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

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DOCKETING & SERVICE
BRANCH

Edward A. Thomas, Chairman
Regional Assistance Committee
Federal Emergency Management Agency
John W. McCormack Post Office and Court House
Boston, Massachusetts 02102

Dear Mr. Ed Thomas:

Reference: Your memo of December 31, 1985 relative to the beach populations in the Seabrook area

As requested, I am responding to your memo regarding the adequacy of the New Hampshire RERP relative to the protection of the beach population. My response is based on Revision 2 of the NH RERP; the RAC/contractor comments on it, including the Seabrook Evacuation Time Study; the analyses of specific Seabrook Station features; and my professional knowledge and judgement related to emergency preparedness. The bases of my opinion that the plans are or will be adequate (contingent on completion of actions by New Hampshire to resolve RAC concerns) to protect the beach population (both the beach transient group and those who inhabit unwinterized accommodations) are provided in the Enclosure to this correspondence.

Should you have any questions concerning the above, please contact me at FTS 488-1213. I would be happy to meet with you and/or the RAC to discuss my response.

Robert Bores, Technical Assistant
Division of Radiation Safety
and Safeguards

Enclosure: As Stated

cc w/encl:
W. Lazarus, RI

NUCLEAR REGULATORY COMMISSION
Docket No. 50-443/444-OL Official Exh. No. 5
In the matter of Seabrook
Staff ✓ IDENTIFIED ✓
Applicant RECEIVED ✓
Intervenor REJECTED
Cont'g Off'r
Contractor DATE 5/19/88
Other Witness Bores
KA

PROTECTION OF NEW HAMPSHIRE BEACH POPULATIONS

BACKGROUND

The requirements for emergency preparedness stem from 10 CFR 50.47(a)(1) and (2), which state that except as provided in 10 CFR 50.47(d) (relative to licensing of a facility for operation up to 5% of rated power), no operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. The NRC will base its finding on a review of the FEMA findings and determinations as to whether state and local emergency plans are adequate and whether there is reasonable assurance that they can be implemented, and on the NRC assessment of the adequacy and implementability of the licensee's onsite emergency plans. The FEMA finding is primarily based on the review of the state and local emergency plans. Any other information already available to FEMA may be used in considering whether there is reasonable assurance that the plans can be implemented. Paragraph (b) of 10 CFR 50.47 requires that the onsite and offsite emergency response plans for nuclear power reactors meet 16 specified planning standards.

NUREG 0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants", was issued to provide a common reference and guidance source for state and local governments and licensees in the development of emergency response plans and preparedness for response to a radiological emergency and for FEMA, NRC and other federal agencies for use in the review of those plans and preparedness.

The planning basis adopted by NRC and FEMA for emergency preparedness around nuclear power plants was taken from NUREG 0396/EPA 520/1-78-016, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants". "The overall objective of the emergency response plans is to provide dose savings (and in some cases, immediate life savings) for a spectrum of accidents that could produce offsite doses in excess of the PAGs" (NUREG 0654). NUREG 0396 intended that the planning basis range from trivial events to worst case accidents and it attempted to identify the boundary parameters based on available knowledge of potential accident consequences, timing of releases, and release characteristics (source term). It should be noted that doses in excess of the EPA PAGs do not equate with loss of life or even a health hazard. The PAGs were intended for use by protective action decision makers in arriving at a balance between radiation risk and that of taking a protective action in the absence of constraints to that action.

Relative to the adequacy of emergency preparedness for the Seabrook beach population, NUREG 0654 elements J.9 and J.10 appear to be pertinent to the situation. Element J.9 states, in part, that each state and local plan must establish a capability for implementing protective measures based upon protective action guides and other criteria. Element J.10 states that these plans to implement protective measures shall include, in part: maps showing evacuation routes and areas, relocation (reception) centers and the population distribution around the nuclear facility by evacuation areas; the means to notify all segments of resident and transient population; the means for protecting persons whose mobility may be impaired; the means of relocation; reception centers/host facilities; projected traffic capacities of evacuation routes under emergency conditions; control of access to evacuated areas and organizational responsibilities for control; identification of and means for dealing with potential impediments to use of evacuation routes and contingency measures; time estimates for evacuation of various sectors and distances based on a dynamic analysis; and the bases for choice of recommended protective actions for the plume exposure pathway during emergency conditions, including consideration of local protection available and estimated evacuation times.

REVIEW OF NEW HAMPSHIRE PLAN, REVISION 2, AUGUST, 1986

J.9 -- The RAC review of element J.9, the establishment of capability for implementing protective measures, for both the State and local level plans, has indicated that no apparent action was warranted by the State at this time for this element. This element was rated "inadequate" for the State, however, because the RAC had not yet resolved the "beach population issue", the subject of this document. New Hampshire is also currently reexamining all emergency resource needs and the resource availability and distribution to support protective action implementation. The resource needs and availability area will be reviewed by the RAC after completion of the NH study. Based on the RAC and my examination of the plans and preparedness for the beach population and those individuals in unwinterized housing, I conclude that these populations can be appropriately protected by implementing those provisions of the current NH emergency plans. There appears to be no unique problem in this area that has not been adequately addressed.

