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IRA L. MYERS, M. D.  
STATE HEALTH OFFICER  
U.S. NUCLEAR REGULATORY COMMISSION  
ADVISORY BOARD ON REACTOR SAFEGUARDS

November 14, 1979

Chairman  
Advisory Committee on  
Reactor Safeguards  
U.S. Nuclear Regulatory  
Commission  
Washington, D.C. 20555

RE: NUREG 0396  
NUREG 0388  
NUREG 0610 Draft for Facilities  
OSP - "Emergency Planning Response  
Exercises" by Science Applications,  
Inc.  
NUREG 751111

Dear Sir:

After reviewing the above material one can only be convinced of the current conflicts in guidance and its interpretation for nuclear plant offsite emergency plans. For example:

1. NUREG 0396 clearly states that the emergency planning zone for inhalation is ten miles, while the worst accident example given in the NRR document would indicate that five miles is as far as one should go.
2. In assessing the off site consequences of any release, we make our first, but conservative, estimate based on the 95% worst meteorological conditions applicable for the given distance and wind speed. This was on the advice of the AEC staff and I believe still continues to be the staff recommendation. If one uses the example releases given in NUREG 0610 for a site emergency, then an evacuation would be required; yet this is not even a suggested state/local action for consideration. The only suggested action is for milk control for up to two miles. I suggest that in view of NUREG 0396 even this is inadequate.
3. Using the same dose estimation technique described in 2, the General Emergency given in the same document would require evacuation in excess of 10 miles or well in excess of that given in the examples in the document.

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Chairman  
Advisory Committee on Reactor Safeguards  
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4. NUREG 0396 gives scoping guidance for emergency planning for those states desiring concurrence. As a part of this concurrence, states have suggested that an exercise should be held to show that the necessary resources are available and can be deployed. The OSP document is a draft of a testing scenario. If we use this scenario, a few problems arise.

(a) Using our methods of calculating doses for determining protective action particulates are not considered. In fact, no federal agency has adopted a generally accepted method of estimating deposition of such particulates. Since no one has an agreed method for such problem, why was it included in the scenario?

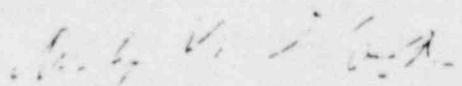
(b) The source of these particulates is not clearly expressed in the OSP document and may be an artifact of a computer code used for larger or different accident scenarios. This is key to determining what isotopes may be present in any contamination.

(c) We know of no federal guidance to take protective actions for human and land contamination from these particulates.

(d) NUREG 0396 states that special planning or resources should not be provided. As I read the OSP document I would be guilty of malfeasance if these particulates are expected but I had not advised the officials and assured adequate decontamination facilities were available along with temporary clothing for those decontaminated. If it is not reasonable to expect and plan for such particulates, why is it in the testing scenario? To embarrass the state/local officials!

It seems ridiculous to have the plan written to one criteria and the test of the plan to another criteria. Further, various groups within the NRC staff are telling the facility licensee that state/local plans must meet different criteria. This is very confusing to everyone because as soon as we think we know what to do, someone else says something different. Please use whatever influence you have to stop this and have one set of criteria used by all staffs. Further, this criteria should have been published for comments prior to its use and as far as I know the only such guidance is 75/111 and 0396.

Thank you,

  
Aubrey V. Godwin, Director  
Division of Radiological Health

AVG:aa

cc: IOAC

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## II. REACTOR SITING

The reactor siting stage of the NRC licensing process plays a critical role in emergency planning and preparedness. Reactor siting is the process of determining feasible locations for power reactors, and is important both to safe reactor operation and emergency planning. Whether a reactor is built in an earthquake or flood-prone area, for example, directly affects its prospects for continued safe operation. Whether it is built near population centers directly affects the feasibility of off-site protective action in the event of an emergency, as well as the extent of the threat to public health an accident might create.

The NRC controls siting decisions for nuclear reactors by criteria set forth in the Code of Federal Regulations, Volume 10, "Part 100."<sup>1/</sup> With respect to locating reactors near populated areas, Part 100 establishes a two-step decision-making procedure. The first step involves mathematical computations of potential fission product releases from proposed reactors. The possible impact of those fission product releases on densely populated areas determines whether the reactor would be too close to those areas. The second step, if necessary, is the review of specific site characteristics.<sup>2/</sup>

In the first step of the procedure, the NRC assesses the maximum fission product release that would be caused by a major accident. This information, in turn, directly determines the size of the LPZ, which is defined as an area containing "residents, the total number and density of which are such that there is a reasonable probability that appropriate protective measures could be taken in their behalf the event of a serious accident."<sup>3/</sup> The proximity of the LPZ to "population centers" finally dictates site suitability -- no reactor may be constructed in a location closer to the nearest boundary of any "population center" than a distance equaling 1 and 1/3 times the LPZ radius. For purposes of the NRC provision, a "population center" is an area with 25,000 or more inhabitants.

