difficult if not impossible to set any a priori limits to the size of the EPZ or to the scope of required emergency planning. Emergency planning can, however, be expected to reduce any public harm in the event of a serious, but highly unlikely accident.

But the rule clearly was intended to set such limits. Even under the Appeal Board's analysis, the rule amounts to a Commission finding that adequate protection can be provided by an EPZ of limited size, 10 miles in radius, give or take a few miles, but certainly much less than 20.

. . . the proper interpretation of the rule would call for adjustment to the exact size of the EPZ only on the basis of such straightforward administrative considerations as avoiding EPZ boundaries that run through the middle of schools or hospitals, or that arbitrarily carve out small portions of governmental jurisdictions. The goal is merely planning simplicity and avoidance of ambiguity as to the location of the boundaries. With such clarity, plans can be implemented with an understanding as to who is being directed to take particular protective actions. 26 NRC at 394–95.

In conclusion, the Commission still finds that the 10-mile EPZ should not be increased to 20 miles.

Issue 2. Extend the EPZ from 10 miles to 20 miles because the effect of rainout was not adequately considered when the size of the EPZ's was determined

Another reason given in support of an expansion of the EPZ was that rainout was not adequately considered when the size of the EPZ's was determined. "Rainout" is the deposition of radioactivity on the ground due to rain scouring radioactive materials from the air. For example, the Seacoast Anti-Pollution League said,

Yet another reason to extend the EPZ to at least 20 miles is the danger of rainout of the radionuclides from the plume. The dosage estimates in NUREG–0396 assume a uniform rate of deposition of radioactive material from the plume . . . if half the material remaining in the plume were to be washed out by a rainstorm between a radius of 15 to 20 miles from the reactor, the doses would be as high as they were within the 5- to 10-mile interval.

Commission Response

Rainout was considered. The statement that the dosage estimates in NUREG–0396 assume a uniform rate of deposition of radioactive material is in error. A full page (p. I–25) of NUREG–0396 is devoted to a discussion of rainout effects. While NUREG–0396 does not explicitly say so, the calculated doses presented in Figures I–10 through I–15 do, in fact, include the effects of rainout.

Rainout is included in the following manner. The entire release of radioactivity is assumed to be contained in a small highly concentrated puff. The

probability of such a puff occurring is approximately 1 time in 100,000 years. Wind is assumed to blow the puff directly over a large population center during a period of extreme atmospheric stability with minimal dilution of the puff so it never becomes much more than a mile in diameter. When the puff is directly over the population center, an extremely heavy rainfall scours most of the nongaseous radioactive material from the cloud and deposits it on the ground. If such a puff is released, the probability of the puff encountering these weather conditions is approximately 1 in 10,000. The radioactivity is assumed to remain on the surface of the ground with no entrance into sewers, no runoffs, and no sinking into the ground to remove or shield the radioactivity. The calculations assume that 100 percent of the radioactivity will remain on the surface without any runoff, but in reality the probability of this is near zero. The people are assumed to be exposed with minimal shielding to the radiation from radiation from the deposited material; in other words, that no one is in an apartment building, no one is in an office building, no one is in a basement, and no one is in any other type of building that provides more shielding than a small one-story frame house. The assumed probability of this is one, whereas it is in reality near zero. The people remain where they are with no evacuation or other protective action for 24 hours. The probability of no emergency response for 24 hours is assumed in the calculations of consequences to be one, but in reality the probability is near zero. It is this specific series of events that gives rise to the largest casualty figures that have been calculated for severe nuclear accidents and which are presented in NUREG–0396. Because of these assumptions, the calculated consequences are greatly overestimated.

Issue 3. Extend the EPZ from 10 miles to 20 miles because ad hoc actions beyond 10 miles would not be adequate

Another reason given by the Citizens Task Force of Chapel Hill, NC petition and several commenters to expand the EPZ is that they did not believe the NRC's statement in its final rule on emergency planning, 45 FR 55402; (August 19, 1980) and NUREG–0396, page 16, that the 10-mile plume EPZ was "large enough to provide a response base that would support activity outside the planning zone." The Citizens Task Force petition quoted a FEMA report,[6] "Like the '5-mile' plans at TMI they [emergency plans with a 10-mile EPZ] may reflect inadequate definitions of the threat, encouraging a false sense of readiness, and delay preparations for a more suitable response to a crisis." The Union of Concerned Scientists noted that it would require only one to four hours for the plume to reach 10 miles. Thus, there would not be adequate time to notify people beyond 10 miles to evacuate.

Commenters opposed to the petition said that the detailed planning for the 10-mile EPZ could be applied outside the 10-mile EPZ if necessary. They also noted that the Commission had already made a judgment on this question in its rulemaking on emergency preparedness (45 FR 55402 and 55406). For example, the law firm of Shaw, Pittman, Potts, and Trowbridge argued:

> Thus, it is likely given the means usually used to distribute public information materials, that the geographic area actually covered will be greater than the plume exposure pathway EPZ. Similarly, the systems used to notify the public to take protective actions provide coverage substantially beyond the EPZ boundary, since the radio and television stations used in the Emergency Broadcast System ("EBS") can be received at distances in excess of 10 miles. And, with respect to actual protective measures, it is clear that sheltering can be accomplished with equal ease by people both inside and outside the EPZ. As to evacuation, even that measure can easily be built upon and use evacuation plans developed for within the 10-mile EPZ.

Commission Response

NUREG–0396 noted that

> it was the consensus of the [NRC–EPA] Task Force that emergency plans could be based upon a generic distance out to which predetermined actions would provide dose savings for any such accidents. Beyond this generic distance it was concluded that actions could be taken on an ad hoc basis using the same considerations that went into the initial actions determinations. [Thus], the size of the EPZs need not be site specific, [as] emergency planning needs seem to be best served by adopting uniform EPZs for initial planning studies for all light water reactors.

Additionally, the Commission firmly believes that emergency actions could be successfully carried out beyond 10-mile EPZ for the following reasons: First, the 10-mile planning basis establishes an infrastructure consisting of emergency organizations, communication capabilities, training and equipment that are similar to other normal community emergency organizations, such as police and fire departments that can be used in the event of an accident at the facility. Second, the radio and TV emergency broadcasting systems that NRC requires for prompt notification of the public within the 10-mile EPZ does reach beyond 10 miles. Third, if emergency actions were necessary beyond 10 miles, the time available to take those actions would be significantly greater than the time available for the taking of protective actions for persons close to the reactor (within 2 miles). This significant additional time (many hours to days) would permit the use of resources from other states, other utilities, the Federal government, and even the international community.

Beyond these reasons, the relationship between wind speed and hazard may have been misunderstood. Higher wind speeds result in lower radiation doses because the radioactive plume becomes greatly diluted and dispersed at higher wind speeds. This was discussed in NUREG–0396.