J.10.a -- The RAC review of element J.10.a relative to beach population protective action implementation, i.e., the maps of evacuation routes, of evacuation areas, and of reception and host areas for both the State and local plans, reveal no inadequacies. (An "inadequacy" was identified with regard to the map of the environmental sampling locations; however, this is unrelated to beach population protection measure implementation. Several minor clarifications were recommended for bus route maps. However, relative to the beach population, this element appears to be adequate.

J.10.b -- The RAC review of element J.10.b, maps showing population distribution by evacuation areas around the nuclear facility, indicate no inadequacies for either the State or local plans. No actions were required of nor recommended to the State for this element.

J.10.c -- Relative to J.10.c, the means for notifying all segments of the population, the RAC left the evaluation of the State portion of this element "open" pending completion of the FEMA-REP-43 (now FEMA-REP-10, Nov. 85) review of the alert/notification system. For the local plans this element was rated "inadequate" because details were not provided relative to provisions for identifying siren failures and for providing backup notification in those instances of identified siren failures. It should be noted that this inadequacy was generic for all town plans and was not applicable only to the beach population.

The physical siren system and the administrative procedures, plans and means for alerting and notifying the public appear to be in place and adequate. Provisions for early notification of beach populations with both siren tones and voice message capability are in place. The alert/siren system can be activated on an individual siren basis, in groups, or as the entire system to provide flexibility to the decision makers to accommodate the circumstances of the event.

J.10.d -- Relative to J.10.d, the means for protecting persons whose mobility is impaired, the RAC identified no inadequacies at either the State or local level. Provisions were found adequate for health care facilities, Rockingham County Jail, schools, etc. Relative to "individuals with special needs", however, the RAC left this item "open" pending a review at a future date by FEMA of the lists of such special needs individuals. This open item is generic to the entire EPZ and is NOT unique to the beach population.

The RAC also recommended that the protection factors for special facilities be considered in any KI administration decision as they are when considering evacuation of these facilities. (The current provisions use no designated protection factors for special facilities when calculating projected thyroid doses for purposes of KI administration decisions.)

J.10.e -- Element J.10.e, provisions for use of KI, is <u>not</u> applicable to the beach population, at least not in any unique sense. Therefore, no evaluation is considered here. The RAC rated this element "adequate".

J.10.f -- Element J.10.f, decision making for use of KI is not directly applicable to the beach population and, therefore, is not considered here. The RAC rated this element "adequate".

J.10.g -- Relative to J.10.g, the means of relocation, the RAC found provisions to be "adequate" at both the State and local levels. The RAC did, however, have a number of recommendations in this area relative to plan and procedure inconsistencies in the bus and ambulance resource needs, resources available, resource response times and in the mechanism for determining precisely the number of special needs persons to be accommodated by the identified resources. These inconsistencies, however, were closely evaluated by the RAC and were judged not to result in a lack of resource provisions to adequately accommodate those needing transportation.

J.10.h -- Relative to J.10.h, relocation centers, the RAC found that provisions for reception centers and host facilities were "adequate". No additional needs or recommendations were identified.

J.10.i -- Relative to J.10.i, projected traffic capacities of evacuation routes, the RAC indicated that the appropriate traffic capacity data were provided. No inadequacies were identified for this element.

J.10.j -- Relative to J.10.j, control of access to evacuated areas, the RAC found no inadequacies. The State has responsibility and adequate provisions to perform this function. The only RAC recommendations for this element concerned radiological directions for emergency workers and access logs.

J.10.k -- Relative to J.10.k, identification of and means for dealing with potential impediments to the use of evacuation routes, the RAC found no inadequacies but did have one additional recommendation to be considered by the State for possible improvement. Inventories of equipment, procedures and letters of agreement were provided and were found to be "adequate".

J.10.l -- Relative to J.10.l, evacuation time estimates, the RAC has reviewed the "Seabrook Station Evacuate Time Estimate Study" (Vol. 6 of the RERP) and concluded that although the study was "essentially adequate" in terms of format, there still exist a number of technical issues that are of concern and need be addressed. The bulk of these technical concerns can be grouped into several areas: the evacuation times appear to be overly pessimistic in that the "worst case situations" were generally utilized whenever there were uncertainties in data or conditions; inconsistencies in data or results were not satisfactorily explained; the bases for data/results were not always clear; and maps and tables had some inconsistencies.

It should be noted that the purpose of Evacuation Time Estimates (ETEs) is not to provide data showing that any or all areas can necessarily be evacuated prior to plume arrival, but rather to provide the decision makers with the best estimate of times needed to evacuate a given area(s) under the circumstances such that the most appropriate decision can be made relative to whether to evacuate an area(s) and the timing of such recommendations.

J.10.m -- Relative to J.10.m, bases for choice of protective actions for the plume exposure pathway, the RAC left this item "open", citing element J.9 in its comments. No specific actions were asked of nor recommended to the State to resolve this issue. As with J.9, there appears to be no unique problem associated with the beach populations which has not been adequately addressed by the NH plans.

Summary - In reviewing the RAC comments relative to the adequacy of provisions for being able to protect the beach population, only element J.10.c was left "inadequate" (lack of detailed provisions in local plans concerning the identification of siren failures and backup notification capability). Element J.10.d was left "open" pending FEMA review of lists of "individuals with special needs". This item is not specific to the beach population but is generic to the EPZ. Elements J.9 and J.10.m were left "open", basically awaiting RAC resolution of the "beach population issue", but citing no specific inadequacies. As noted above, no additional or unique actions appear to be required to adequately protect the beach populations. Element J.10.l, although rated "adequate", can be considered "open" pending the provision of additional clarification of data/assumptions/results in the evacuation time study. Overall, there appears to be no identified technical problem which has a significant potential for precluding adequate protection of the beach populations (including those persons residing in unwinterized shelters).