The foundation on which this decision-making process is built is the evaluation of the postulated major accident from which a fission product release would result. The NRC has established nine classes of postulated accidents, the review of which is instrumental in establishing performance standards for engineered safety features.<sup>4/</sup> The classes of the accidents are ranked in ascending order according to the seriousness of their potential environmental consequences and probable occurrence rates.<sup>5/</sup> Class 1 accidents are

based on small system perturbations that result in insignificant health and safety consequences. Class 9 accidents, the most serious group, are characterized by successive system failures more severe than those considered by protective systems designers or safety engineers. The most serious radiation release and adverse health consequences would be expected to result from the occurrence of a class 9 accident.6/

Class 8 accidents include a spectrum of postulated "loss-of-coolant accidents" (LOCAs), those in which various pipe breaks would, without replenishment of coolant, result in total or partial interruption of reactor coolant flow to the core.7/ The NRC analyzes this postulated range of LOCAs as part of its standard review of facility design.8/ If the analysis of these LOCAs, based on conservative assumptions,9/ indicates that they would not produce radiological consequences at the proposed LPZ boundary in excess of the substantial Part 100 exposure limits, the proposed LPZ will be accepted.10/

In a class 9 accident, the designed safety systems are presumed to fail. However, the NRC does not use class 9 accidents which would result in more substantial radiation releases into the environment than class 8 LOCAs, as the basis for siting determinations. Nor does it use them for establishing performance standards for reactors, having taken the view that, due to the NRC's "defense in depth" regulatory approach, the likelihood of the occurrence of a class 9 accident is extremely remote.11/ The TMI accident, however, has now been classified by the NRC as a class 9 accident.12/

Because the calculation of the LPZ is based in large part on the designed reactor safeguards, it is possible for an applicant to reduce the size of the zone if its border is too close to a population center. The applicant can do so by supplementing the plant design by adding more reactor safeguards, thereby reducing the design basis accident's (DBA) postulated fission product release and, in turn, the LPZ itself.13/ This situation arose concerning the Seabrook, N.H., nuclear plant. The reactor was already under construction when it was objected to as being too near to the recreational shoreline, a "densely populated area" under NRC regulations. Reactor safeguards, however, permitted a reduction of the LPZ sufficient to exclude the shoreline.14/

A fundamental problem in the NRC regulatory approach that affects emergency preparedness is that the LPZ boundary is determined under postulated accident conditions with reference to a standard that permits a substantial dose of radiation to an individual. An applicant is required to determine:

A low population zone of such size that an individual located at any point on its outer boundary who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose in excess of 300 rem to the thyroid from iodine exposure.<sup>14a/</sup>

If the postulated fission product release were actually to occur at these levels, it is evident that persons outside the LPZ would receive serious doses of radiation. The effects of a release beyond the LPZ and the preparedness of off-site organizations to cope with those effects should be a central concern of the regulator, but prior to the TMI accident, they clearly were not.

Prior to the accident at Three Mile Island, the NRC staff had adopted the position that "a distance of 3 miles to the outer boundary of the low population zone is usually adequate."<sup>15/</sup>

Even with the substantial doses of radiation postulated for determining the LPZ boundary, the NRC regulatory approach

to siting reactors has resulted in some LPZs of less than a mile in radius.<sup>16/</sup> In the case of TMI-2, the LPZ was established at 2 miles.<sup>17/</sup> Since a reactor with an LPZ of 2 miles can be constructed 2-2/3 miles from the "densely populated boundary"<sup>18/</sup> of a major population area, TMI-2 is 2.2 miles from Middletown, which is not a major population area, and 10 miles from Harrisburg, which had at the time of siting a population of 68,000.<sup>19/</sup> The estimated population of the 50-mile area immediately surrounding TMI is nearly 2 million. The TMI-2 application predicted that that figure would increase to over 3 million during the 30-year life of the facility. The proximity of reactors to large population centers is not unusual -- 10 million people live within 20 miles of a nuclear reactor.<sup>20/</sup> This regulatory approach has drawn criticism from both within and outside the NRC.<sup>21/</sup>

The NRC approach to reactor siting has complicated the problems of planning for and responding to radiological incidents at nuclear power plants. Under this approach, the NRC and the AEC before it have placed reactors in locations where emergency response might be extremely difficult. Commenting on this problem, Robert Ryan, director of the NRC's Office of State Programs, which has responsibilities for emergency planning, described his reaction to the siting of New York's Indian Point nuclear power complex, which has three reactors:

I think it is insane to have a three-unit reactor on the Hudson River in Westchester County, 40 miles from Times Square, 20 miles from the Bronx. And if you describe that 50-mile circle, as I said before, you've got 21 million people. And that's crazy. I'm sorry. I just don't think that that's the right place to put a nuclear facility.