Further, the radioactive plume is not likely to originate without warning. The nuclear power plant operators, in most cases, would be able to declare an emergency hours before a release, based on what they understand to be happening in the plant. The NRC requires utilities to set emergency action levels for in-plant measurements for which emergencies should be declared (see 10 CFR Part 50, Appendix E and NUREG–0654, Appendix I.) Thus, evacuation recommendations should be made before releases of radioactivity would occur, giving people time to evacuate before the radioactivity would arrive. The petitioners may not be aware that the need for evacuation beyond a few miles from the plant is extremely unlikely. If protective actions were needed beyond 10 miles, the action required would most likely be sheltering while the plume passes and then evacuation of relatively small areas afterwards if much deposition of radioactive materials on the ground were to occur.

Another reason not to expand the EPZ is based upon the fact that risk is highly concentrated in the areas near the nuclear power plant, rather than spread uniformly throughout the 10-mile EPZ. However, the Commission notes that despite the technical information to the contrary, the entire EPZ tends to be thought of by many members of the public as a single homogeneous zone to be treated in a uniform manner. Expanding the EPZ radius from 10 miles to 20 miles might even further aggravate this situation.

[6] Evacuation Planning in the TMI Accident, FEMA, January 1980.

Issue 4. Extend the EPZ from 10 miles to 20 miles because the reduction of early injuries and latent cancers fatalities were not considered when the size of the 10 mile EPZ was determined

Several commenters said a reason to expand the EPZ is that in establsihing the emergency planning zone, not only early fatalities, but also early injuries and future diseae such as cancer should be considered. The Union of Concerned Scientists wrote:

It is by no means clear that prompt fatalities are the dominant health effect from serious reactor accidents. In addition to prompt fatalities, the following additional effects must be considered in establishing an appropriate plume EPZ: (a) latent fatalities, (b) early radiation injuries, (c) non-fatal cancers, (d) genetic effects, and, to a lesser extent, (e) property damage and restrictions on land use caused by accidents. Risk assessment studies have shown consistently that effects other than prompt fatalities constitute a significant portion of the total effects of serious reactor accidents. For instance, Dr. Jan Beyea has pointed out that for the accident in WASH-1400 which was postulated to cause 10 prompt fatalities, the following additional consequences would occur: 7000 cancer deaths, 4000 genetic defects, 60,000 thyroid tumor cases, and 3000 square miles of land contaminated above acceptable levels.

Commission Response

The Commission agrees with the commenter that for most accidents, long-term effects—cancer and genetic defects in offspring—are the most significant effects, from the standpoint of the gross number of effects. Only the most severe accidents could result in any prompt fatalities or injuries. With the existing levels of emergency preparedness it is likely that no one who followed the recommended protective actions would be killed or injured.

Our emergency planning requirements do not require that an adequate plan achieve a preset minimum radiation dose saving or a minimum evacuation time for the plume exposure pathway emergency planning zone in the event of a serious accident. Rather, they attempt to achieve reasonable and feasible dose reduction under the circumstances; what may be reasonable or feasible for one plant site may not be for another. 24 NRC at 30.

A fair reading of the Commission's Shoreham discussion is that implicit in the concept of "adequate protective measures" is the fact that emergency planning will not eliminate, in every conceivable accident, the possibility of serious harm to the public. Emergency planning can, however, be expected to reduce any public harm in the event of a serious but highly unlikely accident. The proper interpretation of the rule would call for adjustment to the exact size of the EPZ on the basis of such straightforward administrative considerations as avoiding EPZ boundaries that run through the middle of schools or hospitals, or that arbitrarily carve out small portions of governmental jurisdictions. The goal is merely planning simplicity and avoidance of ambiguity as to the location of the boundaries.

Given these circumstances, the Commission has concluded that adequate protection can be provided by an EPZ that is about 10 miles in radius.

Issue 5. Extend the EPZ from 10 miles to 20 miles because the radiation from an accident would not stop at 10 miles

Several commenters who favored the recommended change to expand the EPZ gave as a reason that radiation "is not likely to stop at the 10-mile mark in the case of a serious accident." One said, "No one believes that people are any safer at 11 miles than at 10 miles out." Another said, "There is no 10-mile island with lead walls to the sky to prevent radioactivity from blowing beyond the NRC's emergency planning zone."

Commission Response

Obviously, there is no line at 10 miles beyond which radiation cannot pass. However, the hazard from an accident tends to gradually decrease as one moves further from the accident. How far from a nuclear power plant is the potential hazard small enough that specific detailed planning is not worthwhile? In the Commission's judgment, that distance is about 10 miles for the considerations stated in this discussion.

Issue 6. Extend the EPZ from 10 miles to 20 miles because at TMI a 20 mile evacuation was considered

The Citizens Task Force petition and commenters gave the 20-mile evacuation consideration during the Three Mile Island accident as a reason to expand the EPZ to 20 miles. The Task Force quoted a FEMA report as follows:

Emergency management agencies entered the crisis with contingency plans to evacuate a 5-mile circle around TMI. . . . Two days into the accident, the same scientific authorities (now faced with a novel and unexpected situation) suddenly recommended a 10-mile, then a 20-mile contingency evacuation plan. Under emergency conditions, local and State officials were forced to scrap a relatively undemanding 5-mile evacuation and plan for a large, complex population movement on short notice. (p. vi, reference 9.)

The Seacoast Anti-Pollution League noted that the Kemeny Commission Report said, ". . . the NRC itself was considering evacuation distances as far as 20 miles, even though the accident was far less serious than those postulated during siting." [7] The Community Energy Action Network quoted the Rogovin Report's [8] conclusion that a 10-mile EPZ is inadequate:

However, we believe the NRC's proposed 10-mile planning zone, is, by itself, inadequate as an arbitrary cutoff point. Wider evacuation may clearly be necessary in some unlikely accident situations. And, as Three Mile Island demonstrated, an ordered evacuation out of 10 miles would undoubtedly have effects to 20 miles and more. Therefore, at the very least, significant centers of population beyond 10 miles from the plant must be considered in the planning as well. Rogovin Report, Vol. 1, p. 33.

Commenters opposed to the petition said that emergency preparedness had increased greatly since the Three Mile Island accident. For example, Barry G. Wahlig, a nuclear engineer, wrote:

The vacillation over evacuation at TMI is in no way representative of the post-TMI world. At that time, utility and regulatory personnel had scarcely thought about how to think about evacuation. The tenor of emergency exercises over the last three years assures that responsible people have given considerable thought to how to arrive at defensible evacuation recommendations. To the extent reasonably possible, emergency exercise experience shows that plant personnel could make such recommendations in an orderly, timely way.