ADDITIONAL PLAN DISCUSSION

The New Hampshire RERP for Seabrook site appears to meet or will meet the NUREG 0654 criteria (after RAC comments are resolved) in the generic sense. This means that the plan should be adequate to provide reasonable assurance that public health and safety can be protected during a spectrum of emergency scenarios. In addition, particular attention was given to specific features of the offsite land uses and demography. Specifically, the nearby beach areas and high seasonal populations have been studied in depth over a number of years and by a number of organizations. Volume 6 of the NH RERP, Seabrook Station Evacuation Time Study, incorporates many of the results of those studies, expands on other studies and provides additional data and clarifications in other areas. While the scope of Volume 6 includes the entire EPZ, particular attention was focused on the beach areas, the seasonal populations and their evacuation during an emergency under a variety of conditions (ninety-five sets of conditions in all were examined in this study). For summer accident

scenarios, the evacuation time estimates for the beach populations ranged from about 2 hours and 10 minutes to about 4 hours and 20 minutes after the order to evacuate individual areas has been given. Similar evacuation time estimates (ETEs) for the population area within a 2-mile radius of the plant range from 2 hours 20 minutes to 6 hours 40 minutes according to the studies. Again, these studies tended to maximize parameters in the direction of increasing evacuation times. (The more likely situation would involve more rapid evacuations.) As noted earlier, the ETEs are required to provide the decision makers with the best information (neither under-estimates nor over-estimates) of the times likely to be needed to evacuate a given area under the specific circumstances at the time of the accident. This information is necessary to make the optimum decision relative to the type and timing of protective action recommendations for a given situation.

The State and local plans include many special considerations for protecting the beach populations. Some of those considerations are listed below.

1. Provisions have been made to consider closing the beaches or restricting public access to the beach at the Alert emergency classification. At this classification level, no offsite action would be ordinarily warranted to protect the public, but its consideration here would provide additional time to clear the beaches or prevent additional public access to the beach, just in case the situation worsens. Note: Even at the Site Area Emergency classification, one would ordinarily expect that offsite protective actions would not be necessary to protect the public.

2. An alert and notification system has been installed with the beach areas to provide siren coverage. The sirens can be activated individually, in selected groups or as the total system, can be rotated for better coverage or fixed in any direction, and can also carry voice messages and emergency instructions. The system has backup activation capability locally in each town.

3. Administrative provisions and coordination of emergency instructions to be broadcast have been provided to enable the decision makers the flexibility to get the most appropriate message aired in a timely manner for the spectrum of possible scenarios. The scope of situations covered range from that when the emergency organizations are fully staffed and are following a slowly developing situation to the unlikely case when the situation is rapidly developing, obviously severe in nature, and occurs prior to emergency organizations being able to fully staff or assess the situation.

4. Procedures and resources have been provided to assist the public in evacuating the beaches, for directing and controlling traffic, for providing transportation for those without vehicles and for removing impediments or obstructions along evacuation routes.

5. Provisions have also been made to coordinate New Hampshire decisions regarding New Hampshire beach populations with Massachusetts for consideration regarding the Massachusetts beach areas.

PLANT FEATURES AND CONSIDERATIONS

Seabrook Station is a Westinghouse pressurized water reactor (PWR) with a large, dry, strong containment system. Public Service of New Hampshire, the licensee, has prepared two documents, "Seabrook Station Risk Management and Emergency Planning Study" - PLG-0432 and "Seabrook Station Emergency Planning Sensitivity Study" - PLG-0465, to provide the detailed analyses of potential accident sequences, chronology of accident and release sequences, source terms and risks specific to Seabrook Station.

Brookhaven National Laboratory (BNL) reviewed the above analyses and performed additional analyses of the systems and features of Seabrook Station. In December 1986, BNL released the "Draft Technical Evaluation of the EPZ Sensitivity Study for Seabrook", Technical Report A-3852. The source terms utilized in the New Hampshire Yankee and BNL studies were developed using the "Reactor Safety Study" - WASH 1400 (RSS) methodology and did not utilize potential source term reductions under consideration in current NRC and industry studies. Using the RSS assumptions, the New Hampshire Yankee and BNL studies indicated that a severe accident at Seabrook Station posed a public health risk at about two miles from the station that was essentially the same magnitude as considered in NUREG 0396 at 10 miles from a nuclear plant.

BNL concluded that "(t)here is negligible probability of prompt containment failure (at Seabrook). Failure during the first few hours after core melt is also unlikely and the timing of overpressure failure (of containment) is very long compared to the RSS. Most core melt accidents would be effectively mitigated by containment spray operation. 'The above conclusions were not based on Seabrook specific calculations performed at BNL but reflected our best judgment based on extensive reviews of other similar containment designs..."' BNL reviews of containment bypass accident scenarios also indicated that significant releases from such accidents were also not likely in the first hours after a severe accident.