And it was bad enough to put one in, but subsequently they put another in and then yet another.... [I]t's a nightmare from the point of view of emergency preparedness.<sup>22/</sup>

It should be noted that the siting regulations disregard post-licensing changes in land use. Even if an area qualifies at the time of licensing as a sparsely populated region in which an evacuation or other protective action could be carried out successfully, there is no guarantee that the area will maintain that character over time. In many cases, population concentrations can increase in areas near reactors to the point that original siting assumptions become invalid. Although the NRC has been aware of this problem, its regulations do not address it.<sup>23/</sup>

The NRC has recently begun to review its approach through task forces. The NRC Siting Policy Task Force, the

first NRC group since 1962 formally to evaluate siting policy,<sup>24/</sup> recommended in August 1979, that the LPZ be abandoned in favor of a "fixed emergency planning distance of 10 miles." The emergency planning zone would be one in which "evacuation of persons, including transients, would be feasible if needed to mitigate the consequences of an accident."<sup>25/</sup> This proposal is consistent with that of a joint NRC/Environmental Protection Agency (EPA) Task Force Report issued in 1978.<sup>26/</sup> The NRC has now endorsed the recommendations of the NRC/EPA Task Force.<sup>27/</sup>

As a result of the present regulatory approach of the NRC, however, the location of the TMI plant, with its LPZ of 2 miles, was approved without considering the effects of an accident causing a considerable release of radiation beyond the LPZ. That policy has made the possibility of off-site consequences of reactor operation less prominent and has contributed to the development of an attitude visible at all levels of government that radiological emergency planning for off-site consequences was not at all a matter of urgent concern and was not even necessary for areas more than a few miles from the site.<sup>28/</sup>

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### III. NRC REQUIREMENTS FOR EMERGENCY PLANNING

Both the AEC and the NRC accorded emergency planning a low priority. One reason for this attitude was their confidence in designed reactor safeguards, reflected in their approach to reactor siting. Another reason, as NRC Commissioner Peter Bradford admitted, was "reluctance to confront the public with high visibility emergency planning in the context of nuclear power. It was uncomfortable."<sup>29/</sup> That this was a concern was also acknowledged by the NRC's assistant director for emergency preparedness in its Office of State Programs:

There were people in the agency [AEC] who were afraid that if emergency preparedness and planning became too big an issue that it may stymie the development of nuclear power. I think that is a fair statement.<sup>30/</sup>

The history of emergency preparedness within the AEC and NRC demonstrates the lack of commitment. In 1969, when approximately 20 twenty nuclear power plants were already in operation,<sup>31/</sup> only seven AEC employees out of 500 to 600 had any responsibility for emergency planning,<sup>32/</sup> and even those seven did not work exclusively on emergency planning matters. Between 1969 and 1972, they collectively worked "about one to two man years per year" on the subject.<sup>33/</sup>

Even after the promulgation of 10 CFR Appendix E, the regulation on emergency planning, "emergency planning was not a big piece of business in the AEC."<sup>34/</sup> The commitment increased somewhat after 1972,<sup>35/</sup> although it remained weak.<sup>36/</sup> Immediately prior to the TMI accident, only three full-time professionals and one secretary out of 2,500 NRC employees worked on emergency preparedness matters.<sup>37/</sup> "The emergency preparedness function in the NRC was a backwater and ... was not receiving the time, attention, and resources which were necessary to make it a successful program."<sup>38/</sup> The problem is not only one of resources, however. It is also one of attitude. For example, in response to a May 1978, report by the Citizens for a Better Environment, entitled "Nuclear Power Plant Evacuation Plans," which alleged that radiological emergency response planning was inadequate, Robert Ryan, Director of the Office of State Programs for the NRC, while disputing the "sweeping denunciation of our program by CBE," raised a series of emergency preparedness issues for internal resolution by the commission. The memorandum was never answered. According to Ryan, "it disappeared into the sand like a glass of water in the Sahara. It just created not a ripple."<sup>39/</sup> Only since the TMI accident has the NRC proposed a comprehensive review of its regulatory approach to and resource allocations for emergency planning.<sup>40/</sup>