Commission Response

The Commission believes that if protective actions were warranted beyond 10 miles, those actions, whether evacuations, sheltering or relocation, would certainly be recommended to the State officials. Nonetheless, due to the additional time that is available for the taking of protective actions out to greater distances from the reactor, the implementation of these additional protective actions would not require detailed plans.

Issue 7. Extend the EPZ from 10 miles to 20 miles because of the lessons learned from the Chernobyl accident

A few commenters suggested that the NRC should modify its regulations because of the evacuation that took place as a result of the Chernobyl accident.

---

[7] John G. Kemeny, Chairman, Report of the President's Commission on the Accident at Three Mile Island, at 16 generally called the "Kemeny Commission Report," October 1979.

[8] NUREG/CR-1250, Three Mile Island—A Report to the Commissioners and to the Public, generally called "Rogovin Report," January 1980.

Commission Response

A number of facts [9] about the Chernobyl accident bear on emergency planning and preparedness around U.S. commercial nuclear power plants. The implications of the Chernobyl accident and the Soviet response will now be discussed in relation to three aspects of U.S. emergency planning, namely: (1) Size of the emergency planning zone, (2) ingestion pathway measures, and (3) decontamination and relocation.

In drawing a nexus between the Soviet response to the Chernobyl accident and emergency planning implications for U.S. plants, contrasts and differences should be noted. First, there is a substantial difference in the emergency planning base. After the accident at Three Mile Island, large resources were expended to improve emergency planning and response capabilities around U.S. plants. In contrast, although some prior planning appears to have existed in the Soviet Union, perhaps for civil defense, there is little indication that the Soviets have comparable site-specific emergency plans for the general public around their nuclear power plants. Despite this, the Soviets mounted a large and generally effective ad hoc response.

Second, the specifics of the Chernobyl release are unique to the RBMK design. The amounts of radioactive material released from U.S. plants could be as severe but for many accident sequences would be considerably less because, among other things, U.S. plants have substantial containments. In addition, although low-probability, fast-moving accident sequences may be possible, severe accidents at U.S. plants would, in general, progress more slowly resulting in longer warning times before release.

Third, some aspects of the Chernobyl evacuation defy comparison with similar aspects at U.S. plants because of economic and societal differences. For example, the Soviets had to assemble 4000 buses and trucks for the Chernobyl evacuation, whereas, in the United States most people have access to private transportation and necessary alternative transportation is preplanned around U.S. nuclear power plants.

Size of the EPZ's: The Chernobyl accident has focused attention on the adequacy of the size of emergency planning zones around U.S. commercial nuclear power plants. The Soviets evacuated a total of about 135,000 people as well as considerable farm livestock from Pripyat, Chernobyl, and other towns and villages within 30 kilometers (18 miles) of the Chernobyl nuclear power plant. This evacuation appears to have taken place in several stages, beginning for the approximately 45,000 residents of Pripyat about 36 hours after the initial release and extending over several days to a week. The whole-body radiation dose to the majority of individuals did not exceed 25 rem, although about 24,000 persons in the most severely contaminated areas are estimated to have been exposed to whole-body doses in the range of 35–55 rem. The population of Pripyat was initially sheltered as a protective measure and then evacuated when radiation readings increased. In addition to radiation considerations, logistics and contamination control influenced the timing of the evacuation. Despite an apparent lack of site-specific planning, the Soviets mounted a large and generally effective ad hoc response making use of some aspects of civil defense planning. The high initial plume height contributed to relatively low initial dose rates in the immediate vicinity (by cloud seeding other areas) and the spraying of a chemical polymer on evacuation routes to minimize resuspension of deposited activity were also beneficial. The Soviets took ingestion pathway protective measures within the 30-kilometer zone and well beyond. Ingestion pathway protective measures were also taken in several Soviet bloc countries, in Scandinavia, and in Eastern and Western Europe.

Assessment: One difficulty in assessing the implications of emergency actions taken at Chernobyl for U.S. commercial nuclear power plants is the vast difference in the emergency planning base between the United States and the Soviet Union. After the accident at Three Mile Island, large resources were expended in the United States to improve site-specific and generic emergency planning capabilities. Utility, State, local, and federal emergency plans were developed, reviewed, and exercised. Alert and notification systems have been designed, installed, and tested within the plume exposure pathway EPZs (10-mile radius) for almost all U.S. plants. The populations within the plume exposure pathway for U.S. plants are annually provided with informational materials that are to be used in the event of an emergency. These materials contain protective actions that will be taken and include telephone numbers for public inquiries.

In contrast, there is little indication that the Soviets have comparable site-specific emergency plans for the general public around their nuclear power plants. While some prior planning existed, perhaps for civil defense, Soviet authorities indicated that many of the protective actions taken were ad hoc measures. Although a severe accident in the United States could require some ad hoc measures to be taken, a detailed planning base exists to facilitate implementation of the necessary protective actions.

With regard to the issue of EPZ size, the Soviets evacuated the population out to 18 miles, or roughly twice the distance for which an evacuation capability is required to be demonstrated in the United States. Similarly, measures were taken to prevent ingestion of foodstuffs, milk and water at distances considerably greater than the 50-mile ingestion exposure pathway in the United States. This might imply that the U.S. EPZs are too small. However, examination of the background leading to the U.S. requirements leads to a different conclusion.

The sizes of the EPZs were derived from accident considerations, including the severe accidents studied in the Reactor Safety Study (WASH–1400). The more severe and most unlikely accidents studied in WASH–1400 involve releases of radioactivity that are comparable or in some instances larger in magnitude to that which was actually released at Chernobyl. The 10-mile and 50-mile EPZs were chosen as a planning basis to demonstrate a capability and to provide emergency plans with the flexibility of dealing with a broad range of accident releases, rather than being based soley on a single highly unlikely event, such as the worst case. It was recognized that protective actions might need to be taken beyond these planning zone distances for the most severe releases. NUREG–0654 clearly notes:

> The choice of the size of the Emergency Planning Zones represents a judgment on the extent of detailed planning which must be performed to assure an adequate response base. In a particular emergency, protective actions might well be restricted to a small part of the planning zones. On the other hand, for worst possible accidents, protection actions would need to be taken outside the planning zones.

Consequently, a release magnitude similar to the one associated with Chernobyl and the possibility that ad hoc actions beyond the planning zone boundaries might be needed for very unlikely events were considered and have been factored into the development of U.S. requirements, including the sizes of the EPZs.

In conclusion, the Chernobyl accident and the Soviet response do not reveal

[9] NUREG–1251, Vol. I—Implication of the Accident at Chernobyl for Safety Regulation.

any apparent deficiency in U.S. plans and preparedness, including the 10-mile plume exposure pathway EPZ size and the 50-mile ingestion exposure pathway EPZ size. These zones provide an adequate basis to plan and carry out the full range of protective actions for the populations within these zones, as well as beyond them, if the highly improbable need should arise.[10]

Issue 8. Extend the EPZ from 10 miles to 20 miles because the most current methodologies were not used in NUREG–0396 and because of new source term research information.