Relative to the beach population, the distance to the Seabrook Station from the nearest beach area is almost two miles. This distance provides additional time to evacuate beach areas from the time of release until the front edge of the plume arrives over the beach area (assuming the wind is blowing to the beach). This distance also can provide considerable dispersion and dilution of the plume activity in traveling from the site to the beach. (The magnitude of concentration decrease is dependent on existing meteorological conditions, but could be several orders of magnitude.) Note: If dispersion and dilution are small, then the impacted, albeit "hot" area must be small and the corresponding number of affected persons is also considerably smaller and presumably easier to protect.

It is also noted that when large, seasonal beach crowds are likely to be present (on hot and sunny days), the typical wind pattern is from the offshore, cooler surface to the onshore, warmer surfaces of the land masses. This means that any "sea breezes" would likely prevent the plume from traveling to the nearby beach areas when the beaches are most heavily populated.

DISCUSSION

The foregoing discussions have indicated that the current NH plans meet or will meet the criteria of NUREG 0654 in a generic sense. Specific and detailed procedures have been provided to assure early notification and evacuation of the beach population can be effected should the plant status appear to be threatening. The review of these plans and procedures do not indicate the presence of concerns or situations involving the beach populations which warrant unique solution or provisions beyond those already incorporated.

The beaches themselves are nearly two miles from the station at their closest approach. This distance provides for dispersion and dilution of the plume as well as additional plume travel time for a plume to reach the beach area from the site. Additionally, because of the sea breeze situations normally associated with sea coast areas, the wind direction will be normally on shore, i.e., toward the plant, rather than off shore from the plant to the shore) during hot, sunny days when the beaches are likely to be most populated.

The analyzed severe accident scenarios (core melt with early containment failure) indicate that the major portion of the dose to the affected population from such an event is due to exposure to deposited radioactive materials on the ground surfaces rather than from the passing plume. The risk/consequence codes generally used (CRAC models or MACCS) all assume that the population is exposed to this ground deposition for 24-hours after the arrival of the first portion of the plume and to any additional plumes over that area. In other words, the codes assume that no protective actions are implemented for 24-hours after the release reaches the beach (or other areas of interest). In view of the NH plans for beach closure and access control as early as the Alert classification; the cited "negligible probability of prompt containment failure" at Seabrook and low consequence/low probability of serious containment bypass sequences; the plume travel time to the beach areas and the relatively short (2 to 4 hours) time estimated to clear the beaches, it appears that risks to the beach population are a small fraction of the cited risks in NUREG 0396 for this distance. Thus, even if there were a prompt, severe, contaminating release and a portion of the beach population were caught in or under the plume for two hours during the evacuation process, their exposure to deposited radioactivity would only be approximately 2/24 or less than one-tenth of the code assumed dose. In addition, they would be avoiding any additional exposure to the plume(s) after leaving this area.

The overall objective of emergency response plans, as cited in NUREG 0654, is "...to provide dose savings (and in some cases, immediate life savings) for a spectrum of accidents that could produce offsite doses in excess of the PAGs. It has never been the intent of emergency preparedness/emergency plans to guarantee that no one would ever be exposed to radiation, or exposed in excess of the EPA PAGs as a result of any accident or postulated accident. Rather, the purpose is to minimize the risks (produce dose savings) to the extent possible under the circumstances of the given accident. In this context, it is clear that it would be inappropriate to judge the adequacy of emergency planning on the basis of whether or not the plans and preparedness can guarantee that no one would be exposed in excess of the PAGs as a result of any accident scenario. As stated earlier, the PAGs are guidance tools for use by decision makers and are not levels of acceptable or unacceptable risks. The adequacy of emergency plans must be based on a finding that "there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency." Edward Christenbury of the NRC defined the NRC position relative to "reasonable assurance" in his letter to Spence Perry of FEMA, dated June 18, 1986, (copy attached). This position appears to be applicable to the protection of the Seabrook area beach populations.

A similar analysis for persons inhabiting nonwinterized facilities would parallel the above. Further, this subset of the beach population would appear to be less at risk than the beach population with no shelter; would be a smaller number than the beach population; and would generally be treated as part of the local population group. (Those persons in properties on the beach front would be considered part of the beach population during daytime beach season.)

Since precautionary evacuation for nearby areas appears to be the accepted federal and state protective action strategy if the EPA PAGs are projected to be exceeded, the sheltering potential of buildings, other than identified special facilities, is generally not considered for populations within about a 2 mile radius. Persons inhabiting unwinterized buildings in this area would be treated in the same manner as other (year around) residents, i.e., evacuated. Persons outside this area may be considered separately on an ad hoc basis by the decision makers. Finally, it is noted that habitation of unwinterized buildings is generic to all sites with nearby beach or resort areas and that this situation is not unique to Seabrook. The New Hampshire provisions for these individuals near the Seabrook site appear to be well advanced in comparison with those at other applicable sites.

CONCLUSIONS

Following are some of the areas considered above which were utilized in arriving at a conclusion relative to the beach populations.