The lack of commitment evident in NRC's historical approach to emergency planning is manifested in its current regulations. Under Appendix E,<sup>41/</sup> construction permit applicants need submit for NRC review only general information regarding emergency planning.<sup>42/</sup> Operating license applicants must submit more extensive information,<sup>43/</sup> and it is at the operating license review stage that a more detailed examination of emergency planning takes place. Under the regulation, licensee emergency plans must address several matters,<sup>44/</sup> but the appendix states only that "plans should contain" those elements and does not specify the ways in which those matters should be treated.<sup>45/</sup> Regulatory Guide 1.101 (1.101),<sup>46/</sup> which was written to provide more detailed guidance on NRC's view of the extent of planning required by Appendix E, has no legal force. According to a recent congressional report, of the 48 sites with operating commercial power reactors, only four have plans that the NRC considers to be in compliance with 1.101.<sup>47/</sup> TMI is not one of the four.<sup>48/</sup> Prior to the accident, the NRC had no plans to require licensees not in compliance to revise their emergency plans to meet 1.101 standards. One reason given for this decision was the NRC manpower commitment.<sup>49/</sup> Since the accident, however, the NRC's Office of Nuclear Reactor Regulation has determined to bring non-complying plants into compliance with 1.101 on a "fairly short time fuse."<sup>50/</sup>

1.101 covers a range of planning by advising licensees to classify potential accidents,<sup>51/</sup> "describe" emergency response organizations,<sup>52/</sup> "identify" emergency plans and equipment,<sup>53/</sup> and provide some "means to insure" maintenance of emergency preparedness.<sup>54/</sup> 1.101 categorizes "emergency measures" by whether the intended effect of the measures is to mitigate on-site or off-site consequences of accidents. For on-site consequences, plans cover several different responsive actions,<sup>55/</sup> but for off-site consequences, only three are mentioned:

- a. "[A]ctions planned to protect persons in the low population zone and criteria for their implementation";<sup>56/</sup>
- b. "the means and the time required to warn or advise the persons involved, including (1) businesses, property owners, and tenants; (2) schools or recreational facilities; and (3) general public";<sup>57/</sup> and
- c. regarding control of contaminated foodstuffs, provisions "for preventing or minimizing direct or subsequent ingestion exposure to radioactive materials deposited on the ground or other

surfaces ...."58/ For off-site areas, these provisions should take the form of "[P]rotective actions planned for the low population zone with provisions for extending such actions to areas further from the site boundary, if necessary ...."59/,60/

Although the extent of the off-site planning required of the licensee to satisfy these elements is unspecified, it has been held that the licensee's planning obligation is limited to the LPZ.61/ Limiting the obligation to a zone of only a few miles is an approach consistent with both the NRC's approach to siting and its stated position that the response to the off-site consequences of radiological incidents is primarily the responsibility of state and local governments.62/ It is an approach, however, that has drawn extensive criticism.63/

The NRC has instituted a program, discussed in detail later in this report, by which it reviews state plans and issues a letter of "concurrence" if the plans contain certain elements.64/ The program was intended to encourage states to upgrade their emergency plans in accordance with 154 criteria.65/

From 1974 to 1977, no state plans qualified.66/ In 1977, the NRC reduced the number of planning elements necessary for concurrence to 70.67/ Since that reduction, 13 states have received NRC concurrences, including two since the accident at TMI.68/ In the judgment of NRC's director of the Office of State Programs, 24 additional states need concurred-in plans.69/

Despite its view that off-site emergency response is the obligation of state and local governments, the NRC does not require as a condition of licensing that state emergency plans receive NRC concurrence or have specific elements. It has been stated that one reason for this policy has been the NRC's concern that, if the policy were adopted, state governors would have a veto, in effect, over nuclear power plant siting by purposely not obtaining NRC concurrence for state plans.70/ The official reason for this policy -- reflecting the NRC regulatory approach -- was stated by Lee Gossick, the NRC's executive director for operations, in response to criticism from the General Accounting Office (GAO):

NRC protects public health and safety by giving primary consideration to site characteristics and design features of nuclear facilities. Once we are satisfied that these meet an adequate measure of safety, we evaluate the emergency plans for the facility. From this point of view, State and local emergency plans

provide an added margin of protection for the public in the vicinity of a nuclear facility in which we believe that an adequate measure of safety already\* exists. The Commission's licensing decision process is structured to take into account a wide variety of standards and criteria in the evaluation of proposed or existing nuclear power plants to the end that substantial conservatisms exist in design and operating safety margins. To the extent that proposed or existing plants fail to meet these standards, NRC would not license them or permit them to continue to operate. In this context, State and local plans, while related to the facilities undergoing the licensing process, and to applicant's emergency plans, are not essential in determining whether the plant can be operated without undue risk to public health and safety. (Emphasis supplied.)<sup>71/</sup> (\*Emphasis in original.)