The petition submitted by Mr. Sexton as well as a few comment letters suggested that the EPZ size should be based on the most current research information and because the methodologies used in NUREG–0396 are outdated.

Commission Response

Draft NUREG–1150 (February 1987) provides substantial new information concerning our ability to predict severe accident progression and the range of outcomes. Based on this information, it appears that the risks and potential consequences associated with severe reactor accidents are no higher than those predicted in the Reactor Safety Study and may, in fact, be substantially lower. However, there are large uncertainties associated with the ability to predict precisely the release amounts once the core-melt accident is underway and the magnitude of the source term associated with a particular outcome. Draft NUREG–1150 (February 1987) provides insights concerning (1) the way offsite doses would be expected to vary with distance for the plants analyzed and (2) the relative effectiveness of different offsite protection actions [11] at various distances.

A very important question is the nature and magnitude of the radioactive release to the atmosphere. The magnitude of the potential release substantially influences the potential offsite consequences. The source terms and principal assumptions for the analyses in this section are given in Tables M.1 and M.2 of draft NUREG–1150 (February 1987). Release of radioactive material to the environment during most severe accidents (particularly those resulting in early containment failure) is modeled as occurring in two distinct phases although, for most accidents, these phases would be expected to overlap.[12] The first release would be of short duration, usually occurring before there is significant core-concrete interaction, and would consist of the more volatile radiouclide species (i.e., all the noble gases together with signficant fractions of the more volatitle species such as Cs, I, and Te). The second major release would occur after the core materials have melted through the reactor pressure vessel and are interacting with the concrete cavity. This second release could usually take place over a period of several hours or longer.

The nature of the expected offsite consequences for the plants analyzed, assuming no early offsite protective action is taken, is shown in draft NUREG–1150 (February 1987), Tables M.3 and M.4 [13] for early and late containment failure. As can be seen, there could be a significant probability of exceeding a 50-rem [14] whole body dose within a few miles of three of the plants analyzed, even for late containment failure if no protective action is taken. However, this probability diminishes rapidly with distance from the reactor for both early and late containment failure. Probabilities of exceeding 200-rem whole body dose calculated for the Surry plant were compared those obtained using Reactor Safety Study data.

Although the probabilities calculated for draft NUREG–1150 (February 1987) are substantially lower at large distances (due primarily to the assumption of earlier relocation time), the probabilities within a few miles of the plant are comparable.

We have used information from the plants analyzed to calculate how offsite consequences would be expected to vary with distance from each of the plants if different protective actions were taken. The results of these calculations are summarized in draft NUREG–1150, Table M.5 and M.6.

An examination of Table M.5 and M.6 in draft NUREG–1150 (February 1987) provides several preliminary insights. First, either basement sheltering or evacuation will substantially lower the probability of exceeding a whole body dose expected to produce early health effects although evacuation is clearly much more effective within the first few miles. However, the effectiveness of evacuation diminishes substantially if it is delayed until after containment failure and release of radioactive material to the environment. Sheltering in large buildings appears to be very effective outside the first few miles. Although large building sheltering is not usually available for the general population in the environs of a site, it may be a prudent and valuable option for special population groups (e.g., hospital patients, prisoners).

New technical information from the plants analyzed in draft NUREG–1150 (February 1987) shows that for these plants the probability of a core damage accident is small (in the neighborhood of 1 to 10,000 to 1 in 100,000 reactor years of operation) and that the risks and potential consequence associated with such accidents are no higher than those predicted in the Reactor Safety Study and may be substantially lower. However, there is still uncertainty associated with these estimates.

Some insights obtained from this analysis are summarized below:

1. Time of containment failure significantly affects the magnitude of the release and resulting consequences. The consequences of an early containment failure at a given distance are significantly higher than those for a late containment failure.
2. While there are calculated dose differences among the plants, these appear to be secondary compared to the differences seen between early and late containment failure.
3. For late containment failure and no offset protective action: (a) persons beyond about 1 to 2 miles have a low probability of receiving a dose in excess of 200 rems, and (b) persons beyond about 5 miles have a low probability of receiving a dose in excess of 50 rems.

While thus far the effectiveness of protective actions has been completely investigated only for the Surry plant and no generic conclusions for other plants can be drawn, some preliminary insights that can be gleaned from draft NUREG–1150 (February 1987) are:

1. With regard to protective actions, the principal dose savings benefits are obtained from evacuation first followed by sheltering within the first few miles of the plant.
2. Within the first few miles, evacuation appears to be more effective than sheltering in achieving dose savings. At distances beyond about 5 miles, these differences are less notable.
3. For late containment failure accidents, any of the protective actions analyzed would result in essentially zero probability of a person being exposed to doses in excess of 200 rems at distances beyond 1 mile and to

[10] Ibid.

[11] This analysis addresses only those emergency actions that would have to be taken in the vicinity of the plant to provide protection from the immediate effects of the plume exposure pathways.

[12] All Zion releases were modeled as single-phase releases, but this will be revised for the final version of NUREG–1150.

[13] Unless otherwise specified in the table, the source terms and principal assumptions for Tables M.3 through M.6 are those listed in Table M.1 and M.2.

[14] 200-rem and 50-rem whole body doses were used to allow comparisons with earlier studies [e.g., NUREG–0396 because they serve as surrogates for the early fatality and injury thresholds, respectively.

doses in excess of 50 rems at distances beyond 2 miles.

In conclusion, the Commission agrees that the size of the 10 mile EPZ was determined using the methodologies available in 1980 and that today there exists more sophisticated techniques and computer models to estimate radiation releases and doses to the public. Nonetheless, the most sophisticated and up to date methodologies were used in the development of NUREG–1150 (February 1987) which, as mentioned above, does not provide evidence that the size of the plume exposure pathway EPZ should now be increased.