- NH state and local plans essentially meet NUREG 0654 criteria generically
- Special provisions for beach populations in place
- No identified problems requiring unique or unaddressed solutions
- Provisions for early warning of beach populations
- Adequate transportation resources available for those needing public transit
- Beaches are nearly two miles from station affording delay in plume arrival and dilution and dispersion of plume
- Sea breezes would tend to keep plume from traveling directly toward beach when beaches are most populated
- ETEs for beaches are relatively small
- Containment at Seabrook is very strong; probability of prompt containment failure is negligible
- Containment bypass is unlikely to cause severe offsite problems
- Site specific studies for Seabrook indicate risks at two miles are comparable to NUREG 0396 analyzed risks at 10 miles
- "Reasonable assurance" does not equate with "absolute safety", i.e., guarantee of no exposures or exposures above the PAGs

Based on the above, it appears that contingent on the completion of action by the State to resolve the other RAC concerns with the New Hampshire and local plans, those plans appropriately provide for dose savings for the spectrum of possible accidents and are adequate to provide reasonable assurance that the beach and unwinterized housing populations will be protected and that these plans will essentially meet the criteria of NUREG 0654 and the intent of the NRC regulations in this area.

Attachment:
Letter from Christenbury to Perry dated June 18, 1986

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

June 18, 1986

cc: J. Allan
J. Gutierrez
R. Starostecki
B. Kane
S. Ebneter
B. Johnston
T. Martin
R. Bellamy
B. Lazarus
6/24/86-TEM

Spence W. Perry, Acting General
Counsel
Federal Emergency Management Agency
Room 840
500 C Street, S.W.
Washington, D.C. 20472

In the Matter of
Public Service Company of New Hampshire, et al.
(Seabrook Station, Units 1 and 2)
Docket Nos. 50-443 OL and 50-444 OL

Dear Mr. Perry:

In response to a request made by Edward Thomas of FEMA Region I, we have evaluated, in conjunction with Joseph Flynn of your office, an undated memorandum prepared by Thomas Dignan of Ropes and Gray on behalf of the applicants for the Seabrook nuclear plant ("Dignan Memorandum", a copy of which is attached as Attachment A). Our evaluation is set forth in the following discussion.

The Dignan Memorandum addresses what are described as "three misconceptions" pertaining to offsite emergency planning for the Seabrook nuclear plant, and concludes that they are "false as matter of law" (Dignan Memorandum at 1). These purported "misconceptions" are as follows:

A. That the plans must be shown to guarantee that no adverse effects on the public health and safety will occur no matter what kind of accident occurs at Seabrook.

B. That it must be demonstrated that the plans will assure that all persons located in the Emergency Planning Zone or some certain portion of it can be evacuated in some certain time.

- In particular, there have been assertions that the plans must assure the sheltering or evacuation of persons from the beaches in approximately 1/2 hour.

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[1] It should be noted, however, that under the Commission's regulations, 10 CFR § 50.3, only written regulatory interpretations provided by the General Counsel will be recognized as binding upon the Commission.

ATTACHMENT

C. That the plans must be designed, and shown to be able, to cope with a particular type of accident -- in particular, one involving an early release of radioactivity off-site.

For the reasons set forth below, it is our opinion that, with minor clarification, Mr. Dignan's conclusions are essentially correct as to items (A) and (B) above; however, his discussion of item (C) appears to contain an error which requires correction.

DISCUSSION

A. Absolute Assurance of Perfect Safety.

As set forth above, item (A) concerns the question of whether an emergency response plan must be shown to guarantee that no adverse health and safety effects will occur, regardless of what kind of accident may occur at the plant. In our opinion, Mr. Dignan correctly concludes that "[n]either the Atomic Energy Act nor any regulation of NRC, whether dealing with emergency planning or not, requires absolute assurance of perfect safety" (Dignan Memorandum, at 1-2).

As you know, prior to issuance of a full power operating license, NRC regulations require a finding "that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency." 10 C.F.R. § 50.47(a)(1). With respect to offsite matters, the NRC will base its finding on a review of the FEMA findings and determinations "as to whether State and local emergency plans are adequate and whether there is reasonable assurance that they can be implemented." Id., § 50.47(a)(2). These regulations plainly do not require any demonstration of "absolute assurance" that the public will be totally protected in the event of a radiological emergency. Rather, the intent of the Commission's emergency planning regulations is to reduce the impact of an accident and achieve "dose savings" through protective actions that take into consideration plant conditions, evacuation times, shelter factors, and other conditions that may exist at the time of the accident. NUREG-0654/FEMA-REP-1, Rev.1 states as follows (at 6):

> The overall objective of emergency response plans is to provide dose savings (and in some cases immediate life saving) for a spectrum of accidents that could produce offsite doses in excess of Protective Action Guides (PAGs).

The Appeal Board has similarly stated, "[t]he basic goal of emergency planning is . . . the achievement of maximum dose savings in a radiological emergency." Cincinnati Gas & Electric Co. (Wm. H. Zimmer Nuclear Power Station, Unit No. 1) ALAB-727, 17 NRC 760, 770 (1983).

In Southern California Edison Co. (San Onofre Nuclear Generating Station, Units 2 and 3), CLI-83-10, 17 NRC 528, 533 (1983), the Commission summarized its rationale for selecting an emergency planning basis as follows:

> The underlying assumption of the NRC's emergency planning regulations in 10 CFR § 50.47 is that, despite application of stringent safety measures, a serious nuclear accident may occur. This presumes that offsite individuals may become contaminated with radioactive material or may be exposed to dangerous levels of radiation or perhaps both. Planning for emergencies is required as a prudent risk reduction measure for those individuals. Since a range of accidents with widely differing offsite consequences can be postulated, the regulation does not depend on the assumption that a particular type of accident may or will occur. In fact no specific accident sequences should be specified because each accident could have different consequences both in nature and degree. Although the emergency planning basis is independent of specific accident sequences, a number of accident descriptions were considered in development of the Commission's regulations, including the core melt accident release categories of the Reactor Safety Study (WASH-1400).