Since the accident, Chairman Hendrie has retreated from this statement, saying in hearings before a subcommittee of the House of Representatives that the "assortment of questions" raised by the accident "absolutely" revised that staff position.<sup>72/</sup> Hendrie would not, however, go so far as to recommend that licenses should not be issued in the absence of effective state and local plans, preferring to resolve that issue within the commission at a later time.<sup>73/</sup> Commissioner Richard Kennedy, however, still adheres to the view that state and local plans are not necessary for safe reactor operation.<sup>74/</sup> Nonetheless, in states which do not "move toward" having effective plans, he would consider shutting down plants in the future.<sup>75/</sup> Two other commissioners, Peter Bradford and Victor Gilinsky, feel that licensing should be contingent upon states and localities having "satisfactory emergency plans."<sup>76/</sup> The author of the statement quoted above, Lee Gossick, has testified that his views remain unchanged. Although Gossick acknowledges that off-site communications are necessary, he believes that "a plan for evacuation is perhaps of marginal value."<sup>77/</sup> Regardless of NRC's resolution of this issue, its long-standing approach to emergency planning unmistakably influenced the emergency planning in place during the TMI accident, a planning process that was shaped at the licensing stage.

## IV. THE TMI OPERATING LICENSE REVIEW -- CONTENTION 8

The radiological emergency planning performed by Met Ed and state and local governments for TMI was specifically challenged during the NRC's operating license review process. Met Ed's application proposed an exclusion zone of 2,000 feet,<sup>78/</sup> a zone which would reach neither bank of the Susquehanna River. The proposed LPZ was 2 miles.<sup>79/</sup> Acceptance of that LPZ by the NRC would result in TMI-2 being located within 10 miles of Harrisburg, PA (1970 population 68,000),<sup>80/</sup> within 1.5 miles of Goldsboro (1970 population 600), within 2 miles of York Haven (1970 population 700), within 2.5 miles of Royalton (1970 population 1,100) and within 2.2 miles of Middletown-Steelton (1970 population 22,450).<sup>81/</sup> The total population within the LPZ was estimated at 4,000.<sup>82/</sup>

In accordance with established procedure, the NRC staff initially reviewed the TMI-2 emergency plan and, in its safety evaluation report (SER), concluded that the plan satisfied all of the legal requirements of Appendix E.<sup>83/</sup> To support that conclusion, the staff cited the plan's compatibility with 1.101, noted that necessary agreements between the utility and off-site organizations had been reached, and further concluded, based on its calculations, that "the time to evacuate any 22 1/2 degree sector out to five miles would vary from three to six hours, with resulting radiation doses which are a small fraction of the siting doses of 10 CFR Part 100."<sup>84/</sup> Supplements to the SER did not discuss the emergency plan, indicating that the NRC's Advisory Committee on Reactor Safeguards, which reviewed the SER, had no objections.<sup>85/</sup>

At the public hearing stage of the licensing procedure, however, when the NRC staff position on the emergency plan was already taken, assertions of plan inadequacy arose. Citizens for a Better Environment (CBE), an environmental group which was not represented by counsel and which did not present direct testimony, raised numerous objections to the proposed license, including Contention 8 on emergency planning:

The warning and evacuation plans of the Applicants and the Commonwealth of Pennsylvania are inadequate and unworkable. The plans assume that all local and state officials involved are on 24-hour notice and can be contacted immediately. They further assume that all people notified will promptly react and know how to respond and are trained in what to do. They also assume that the public, which has been assured that accidents are "highly unlikely" or "highly improbable," will respond and allow themselves to be evacuated. No

operating license should be granted for Unit 2 until emergency and evacuation plans are shown to be workable through live tests.86/

At the hearing before the Atomic Safety and Licensing Board (ASLB), the state and county civil defense agencies and the NRC staff supported the TMI-2 plan. Craig Williamson, deputy director of what is now the Pennsylvania Emergency Management Agency, testified for Met Ed. Williamson outlined Pennsylvania's emergency response structure, the state's Disaster Operations and Assistance Plan, and the state's expected response in an emergency.87/ The NRC staff also supported the licensee by reiterating its earlier SER approval of the plan.88/ Kevin Molloy, the director of civil defense for Dauphin County, who was aided in the preparation of his testimony by Met Ed lawyers,89/ testified that his emergency organization could successfully contact all necessary persons "within minutes" of the onset of an accident.90/ He testified further that his organization could evacuate the most populated areas around the plant out to 5 miles in a period of less than 7 hours.91/