Issue 9: Extend the EPZ from 10 miles to 20 miles because any radiation can be harmful therefore the public should be able to take protective actions to assure that they receive no radiation in the event of an accident

Citizens Task Force of Chapel Hill, NC, petition and some commenters in support of this change gave the reason that any amount of radiation can be harmful. They stated:

> It is agreed that a radiation dose low enough to produce no effect has not been identified. In other words, all levels of radiation may produce some effects on cell . . .
>
> Some experts state, however, that one could sit on the fence of a normally operating nuclear power plant for a year and absorb no more radiation than that released by a chest x-ray. This group stresses the fact that people have lived with varying levels of background radiation with no demonstrable negative results . . .
>
> Others, also well informed, argue that our scientific understanding of the long-range effects of low-level radiation continuously emitted into our environment is inadequate at this time to measure the dangers with any degree of certainty. They are concerned that the various effects we get from radiation, pollution, chemical carcinogens, and so forth may lead to a yet undocumented multiplier effect. They see the precipitous rise of cancer rates during the last couple of decades as strong support for this conclusion. They further argue that some radioactive elements released into the air or dumped into the water—even if not immediately dangerous in small accounts—can in some form enter the food chain. Through a process termed "biological amplification," these radioactive elements may be concentrated through the chain of lesser plants and animals until they reach human beings through the food they eat. By this time the radioactive materials may be heavily concentrated. They cite the well documented rise of radiation levels in milk in the United States after weapons testing in China as evidence of this process. . . . And although the level of harm which may result is not agreed upon, it is certain that our bodies take up radioactive elements and use them in the matrix of the bones and in tissue; that these elements emit radiation for periods ranging from a few days to half a century; that fetuses and children under ten are much more vulnerable to radiation effects; and that cell damage from whatever cause is a medical concern of great importance.

Commission Response

The statements above representing the petitioner's interpretation of various views of the hazards of radiation need clarification. The statement that "a radiation dose low enough to produce no effect has not been identified" demonstrates an overestimation of what scientific experiments can accomplish. Experiments on the effects of toxic substances generally do not allow experimenters to draw a conclusion of no effect. If no effect is observed, the experimenter cannot conclude that there was no effect because there may have been an effect that was too small to be observed. There are a number of experiments on low doses of radiation that show no observable effect. From such experiments one can never conclude that there is no effect. Only an upper limit of the size of the effect can be estimated. That has been done for radiation, and there is general agreement among scientists on the approximate upper limit.

Likewise, the statement that "others, also well informed, argue that our scientific understanding of the long-range effects of low-level radiation continuously emitted into our environment is inadequate at this time to measure the damages with any degree of certainty," misrepresents prevailing scientific viewpoints. Scientists are in general agreement that the effects of doses of a few rems are too small to be measured.

The petitioner's statement that, the precipitous rise in cancer rates during the last couple of decades is support for the possible existence of "a yet undocumented multiplier effect" between environmental pollutants seems to be based on an incorrect premise. According to the American Cancer Society, the death rate from all cancers except lung cancers has dropped slightly for males and dropped sharply for females during the last couple of decades (shown, for example, in Figure 19, page 38 of NUREG/BR–0024 [15]). The lung cancer death rates have climbed sharply for males and females, but this is attributed almost entirely to cigarette smoking.

The petitioner's statements that some radioactive elements ". . . can in some form enter the food chain and may be concentrated through the chain" is a long-known and well-documented fact. The concentration effect was predictable from knowledge of biology and was first observed almost 40 years ago before "weapons testing in China." Since this effect was known long before the start of large-scale nuclear electric generation, the radioactivity in the environment and foods near nuclear power plants is and has always been carefully measured both before and during nuclear power plant operation. Radioactivity in foods and water due to nuclear power plants is and has always been kept at low levels.

The petitioner's statement that "cell damage from whatever cause is a medical concern of great important" is misleading. Scientifically, the importance will depend on how many cells are damaged, the nature of the damage, the type of cell damaged, and the probability of the damage to that cell leading to any further consequences. For example, if a large group of people are exposed to a radiation dose of 1 rem each, the EPA's lower protective action guide, about 5 out of 10,000 people would be expected to get cancer as a result. And, because not all cancer is fatal, about 2 out of 10,000 would be expected to die from this radiation-induced cancer. (About 2,000 out of 10,000 people will eventually die of cancer, but those cancers are mainly unrelated to radiation exposure.) Of the 9,995 out of 10,000 who did not get cancer caused by the 1-rem radiation dose, based on current knowledge, their health would be unaffected by their radiation exposure. On the basis of the epidemiological evidence, they would live as long and be as healthy as if they had not received the radiation dose.

Issue 10: Extend the EPZ from 10 miles to 20 miles because of the evacuation shadow phenomenon

Commenters in favor of the recommended changes gave as a reason the belief that if an accident occurred many people outside the 10-mile EPZ would evacuate even though they were not advised to do so. They said, in this "evacuation shadow," masses of people would be fleeing in panic, would congest roads making evacuation of those within the EPZ slower or even impossible. As a way to plan for this effect these commenters suggested extending the EPZ zone radius from 10 to 20 miles.

[15] NUREG/BR–0024, Working Safely in Gamma Radiography, September 1982.

Commenters opposing the petition said this was not a problem, because evaluation of nonradiological incidents which have required mass evacuation has also demonstrated that, even without advance planning, an orderly, safe, and prompt evacuation can be undertaken.

Commission Response

In CLI–87–12, the Commission noted that:

> . . . we think it is entirely reasonable and appropriate for the Commission to hold that arguments for "adjusting" a 10-mile EPZ to improve safety, especially arguments that entail complex analysis and lengthy litigation are an impermissible challenge to the rule . . .
>
> Accordingly, we think the better interpretation is that the rule precludes adjustments on safety grounds to the size of an EPZ that is "about 10 miles in radius" and that Contention 22.C [whether the EPZ should be expanded by a few miles to minimize the occurrence and effects of spontaneous evacuation from outside the EPZ] should on this ground be deemed impermissible challenges to the rule. In our view, the proper interpretation of the rule would call for adjustment to the exact size of the EPZ only on the basis of such straightforward administrative considerations as avoiding EPZ boundaries that run through the middle of schools or hospitals, or that arbitrarily carve out small portions of governmental jurisdictions. The goal is merely planning simplicity and avoidance of ambiguity as to the location of the boundaries. With such clarity, plans can be implemented with an understanding as to who is being directed to take particular protective actions. 26 NRC at 395 (brackets not in the original).

As noted above, the Commission determined, based on information available at the time that it promulgated the emergency planning regulations, that a plume exposure pathway emergency planning zone (plume EPZ) of about 10 miles in radius was the proper and appropriate area for detailed planning for protective actions in the event of a radiological emergency. At that time, the Commission specifically recognized that detailed planning in that zone would more readily permit the development and implementation of ad hoc actions beyond the 10 mile plume EPZ should the need arise. See NUREG–0386, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," (December 1978); NUREG–0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," (November 1980), p. 12; Shoreham, 26 NRC, at 392–93, Southern California Edison Co. (San Onofre Nuclear Generating Station, Units 2 & 3), LBP 82–39, 15 NRC 1163, 1171–73 (1983). In effect, the Commission accounted for the possibility of spontaneous evacuation outside the plume EPZ when it established the size of that EPZ in the first instance. The petitions provide no justification for expansion of the plume EPZ to further account for the possibility of spontaneous evacuations.