These statements demonstrate that the goal of emergency planning is to reduce the impact and achieve dose savings for a spectrum of accidents, and that emergency planning may satisfy NRC regulations even though the potential for adverse health effects in an emergency has not been totally eliminated.

Notwithstanding our opinion that Mr. Dignan is essentially correct in his conclusion as to item (A), two statements contained in this portion of his memorandum require clarification. First, he goes too far in asserting that "it has been recognized from the outset . . . that if one assumes a major accident with offsite releases, some adverse effect on the public will, by definition, occur" (Dignan Memorandum at 2; emphasis added). Contrary to this assertion, the occurrence of a major accident accompanied by offsite releases will not necessarily lead to adverse health effects. Rather, in some circumstances, emergency planning may serve to avert the occurrence of any adverse health effects. Further, whether any such health effects occur, and the extent of any such effects, will depend upon a host of factors, such as the type and quantity of release, the plume direction, meteorological conditions, exposure durations, and the timely implementation of an appropriate protective response.

Secondly, his memorandum states that emergency planning is intended to limit any adverse health effects to as low a level as reasonably possible, "given the facilities at hand" (Id.), possibly implying that additional

facilities will never be required to be built or installed to satisfy NRC emergency planning regulations. In support of this statement, Mr. Dignan cites the San Onofre decision, supra. However, that decision provides only limited support for this conclusion. There, the Commission addressed only the issue of whether additional hospital construction should be undertaken, and concluded that such extraordinary measures are not required.

B. Evacuation Within A Specific Time Period.

The second item addressed by Mr. Dignan is whether the Applicants must demonstrate that all or part of the plume exposure pathway EPZ can be evacuated in some specified time; in particular, this item addresses the question of whether the beaches in the Seabrook vicinity must be evacuated within approximately one-half (1/2) hour. It is Mr. Dignan's conclusion that NRC regulations do not require that an evacuation be assured within any particular time (Dignan Memorandum at 17. We concur with Mr. Dignan's conclusion as to this item.

In support of his conclusion on this matter, Mr. Dignan cites two decisions: Cincinnati Gas & Electric Co. (Wm. H. Zimmer Nuclear Power Station, Unit No. 1), ALAB-727, 17 NRC 760, 770 (1983), and Detroit Edison Co. (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-730, 17 NRC 1057, 1069 n.13 (1983). In Zimmer, the Appeal Board stated as follows:

> The applicants are . . . correct in their insistence that the Commission's emergency planning requirements do not prescribe specific time limits governing the evacuation of plume EPZs. The matter of the time in which evacuation can be accomplished is left to be determined on a case-by-case basis upon consideration of all relevant conditions prevailing in the specific locality. But it does not follow, as the applicants would have it, that a particular evacuation plan need not be concerned with the efficiency with which evacuation might be accomplished given the conditions under which it must take place [n. 16]. Indeed, the Commission guidelines suggest the contrary. . . . If the responsible governmental officials are to make an informed decision respecting what is appropriate protective action in a given radiological emergency, they must have available to them time estimates which are realistic appraisals of the minimum period in which, in light of existing local conditions, evacuation could reasonably be accomplished. And, the nearer to the plant the area that must have to be evacuated, the greater the importance of accurate time estimates.

1/ Those conditions include, for example, the size and nature of the population, the available

> transportation facilities, the existing road network, topographical features and political boundaries. . . .

Zimmer, supra, 17 NRC at 770-71. Similarly, in the Fermi decision the Appeal Board stated:

> . . . [T]he Commission's emergency planning regulations do not specify the time within which the plume EPZ must be evacuated in the event of a nuclear emergency. 10 C.F.R. Part 50, Appendix E, § IV, requires only that applicants provide "an analysis of the time required to evacuate and for taking other protective actions for various sectors and distances within the plume exposure pathway EPZ for transient and permanent populations."

Fermi, supra, 17 NRC at 1069 n.13. Thus, there is no requirement that an evacuation be accomplished within 30 minutes. While some other functions must be capable of being accomplished within that time frame, those functions generally involve the notification of appropriate governmental officials and notification of the public. See 10 C.F.R. Part 50, Appendix E, § IV.D.

C. Planning for A Particular Type of Accident.

The third issue addressed by Mr. Dignan is whether a facility's emergency plans must be designed to cope with a particular type of accident and, in particular, an accident involving an "early release of radioactivity off-site." Two conclusions appear to be reached by Mr. Dignan in this regard: (1) that while emergency plans must be designed to cope with a spectrum of accidents, they need not be designed to cope with a specific accident or "any worst case accident" (Dignan Memorandum at 4), and (2) that emergency plans are not required to be designed to cope with an early release of radioactivity (Id., at 2-3). While we agree with the first of these conclusions, the second conclusion is incorrect and requires clarification.