During the proceedings, state and Met Ed lawyers had not objected to questions about planning beyond the LPZ so long as the area discussed was within the 5-mile emergency planning zone the state required of civil defense organizations.92/ When Molloy was pressed by intervenors about whether he could promise effective evacuation in areas beyond 5 miles from the site, however, the lawyers for both Pennsylvania and Met Ed objected to the line of questioning on the basis that nowhere was it apparent that an evacuation beyond 5 miles might ever be necessary. Citing a decision of the Atomic Licensing and Appeal Board (ALAB) in a previous case, Met Ed lawyers further maintained that any such discussion went beyond the "confines" of the hearing. The board sustained the objections, thus precluding any inquiry into the state of emergency preparedness beyond the 5-mile radius.93/

At the conclusion of the proceedings, the ASLB dismissed the intervenor's objections:

[W]e find that the record supports the conclusion that Contention 8, in its entirety, is without merit, and that the Staff has properly assessed the adequacy and workability of the emergency response. We also find the emergency and evacuation plans to be both adequate and workable.94/

Six months later, the ALAB affirmed.95/ Relying heavily on the opinion evidence entered in the lower proceedings, the ALAB rejected all of the intervenors' arguments. It dismissed

intervenor's contention that "live tests and drills" should be held regularly (to ensure continued plan workability) on the basis of Molloy's testimony that such tests could be "counter-productive."<sup>96/</sup> Again relying on Molloy, it dismissed the notion that local officials might be unable to respond adequately to a nuclear emergency because of their lack of specialized knowledge about radiation, holding that the lack of detailed knowledge of why evacuation might be necessary presents no bar to executing an evacuation successfully. It dismissed as unfounded the intervenor's argument that sufficient numbers of emergency response personnel might be unavailable on occasion to assist the public.<sup>97/</sup>

On the question of considering feasibility of evacuation beyond the 5-mile emergency planning zone required by the state, the board said:

It is true that, for reasons which need not be discussed here, the applicants and the staff nevertheless looked into the possible need for protective measures within a five mile radius of the reactor -- and the intervenors were permitted to cross-examine on the evidence presented in this regard. It scarcely follows from this fact, however, that the question of emergency planning at still greater distances from the LPZ boundary had to be explored at the intervenor's instance.<sup>98/</sup>

From: Memorandum from Morris K. Udall, Chairman, to Members, Subcommittee on Energy and the Environment, U. S. House of Representatives (Nuclear Policy Memorandum), Oct. 9, 1979.

G

VIII. REMOTE SITING

BACKGROUND

From the perspective of protecting the public against the effects of a major radiological release caused by a nuclear accident, the existing regulatory framework places major emphasis on safe plant design and operation. As a result, siting is downplayed as a factor that could make a significant contribution to the protection of public health and safety. Today's regulatory philosophy is illustrated by the fact that sites with unfavorable characteristics may be "found to be acceptable if the facility includes appropriate and adequate compensating engineering safeguards to accommodate the unfavorable characteristics" (10 CFR Part 100.10).

At present the NRC, in making siting decisions, is not required to take explicit account of the possibility of a major nuclear accident. Current siting regulations consider a "maximum credible accident" which is defined not to include a major off-site release of radioactivity -- the so-called Class 9 accident. Implicit account is taken of such accidents since the NRC as a practical matter will not issue a construction permit for reactors in densely populated areas and the Commission is moving toward more specific and more stringent siting criteria.

As a result of the current site selection process 10 million Americans now live within 20 miles of a reactor and 10 million live within 30 miles. An example of a plant in an area of high population density is the Indian Point station which is located 40 miles from New York City. Based on 1970 census data, 53,000 people live within 5 miles of Indian Point, 220,000 live within 10 miles, 890,000 live within 20 miles, and 4 million within 30 miles.

During the accident at Three Mile Island the NRC considered an evacuation of citizens out to a radius of 20 miles from the plant an area which enclosed 600,000 people. The practical problems associated with evacuating large numbers of people in the event of a serious nuclear accident have long been obvious; these problems have assumed new significance in the aftermath of TMI.

The Senate version of the FY1980 NRC authorization bill would require the Commission to promulgate new demographic requirements for the siting of nuclear plants. These new siting requirements would apply to new construction permit applications, and would specify:

- the extent and maximum population density of the low population zone immediately surrounding the site, including



consideration of permissible radiation exposure;

- acceptable means of assuring such maximum population density is not exceeded during the useful life of the plant; and,

- the maximum distance from the site to the nearest boundary of any densely populated area.