Issue 11: Extend the EPZ to include any towns bordering on or partially within the EPZ

The Citizens Task Force of Chapel Hill, NC, petition requested the NRC to amend its regulations to state that any towns bordering on or partially within the EPZ be included within the EPZ in their entirety.

Commenters in favor of this request said that if, for example, some suburbs of a city were included in the emergency planning, but the city were not, then fragmented authority would result.

Commission Response

As discussed in the Commission response to Issue 1, NUREG–0396 provides that "judgement . . . will be used in determining the precise size and shape of the EPZs considering local conditions such as . . . local jurisdictional boundaries . . ."

Thus, Commission practice already allows for adjustment of the EPZ to accommodate jurisdictional boundaries where appropriate to enhance the planning basis.

Issue 12: That a utility fund and install independent monitoring equipment to be used by local communities around nuclear power plants

The Citizens Task Force of Chapel Hill, NC, petition requested that the communities within the EPZ should be provided, with utility funding to purchase, install, and operate their own radiological monitoring equipment. The petitioner said such independent monitoring will permit detection of radioactive materials such as iodine-131 in a short enough time to be useful in making decisions on emergency actions.

As a reason for requiring independent monitoring, the petitioner claimed there is a lack in both quality and quantity of radiation monitoring equipment around nuclear power plants. Since the petitioner believes the utilities do not have adequate equipment, the petitioner believes local communities should provide it for themselves. The petitioner cited as evidence a March 30, 1979 General Accounting Office report, Areas Around Nuclear Facilities Should be Better Prepared for Radiological Emergencies. The section of the report quoted by the petitioner referred to "deficiencies in . . . preparedness." The petitioner also cited a June 1980 FEMA report, State Radiological Emergency Planning and Preparedness in Support of Nuclear Power Plants. FEMA wrote:

> . . . the preparedness of state and local governments with respect to . . . monitoring instruments . . . is generally inadequate to meet the requirements of the new [post-TMI] evaluation criteria.

Commenters opposing the petition said that adequate monitoring equipment is now available, that the evidence cited by the petitioners is outdated and no longer valid, and that such equipment would be too difficult for local communities to use properly. For example, Barry G. Whalig, nuclear engineer, wrote:

> Petitioners show a lack of appreciation for the difficulty of making accurate estimates of airborne and groundplane contamination in the post-accident environment. This is especially difficult using the sort of survey meters which the petitioners seem to want supplied in the tens or hundreds to individuals in the nearby communities. Examples of the problems are: (a) Prevention of instrument contamination during the event; (b) ensuring uniformity of instrument calibration and of measurement protocol; (c) differentiation of plume and groundplane contributions without sampling; and (d) precise reporting of the location where measurements are made. Experience show that even technically competent people are subject to these errors.

The Citizens Task Force petition also said that there is a need for independent monitoring because there is a credibility gap between what the utility and NRC would say during the course of an accident and what the public would believe. The petitioner quoted a May 12, 1979 statement by Dayne H. Broun, Director of Radiation Protection Section of the North Carolina Department of Human Resources, and an April 29, 1979 statement by North Carolina Governor James B. Hunt, Jr., as evidence of lack of credibility. The petitioner wrote:

> The largely spontaneous and unorganized evacuation of several hundred thousand people from the area around the Three Mile Island (TMI) accident reflects a serious problem: the lack of public confidence in the utilities' commitment and ability to provide timely and accurate warnings regarding leakages of radioactivity and/or reactor problems. The resultant uncertainty contributed to very real psychological stress experience by citizens living in communities around the reactor.

The Sorghum Alliance wrote:

> Independent radiation monitoring is necessary because of the history of utilities' and the NRC's reluctance to let the public

know of danger and also because of problems in utility-managed monitoring equipment.

The NRC officials played down the gravity of the accident at Three Mile Island, as they were more concerned with the public relations impact of their statements than with technical accuracy.

Commenters opposing the Citizens Task Force petition saw little evidence of a problem with a credibility gap. The law firm of Shaw, Pittman, Potts, and Trowbridge wrote:

Aside from two newspaper accounts of statements made more than three years ago by the North Carolina Governor and the State Director for Radiation Protection, petitioner offers no support for its broad-based claim of a 'credibility gap'.

Barry G. Wahlig, a nuclear engineer wrote:

Whether or not they suffer a 'credibility gap' as alleged by the petitioners, the existing monitoring organizations are answerable to responsible bodies. The diffuse group of independent monitors suggested by petitioners would be answerable to no one but themselves for the accuracy of their measurements, the method of their reporting, or the consequences of poor values. This lack of responsibility would make their measurements less reliable, not more so.

Commission Response

The Commission agrees that as of March 30, 1979, there was a need to be better prepared for emergencies around nuclear power plants. This need prompted the Commission to publish in the Federal Register (45 FR 55402; August 19, 1980) an upgraded emergency preparedness regulation. The regulation required, among other things, the establishment of emergency planning zones, the development of emergency action levels, the installation of prompt public warning systems, and adequate offsite monitoring capabilities. Implementation of these upgraded regulations has been completed.

Equipment capability is continually checked by NRC and FEMA. The Commission does not believe there is a lack of monitoring equipment and therefore does not see lack of equipment as a reason to amend its regulations to require that monitoring equipment be given to and operated by local communities.

The Commission also finds no basis to assume there is a credibility gap that would cause a danger to public health and safety. There is no evidence that the majority of the public would not respond to protective actions ordered by responsible government authorities. At Three Mile Island, although people evacuated to a far greater extent than officially recommended and without a written plan, the evacuation was quite orderly.

The Commission also finds no basis for the claim that "NRC officials played down the gravity of the accident at Three Mile Island." In fact, quite the contrary occurred. Admittedly, there were confusing and contradictory statements which alarmed the public. But, if anything, the actual danger may have been exaggerated rather than downplayed.

Furthermore, the proliferation of independent radiation monitoring could result in conflicting and confusing information during the course of an accident. Confusion can be minimized if information from all sources flows to a single operations center where it can be analyzed by experts. Expert opinion could then be presented to the state and local governments charged with the responsibility to order protective actions.

Moreover, even if the reason advanced by the petitioner and commenters were valid, independent monitoring would not be a solution. Offsite monitoring is not intended and cannot be used properly by itself to make intitial decisions on protective actions. Elevated radiation levels offsite are among the very last indicators of a serious accident and tend to occur at a time when protective action decisions should already have been made. The earliest indication of a serious accident would be seen in the nuclear power plant control room. Numerous indicators and alarms would tell the operators that there is a problem and should enable them to assess the problem. By NRC regulation, each plant has a set of emergency action levels based on specific plant conditions which can be used to project potential offsite doses. Projected dose information allows protective actions to be taken or at least considered prior to the arrival of the radioactive plume. For example, if a core-melt were to occur causing a large release of radioactivity, there would necessarily be some time between the start of the accident and the release of the radioactivity from the fuel to the containment because it takes time for the heat being generated to evaporate the available water and heat the fuel to its melting point. During this time, projected doses can be calculated and protective actions can be decided upon, recommended to the state and local governments, and ordered before any appreciable amount of radioactivity has been released to the environment.