First, Mr. Dignan is correct in stating that the emergency plans must be designed to cope with a spectrum of accidents, but are not required to address any particular accident sequence or a "worst case accident." The Commission has decided, on a generic basis, that compliance with its emergency planning regulations provides the reasonable assurance required by 10 C.F.R. § 50.47(a); accordingly, offsite emergency plans are not required to address particular accident sequences. In the Statement of Consideration published upon adoption of the Commission's final emergency planning regulations, the Commission stated as follows:

> The Commission recognizes that no single accident scenario should form the basis for choice of notification capability requirements for offsite authorities and for

> the public. Emergency plans must be developed that will have the flexibility to ensure response to a wide spectrum of accidents. This wide spectrum of potential accidents also reflects on the appropriate use of the offsite notification capability. . . .
>
> Any accident involving severe fuel degradation or core melt that results in significant inventories of fission products in the containment would warrant immediate public notification and consideration, based on the particular circumstances, of appropriate protective action because of the potential for leakage of the containment building. In addition, the warning time available for the public to take action may be substantially less than the total time between the original initiating event and the time at which significant radioactive releases take place. . . . The reduction of notification times from the several hours required for street-by-street notification to minutes will significantly increase the options available as protective actions under severe accident conditions. These actions could include staying indoors in the case of a release that has already occurred or a precautionary evacuation in the case of a potential release thought to be a few hours away. Accidents that do not result in core melt may also cause relatively quick releases for which protective actions, at least for the public in the immediate plant vicinity, are desirable.

45 Fed. Reg. 55402 (1980). Similarly, NUREG-0654/FEMA Rep.1, Rev. 1, provides as follows (at 6-7):

> No single specific accident sequence should be isolated as the one for which to plan because each accident could have different consequences, both in nature and degree. Further, the range of possible selection for a planning basis is very large, starting with a zero point of requiring no planning at all because significant offsite radiological accident consequences are unlikely to occur, to planning for the worst possible accident, regardless of its extremely low likelihood. The NRC/EPA Task Force did not attempt to define a single accident sequence or even a limited number of sequences. Rather, it identified the bounds of the parameters for which planning is recommended, based upon knowledge of the potential consequences, timing, and release characteristics of a spectrum of accidents. Although the selected planning basis is independent of specific accident sequences, a number of accident descriptions were considered in the development of the guidance, including

> the core melt accident release categories of the Reactor Safety Study [WASH-1400].

Accord, San Onofre, supra, 17 NRC at 533. In Long Island Lighting Co. (Shoreham Nuclear Power Station), LBP-85-12, 21 NRC 603, 688 (1985) (cited in Dignan Memorandum at 4), the Licensing Board dismissed a contention asserting that the emergency plans must be capable of coping with any worst case accident (there involving the possible loss of offsite power); the Board stated, "NUREG-0654 does not require an adequate response for the 'worst possible accident' at Shoreham. . . ." In sum, these regulatory pronouncements and decisions clearly demonstrate that emergency planning for a nuclear plant is not required to be designed to cope with any particular accident sequence or a "worst case accident." In this respect, we concur with Mr. Dignan's memorandum.

The Dignan Memorandum is incorrect, however, in its conclusion that the emergency plans are not required to be designed to cope with an early release of radioactivity (Dignan Memorandum at 2-3). This error appears to have resulted by confusing the "worst possible accident" for any accident involving an early release. While the "worst possible accident" could involve an early release of radioactivity, other less severe accidents might also result in early releases and were included within the parameters which established the Commission's emergency planning basis. The Statement of Consideration, quoted above, clearly recognizes that "early releases" may occur; it is for this reason, in part, that the licensee is required to notify offsite authorities within 15 minutes after the licensee has declared an emergency, and that responsible offsite authorities have a capability to notify the public within 15 minutes after they have received notification from the licensee of an emergency condition.

The following guidance is provided in NUREG-0654/FEMA Rep. 1, Rev. 1 (at 13-14):

> The range of times between the onset of accident conditions and the start of a major release is of the order of one-half hour to several hours. The subsequent time period over which radioactive material may be expected to be released is of the order of one-half hour (short-term release) to a few days (continuous release). . . . [G]uidance on the time of release . . . has been used in developing the criteria for notification capabilities . . . . (Other reasons for requiring prompt notification capabilities include faster moderate releases for which protective actions are desirable and the need for substantial lead times to carry out certain protective measures such as evacuation, when this is indicated by plant conditions.)

It should be noted that the responsible offsite authorities are not necessarily required, in all cases, to notify the public within 15 minutes after they have

received notification by the licensee. Rather, the time in which the public is notified will range from immediate notification (within 15 minutes after state and local officials are notified that a situation exists which requires urgent action) to the more likely events where there is substantial time available for them to make a judgment as to whether or not to activate the public notification system. Also, it should be noted that the 15 minute criterion refers only to the time in which the public is to receive notification, and does not refer to the time in which protective actions are to be completed.

In sum, responsible offsite authorities must have received notification of the emergency situation within 15 minutes after the licensee has declared an emergency, and the offsite authorities must have the capability to notify the public within 15 minutes after they have received notification from the licensee. Emergency planning for accidents involving "early releases" is required -- although the protective action recommendations may be issued before, during or after the occurrence of an offsite release of radioactivity. There is no requirement that protective actions be completed within 30 minutes after the licensee has declared an emergency.

CONCLUSION

For the reasons set forth above, the following conclusions are offered as to the matters referred to in the Dignan Memorandum:

1. The basic goal of emergency planning is to reduce the impact of and achieve dose savings for a spectrum of accidents; however, there is no requirement that absolute assurance be provided that adverse radiological effects will not occur.