PROPOSAL A (regarding new sites)

Depending upon the outcome of Congressional action on the FY80 NRC authorization, the Atomic Energy Act could be amended to require NRC to adopt more stringent siting criteria which take into account the possibility of major off-site radiological releases resulting from a nuclear plant accident.

PROPOSAL B (regarding existing sites)

Using the new siting criteria (developed in accordance with Proposal A), NRC must re-evaluate the suitability of existing sites where reactors are either licensed for operation or construction, as follows:

(1) NRC must review the siting conditions at all locations where commercial reactors are licensed to operate or be constructed;

(2) NRC must assess the extent to which these existing sites are in compliance with the new siting criteria;

(3) NRC must identify those existing sites which are not in compliance with the new criteria;

(4) NRC must recommend steps that could be taken so that a non-conforming existing site could be brought into compliance with the new criteria; and,

(5) NRC must report to Congress on the results of this reevaluation of the suitability of existing sites.

Advantages

Remote siting could help mitigate the consequences of serious nuclear accidents by facilitating emergency preparedness and the carrying out of emergency evacuations. Evidence suggests that siting reactors 50 to 100 miles from city centers would reduce the consequences of major accidents and would not damage the competitive position of nuclear vis-a-vis alternative energy sources.

The population exposure resulting from small radiological releases may be less for a remotely sited plant than for a reactor nearer to a large population center.

Disadvantages

As a practical matter, NRC and industry seem to be moving in the direction of selecting and approving sites located away from population centers, and legislation requiring remote siting, therefore, may be unnecessary. It also has been argued that as nuclear plant sites become more remote from load centers and population centers, longer transmission lines will be needed and system reliability could decrease.

It also may be the case that remote siting puts plants in areas where people who receive a small portion of the plant's benefits have imposed on them a disproportionately large share of its risks.

Options

The Subcommittee could:

- A) Approve legislation which requires NRC to develop remote siting criteria, which would be applicable to both new and existing sites;
- b) Approve legislation required NRC to develop remote siting criteria which would be applicable to new sites, but not to existing sites where plants are in operation or under construction;
- c) Not address the remote siting issue.

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From: Memorandum from Morris K. Udall, Chairman, to Members, Subcommittee on Energy and the Environment, U. S. House of Representatives, (Nuclear Policy Memorandum), Oct. 9, 1979.

VII. EMERGENCY PLANS

Background

Reactor owners are now required by NRC regulation to provide limited plans for coping with radiological emergencies. Within the boundaries of the reactor site and with regard to licensee personnel the reactor owner is required to demonstrate a capability for emergency response including notification, protection and evacuation and to provide emergency radiological health services. With regard to areas or persons outside the boundaries of the reactor site, these regulations require only that the licensee obtain written agreements from local and state authorities that such officials can and will provide emergency assistance for the public in case of an accident at the reactor. Such assistance is required by NRC regulations and guidelines to include public notification, evacuation capability and appropriate emergency response organizations and personnel. In addition, licensees are required to obtain agreements from hospitals assuring availability for the public of adequate emergency radiological medical services. The licensee is responsible only for the existence of the written agreements, however, and not for the integrity of those agreements. The actual capabilities represented by the agreements are not tested by the Commission. Serious questions have been raised by the General Accounting Office

and by numerous citizens' groups and state and local officials regarding the actual preparedness of state and local governments and the public to respond to radiological emergencies.

The NRC has attempted to improve state and local emergency response capabilities through technical assistance programs. In addition, the agency has a program for evaluating emergency capabilities around reactor sites. However, NRC approval of such emergency capabilities is not required for approval of reactor licenses.

In June of 1979 the Commission created a Task Force on Emergency Planning to review current emergency planning policies and requirements and to make recommendations concerning possible improvements. The task force was requested to consider "recent lessons learned" from the accident at the Three Mile Island power plant in Pennsylvania.

The Task Force and the Commission initiated in July, 1979 a rulemaking on the "Adequacy and Acceptance of Emergency Planning Around Nuclear Facilities." The Commission undertook to expedite the rulemaking and to complete the process within six months. The rulemaking considers whether licenses for new reactors or for operating reactors should be conditioned on NRC approval of associated state and local emergency response plans. Other issues addressed include the appropriate extent to which plans should be tested, the criteria for determining the adequacy of capabilities, Federal/state/local

interaction, possible Federal financial assistance to State and local governments, and the proper extent of licensees' financial and other responsibilities for off-site emergency protection.