During the Three Mile Island accident, the radioactivity actually released came from auxiliary plant systems. The amount of radioactivity in these systems was relatively small and no protective actions would have been indicated based on those releases because the radiation dose, actual or projected, was small. The main threat perceived by the NRC staff was the potential threat from a hydrogen gas explosion in the reactor that could conceivably result in added core damage and in-turn present added threat to the containment integrity. While the fears over an explosion of the hydrogen gas were not technically well-founded and, of course, the situation did not materialize, it was the central basis for the evacuation recommendation that was made. The recommendation was not based on elevated radiation readings offsite because none of the offsite readings were high enough to justify ordering evacuation as a protective action.

Issue 13: Current planning is inadequate

The Citizens Task Force of Chapel Hill, NC, petition as a reason for the recommended rule change, stated that "Emergency planning and preparedness in support of nuclear power plants is presently inadequate and incapable of providing an acceptable level of radiological emergency preparedness." Since utilities are seen as not providing adequate emergency preparedness, communities are seen as having to provide it for themselves. The petitioner believes that this situation requires them to have their own monitoring equipment to detect radioactive materials in a short enough time to allow them to make their own decisions on emergency actions.

The Citizens Task Force petition quoted a FEMA report which said that, for some of the 12 nuclear power plant sites with the highest population density within the 10-mile EPZ, "the current alert and notification systems are judged to be totally inadequate . . ." (FEMA, Dynamic Evacuation Analyses, p. 5, February, 1981).

A number of commenters expressed little confidence in current emergency plans saying they should be more site-specific, taking into account the population density, large population centers just outside the 10-mile EPZ, a lack of sufficient roads or the presence of bottlenecks on the roads, geography, and meteorology of each specific site.

Commenters opposing the petition said that present emergency preparedness is adequate, that the petitioner based its conclusions on outdated information, and that the upgrade in emergency preparedness by utilities since the Three Mile Island accident should be recognized and given credit. For example, KMC, Inc. wrote:

Beginning in early 1981, each operating nuclear facility's emergency plan was appraised by the NRC using NUREG–0654 as

the basis of the appraisal and each facility exercised its plan in conjunction with the State and local governments with both NRC and FEMA as judges as to the adequacy of the exercise. Utilities were given 120 days to correct deficiencies which could have an adverse impact on the ability of the utility to promptly and effectively respond to an emergency. Further, nuclear facilities are required to annually have an independent audit of their program and to have an exercise in conjunction with State and local jurisdictions. In addition, the NRC will perform an annual appraisal of each utility's emergency plan to assure that the utility's emergency capability does not degrade. It is inappropriate to compare performance of emergency planning capability and implementation in 1979 with what has been required and demonstrated in 1981 and 1982 by the utilities.

Commission Response

The Commission does not agree with the petitioner's claim that emergency preparedness is presently inadequate. Emergency preparedness has been considerably increased since the Three Mile Island accident. The FEMA report cited was written to evaluate the alerting system existing at that time against draft criteria that had just been issued for comment and interim use. Since the FEMA report was written, final criteria have been published and systems have since been improved to meet the criteria. FEMA and NRC now periodically evaluate the emergency preparedness at nuclear power plants and have generally found the preparedness adequate. Where improvements were thought necessary, they have been ordered.

The Commission does agree that site-specific factors, such as those mentioned by some commenters, should be taken into account in emergency plans. In fact, NRC regulations (10 CFR 50.47(c)(2)) already require emergency plans to consider site-specific factors.

Issue 14: Utility funding of emergency preparedness

Another change recommended by the Citizens Task Force of Chapel Hill, NC petition is that utilities be required to finance the emergency planning and preparedness efforts of the municipalities around nuclear power plants. The Citizens Task Force wrote:

> Lack of funding is the single largest impediment to the establishment of an adequate level of emergency preparedness around nuclear reactors. . . .
>
> Many states clearly have been unable to achieve effective legal steps to insure that utilities finance adequate emergency preparedness around nuclear plants.
>
> The role of the federal government in regard to emergency preparations should be to insure that the communities in those states which have not, or will not soon, enact preparedness-financing legislation do receive adequate funding.

Commenters in support of the recommended change to require utility funding said that utilities should pay the full cost of choosing to build a nuclear plant instead of some other type of generating plant. They said this should be considered part of the cost of doing business and that in some cases funding of emergency preparedness is a real hardship for the municipalities or counties involved. They said it is unfair to expect local governments to finance these plans since some of the areas under obligation to plan for nuclear power plant accidents do not receive any tax revenues from the plant. One commenter said:

> . . . considering the unique and deadly dangers of radiation, it is insane to reduce the already inadequate methods of protection and regulations. The utilities and the government owe it to us to pay for our safety. They are putting our lives in jeopardy, not the other way around.

Commenters opposing the petition generally stated that there was no need for such a funding requirement. They said that FEMA has not found state and local plans inadequate due to lack of funding and that voluntary utility assistance together with state and local programs to assess costs for radiological emergency preparedness have been successful. All seven of the state and local emergency preparedness agencies that commented on the petition say there is no need for such a funding requirement. Commenters said that states should have jurisdiction over this area of utility funding and that the Federal Government does not have the expertise or the legal right to mandate utility rate structure changes.

Some commenters thought utilities should not be forced to fund all local emergency preparedness efforts because many of the emergency preparedness improvements also improve governmental abilities to cope with natural disasters and other types of man-made emergencies. The utilities should not have to bear the full costs of these improvements in plans and facilities which overlap with other functions normally required of the governments.

Some commenters said utilities had a strong incentive to fund local preparedness efforts. The State of Iowa Office of Disaster Services said that Iowa already receives funding assistance from four nuclear facilities and added:

> Obviously the utilities do not, by law, have to provide this funding, but practically speaking, it is being done. The onus of FEMA critique and NRC censure with operating license ramifications serves as a pragmatic inducement for all utilities to provide the radiological emergency response planning and exercise funding. To include this in a petition for rulemaking and potential legalization may do no more than to create an intensely acrimonious relationship between state government and utilities. Why legalize what I know to already be the case in Iowa and other surrounding states, on a cooperative basis.