2. The Commission's emergency planning regulations do not require that the evacuation of all or part of a plume exposure pathway EPZ be completed within any particular time.

3. The emergency plans must comply with the Commission's emergency planning regulations and thereby should be capable of responding to a wide spectrum of accidents; however, the plans are not required to be designed for any specific accident sequence or a "worst case accident."

4. Accidents involving early releases are within the Commission's emergency planning basis, however, the regulations do not specify a time within which the recommended protective actions are to be completed.

Sincerely,

Edward S. Christenbury
Director and Chief Hearing
Counsel

Enclosure

cc: J. Taylor
E. Jordan
T. Murley

MEMORANDUM

This memorandum addresses three misconceptions which have arisen as to the standards to which state and municipal emergency plans will be held in an NRC licensing proceeding. These misconceptions are:

A. That the plans must be shown to guarantee that no adverse effects on the public health and safety will occur no matter what kind of accident occurs at Seabrook.

B. That it must be demonstrated that the plans will assure that all persons located in the Emergency Planning Zone or some certain portion of it can be evacuated in some certain time.

- In particular, there have been assertions that the plans must assure the sheltering or evacuation of persons from the beaches in approximately 1/2 hour.

C. That the plans must be designed, and shown to be able, to cope with a particular type of accident -- in particular, one involving an early release of radioactivity off-site.

Each of these propositions is false as a matter of law.

First, the issue of absolute safety: Neither the Atomic Energy Act nor any regulation of NRC, whether dealing with emergency planning or not, requires absolute assurance of

perfect safety. Indeed, it has been recognized from the outset of the formulation of the current emergency planning regulations that if one assumes a major accident with offsite releases, some adverse effect on the public will, by definition, occur. The purpose of emergency planning is to have in place means and methods of coping with such an event in order to keep those effects to as low a level as reasonably possible given the facilities at hand. Southern California Edison Co. (San Onofre Nuclear Generating Station, Units 2 and 3), CLI-83-10, 17 NRC 528, 533 (1983).

Second, as to the proposition that the plans must be demonstrated to be capable of assuring evacuation of certain areas within a certain time: This simply is not the law. The Appeal Boards of the Commission have so held - flatly and without equivocation. Cincinnati Gas & Electric Company (Wm. H. Zimmer Nuclear Power Station, Unit No. 1, ALAB-727, 17 NRC 760, 770 (1983); The Detroit Edison Co. (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-730, 17 NRC 1057, 1069 n.13 (1983). Indeed, the only activity which the regulations specifically require to be capable of accomplishment in one-half hour is public notification. And it is in that context the 1/2 hour rule is discussed in NUREG-0654, the NRC emergency planning guidance document.

Third, the proposition that the plans will be judged as to adequacy against a certain type of accident and in particular one involving a release as soon as 1/2 hour:

That proposition is not only bad law, it is directly contrary to the theory of the NRC emergency planning criteria. The theory upon which the regulations were baswd was that the planners should consider a spectrum of accidents. The key is that the plan be shown to be flexible and capable of reducing the adverse effects to the greatest extent reasonably possible. The Commission itself has stated:

> "Since a range of accidents with widely differing offsite consequences can be postulated, the regulation does not depend on the assumption that a particular type of accident may or will occur. In fact, no specific accident sequences should be specified because each accident could have different consequences both in nature and degree. Although the emergency planning basis is independent of specific accident sequences, a number of accident descriptions were considered in development of the Commission's regulations, including the core melt accident release categories of the Reactor Safety Study (WASH-1400).
>
> "It was never the intent of the regulation to require directly or indirectly that state and local governments adopt extraordinary measures, such as construction of additional hospitals or recruitment of substantial additional medical personnel, just to deal with nuclear plant accidents. The emphasis is on <u>prudent</u> risk reduction measures. The regulation does not require dedication of resources to handle every possible accident that can be imagined." CLI-83-10, 17 NRC at 533.

Furthermore, there is no requirement that it be demonstrated that a plan will cope with any worst case accident. NUREG-0654 simply does not require an adequate response for the worst possible accident. Long Island Lighting Co. (Shoreham Nuclear Power Station), LBP-85-12, 21 NRC 603, 888 (1985).

In short, the standard by which any emergency plan is to be judged is whether or not it represents the best efforts of knowledgeable people through the use of reasonably available facilities to reduce to the maximum extent reasonably possible the adverse effects on the public health and safety which will result from off-site releases resulting from a spectrum of accident scenarios. The guiding principles, as recently stated by an NRC Licensing Board are:

> "The purpose of emergency planning is to achieve dose savings to the general public in the event that radioactive material is accidentally released off site. There is no minimum standard of public radiation dose which must be met in emergency planning.
>
> "Absolute protection of the public against all radiation doses cannot be guaranteed and is not required for all possible accident scenarios.
>
> "The emergency response plan should not be developed for any specific preconceived accident sequence. It should instead be framed to cope with a spectrum of accident possibilities including the worst accidents.

"There is no standard time required to be met for evacuation in a radiological emergency. Estimates are necessary to determine accurately the actual time required for evacuation. These estimates are needed to aid in protective action decisionmaking.

"No massive investment of resources (stockpiling of supplies or construction of hospitals) are required for emergency planning. We will apply a practical standard of efficience of utilization of existing resources (such as roadways and manpower) in evaluating the acceptability of the evacuation plan." LBP-85-12 at 782.