The Interior Committee recommendation for the NRC Authorization for FY 1980 includes a provision prohibiting use of FY '80 funds for issuing a nuclear power plant operating license unless the Commission has approved an emergency evacuation plan submitted by the State in which the plant is located. Where applicable the plan must encompass a multi-state region. The Senate version of the FY 1980 NRC Authorization (S. 562) amends the Atomic Energy Act with a much more elaborate emergency plan requirement. It amends the Atomic Energy Act similarly to the above 1 year requirement and calls for operating reactors to be shut down if no plan is approved.

Proposal

If the issue is not adequately addressed in the NRC Authorization bill, the Atomic Energy Act might be amended to add as a condition of obtaining an operating license that there be an NRC approved state emergency plan for responding to nuclear accidents. Such plans would be required to meet objective criteria showing that they would be effective. The NRC would review emergency plans for existing plants on a

case-by-case basis. Where adequate State plans could not be obtained for existing plants, the NRC would have authority to take such actions as it deemed necessary, including revocation of operating licenses.

#### Advantages

Congressional action would assure that emergency protection for the public was taken seriously and given top priority by both Federal officials and those state and local officials whose cooperation is crucial. Emergency planning is essential as the last line of defense against accidents at nuclear reactors. Although some improvisation will always be necessary to deal with specific emergency situations, adequate planning can save time, avoid confusion or panic and particularly assure that necessary medical and other special radiological equipment and facilities are available.

The Nuclear Regulatory Commission is now licensing reactor operation in an admitted absence of assurance that the public would be as well protected as possible from the effects of a nuclear accident. Past Commission decisions on this issue have disregarded advice from public interest groups, the General Accounting Office and its own Advisory Committee on Reactor Safeguards. Legislative action would provide a positive directive to the Commission and assure that the emergency planning problem is addressed.

#### Disadvantages

Emergency planning is the responsibility of state and local governments. Those officials and organizations are the

only parties in a position to effectively assist the public in case of a local emergency. The emergency planning agreements between reactor operators and these officials constitute adequate assurance that emergency protection will be provided. Detailed emergency plans cannot anticipate actual emergency situations and may turn out to be of little help in case of an accident. Since neither the reactor operator nor the Commission is in any position to control the governments or the adequacy of their emergency plans, it would be inappropriate to condition reactor licensing on such a requirement.

The Commission is addressing these sensitive issues in a rulemaking, the results of which will be available early next year. At the least, any Congressional action should await the outcome of that study.

#### Subcommittee Options

- 1) Require that adequate emergency plans be provided for all nuclear reactor facilities, leaving the determination of adequacy to the Nuclear Regulatory Commission.
- 2) Condition reactor licenses on adequate emergency plans, incorporating existing NRC criteria for adequacy.
- 3) Condition issuance of all new reactor operating licenses on adequate emergency plans. With regard to existing reactors:
  - a) Authorize the Nuclear Regulatory Commission to decide on a case-by-case basis to take such action as it may deem necessary, including license revocation, or



- b) Require that facilities which cannot provide for adequate emergency plans due to demographic, geographic or other considerations to
- 1) be shut down if a determination is made that adequate power exists in an area from other generating sources, or
  - 2) if adequate power is not available, curtail power production at the nuclear facility to the extent possible in order to reduce the accident hazard.
- 4) Leave the emergency planning issue to the Nuclear Regulatory Commission rulemaking.
- 5) Postpone Subcommittee action until after the NRC authorization has been completed in the Congress and/or after the completion of the NRC rulemaking.

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RHB-062-79

December 6, 1979  
NFR-293-79

Mr. Samuel J. Chilk  
Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Docketing and Services Branch

Subject: NUREG 0610 "Draft Emergency Action Level Guidelines  
For Nuclear Power Plants" - General Electric Comments

- References:
- 1) NUREG 0610, "Draft Emergency Action Level Guidelines For Nuclear Power Plants", Office of Nuclear Reactor Regulation, September 1979.
  - 2) AIF Letter J.E. Ward to Samuel J. Chilk, dated November 28, 1979.
  - 3) S.H. Bush, "A Reassessment of Turbine-Generator Failure Probability", Nuclear Safety Volume 19, No. 6, November-December 1978.

The U.S. NRC Office of Nuclear Reactor Regulation developed draft emergency action level guidelines to improve the emergency preparedness capabilities of operating nuclear power plants. The draft guidelines were published as NUREG 0610 (Reference 1) and public comments were solicited. This letter is written to provide General Electric comments.

General Electric endorses the Atomic Industrial Forum's Committee on Reactor Licensing and Safety comments (Reference 2). In particular, we wish to support the AIF recommendation to include "in-plant occurrence" as an emergency action class rather than "notification of unusual event".

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