Several law firms said NRC did not have authority to require such funding. The law firm of Shaw, Pittman, Potts, and Trowbridge wrote:

> The simple answer to this request is that Commission lacks the legal authority to impose such a tax . . . This is because the provision pursuant to which the Commission collects fees from Utilities, 31 U.S.C. 483 a (1976), has been authoritatively construed by the United States Supreme Court to authorize the imposition of fees only to cover services rendered by a federal agency and then only if those services confer a special benefit on the fee-paying entity and not a general benefit on the public at-large . . . This clearly would exclude the tax suggested by petitioner which would cover costs not incurred by the Commission and would result in general public benefits rather than specifically identified benefits of the utilities.

Some commenters pointed out that utilities already pay considerable taxes and deserve some services in return. They said, typically, that nuclear power plants tend to be the largest single tax paying organization in their political subdivision and, as a result, the residents of an area generally benefit from higher than average tax revenues, even though the tax burden on the individual is usually lower than average. Thus, municipalities around nuclear power plants already derive sufficient funds from the operation of the plant to finance their emergency planning efforts.

Commission Response

Funding arrangements are essentially a matter of state and local government interest; therefore, the Commission finds no factual basis to conclude that the proposed funding is necessary to enable state or local governments to establish adequate emergency preparedness plans. Accordingly, we do not reach the question of our legal authority to require licensee funding in the manner requested by the petitioner.

Issue 15: That emergency preparedness requirements be established for low power operations

The State of Maine petition requested that the NRC require that offsite emergency preparedness findings be

made before any fuel loading and/or low power operations are permitted.

Commission Response

In a final rule published in the **Federal Register** on September 23, 1988 (53 FR 36955, 36960) the Commission addressed this specific matter and for the reasons stated therein revised 10 CFR 50.47(d) to read . . .

* * * no NRC or FEMA review, findings, or determinations concerning the state of offsite emergency preparedness or the adequacy of and capability to implement State and local or utility offsite emergency plans are required prior to issuance of an operating license authorizing only fuel loading or low power testing and training (up to 5 percent of the rated power). Insofar as emergency planning and preparedness requirements are concerned, a license authorizing fuel loading and/or low power testing and training may be issued after a finding is made by the NRC that the state of onsite emergency preparedness provides reasonable assurance that adequate protective measures can and will be taken in event of a radiological emergency. The NRC will base this finding on its assessment of the applicant's onsite emergency plans against the pertinent standards in paragraph (b) of this section and Appendix E. Review of applicant's emergency plans will include the following standards with offsite aspects.

(1) Arrangements for requesting and effectively using offsite assistance on site have been made, arrangements to accommodate State and local staff at the licensee's near-site Emergency Operations Facility have been made, and other organizations capable of augmenting the planned onsite response have been identified.

(2) Procedures have been established for licensee communications with State and local response organizations, including initial notification of the declaration of emergency and periodic provision of plant and response status reports.

(3) Provisions exist for prompt communications among principal response organizations to offsite emergency personnel who would be responding onsite.

(4) Adquate emergency facilities and equipment to support the emergency response onsite are provided and maintained.

(5) Adquate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use onsite.

(6) Arrangements are made for medical services for contaiminated and injured onsite individuals.

(7) Radiological emergency response training has been made available to those offsite who may be called to assist in an emergency onsite.

Issue 16: Emergency plans should be completed and approved by the Governor of the affected State as a pre-condition to construction

The State of Maine petition requested that the Commission amend 10 CFR § 50.47 to require that emergency planning be done before any construction of a nuclear facility is permitted and that the Governor or Governors of any affected State approve the emergency plans as a precondition to construction.

Commission Response

The intent of the State of Maine's petiton was granted in part in a final rule published in the Federal Register on April 18, 1989 (54 FR 15372, 15393) where the Commission added new regulations to provide for issuance of early site permits, standard design certifications, and combined construction permits and operating licenses for nuclear power reactors. The aim of this rulemaking was to provide procedures for the standardization of nuclear power plants and the early resolution of safety and environmental issues in licensing proceedings. The new rule requires in 10 CFR part 52, § 52.79(d) that applications for a combined construction permit and operating license must contain emergency plans which provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the site.

(1) If the application references an early site permit, the application may incorporate by reference emergency plans, or major features of emergency plans, approved in connection with the issuance of the permit.

(2) If the application does not reference an early site permit, or if no emergency plans were approved in connection with the issuance of the permit, the applicant shall make good faith efforts to obtain certifications from the local and State governmental agencies with emergency planning responsibilities (i) that the proposed emergency plans are practicable, (ii) that these agencies are committed to participating in any futher development of the plans, including any required field demonstrations, and (iii) that these agencies are committed to executing their responsibilities under the plans in the event of an emergency. The application must contain any certifications that have been obtained. If these certifications cannot be obtained, the application must contain information, including a utility plan, sufficient to show that the proposed plans nonetheless provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the site.

These provisions provide that to the maximum feasible extent emergency plans will be approved by the NRC before it issues the construction permit for a new nuclear power plant.

The petition(s) are denied

In conclusion, the Commission finds that an insufficient basis exists for amending its regulations on emergency preparedness in any of the ways recommended by the petitioners. The petitions of the Cititzens' Task Force of Chapel Hill, North Carolina; Mr. K. Sexton; and the Attorney General of the State of Maine are hereby denied.

Dated at Rockville, Maryland this 13th day of February, 1989.

For the Nuclear Regulatory Commission.

John C. Hoyle,

Assistant Secretary to the Commission.

[FR Doc. 90-3735 Filed 2-15-90; 8:45 am]

BILLING CODE 7590-01-M

NATIONAL CREDIT UNION ADMINISTRATION

12 CFR Parts 722 and 741

Appraisals and Requirements for Insurance

AGENCY: National Credit Union Administration (NCUA).

ACTION: Proposed Amendments.

SUMMARY: This proposed regulation implements Title XI of the Federal Financial Institutions Reform, Recovery and Enforcement Act of 1989 ("FIRREA"). It is intended to protect Federal financial and public policy interests in real estate-related financial transactions requiring the services of an appraiser. Title XI of FIRREA and this proposed regulation provide the affected Federal entities with added assurance that real estate appraisals used in connection with Federal responsibilities and requirements are performed in accordance with uniform standards by individuals whose competency has been demonstrated and whose professional conduct will be subject to effective supervision. Toward this end, the proposed regulation identifies which transactions require an appraiser, sets forth minimum standards for performing appraisals, and distinguishes those appraisals requiring the services of a state-certified appraiser from those requiring a state licensed appraiser. Uniform proposed regulations are being issued by all Federal financial regulators.

DATES: Comments must be received on or before April 17, 1990.

ADDRESSES: Send comments to Becky Baker, Secretary, NCUA Board, 1776 G Street NW., Washington, DC 20456.

FOR FURTHER INFORMATION CONTACT: Michael J. McKenna, Office of General Counsel, at the above address or telephone: (202) 682-9630, or Timothy P. Hornbrook, Office of Examination and