United States General Accounting Office 131878

GAO

Report to the Honorable Alfonse M. D'Amato
United States Senate

December 1986

# NUCLEAR REGULATION

# Unique Features of Shoreham Nuclear Plant Emergency Planning


GAO

**United States**
**General Accounting Office**
**Washington, D.C. 20548**

**Resources, Community, and**
**Economic Development Division**

**B-225103.2**

December 2, 1986

The Honorable Alfonse M. D'Amato
United States Senate

Dear Senator D'Amato:

As requested by your May 2, 1986, letter and subsequent discussions with your office, we reviewed the procedures followed to date in preparing, assessing, and testing off-site emergency response planning around the Shoreham Nuclear Power Station in Suffolk County, Long Island, New York. Our objective was to determine whether the procedures being followed at Shoreham are different from those at other commercial nuclear plants.

Emergency plans for commercial nuclear power plants are intended to protect public safety in the event of plant accidents resulting in releases of radioactive materials to the environment. The Nuclear Regulatory Commission (NRC) licenses and regulates these plants. Two prerequisites for an operating license are adequate on- and off-site emergency plans. NRC requires that a utility seeking an operating license submit an on-site emergency plan for its review. In contrast, off-site emergency plans are usually prepared by affected state and local governments and submitted to the Federal Emergency Management Agency (FEMA) for review. NRC then considers the results of FEMA's review of an off-site plan and its own review of an on-site plan in making its overall licensing decision. Although the cooperation of state and local governments is important to the development of off-site emergency plans, neither NRC nor FEMA can require state and local governments to participate.

The state of New York and Suffolk County have declined to prepare off-site emergency plans for the Shoreham nuclear plant. For this reason, the Long Island Lighting Company (LILCO), which owns the Shoreham plant and has applied to NRC for a license to operate it, prepared an off-site emergency plan and submitted it to NRC for review and approval. Although the lack of state and local plans is unprecedented in recent nuclear plant licensing proceedings, the Congress has specifically authorized NRC to consider an off-site emergency plan submitted by a utility in the absence of state and local plans.

In summary, we found that NRC has made no final decision on the adequacy of the Shoreham off-site emergency plan, but this unique case has resulted in several significant differences from earlier nuclear plant

licensing proceedings. For example, the exercise testing the effectiveness of the off-site plan was carried out by LILCO personnel without state and local participation. Also, NRC and FEMA agreed that the latter agency would provide NRC with the deficiencies found in its review of LILCO's off-site plan, but would not make an overall finding on the plan's adequacy. FEMA usually makes such a finding when it has reviewed off-site plans submitted by state and local governments. NRC's licensing board will be conducting hearings in 1987 to try to resolve several outstanding issues relating to the state and local decisions not to participate in off-site planning.

## Perspective on Emergency Planning

LILCO applied for a license to operate its Shoreham plant from NRC in 1975. Plant construction was essentially completed in 1983. When LILCO applied for its operating license, NRC required it to prepare an on-site emergency plan. Although NRC also assisted state and local governments in developing off-site emergency plans, it did not require such plans until after the March 1979 accident at the Three Mile Island nuclear power plant.

The accident at Three Mile Island stimulated major changes in federal regulatory requirements and institutional arrangements pertaining to emergency planning. For example, the President transferred federal responsibility for coordinating off-site emergency planning from NRC to FEMA. NRC, however, retained responsibility for licensing nuclear plants, including making final determinations on the adequacy of overall emergency plans. In NRC's 1980 and subsequent authorization acts, the Congress permitted NRC to license operation of any nuclear plant only if it determined

- in consultation with FEMA, that there exists a state or local emergency preparedness plan that provides for responding to accidents at the specific plant and complies with NRC guidelines for such plans or
- in the absence of such a plan, there exists a state, local, or utility emergency plan providing "reasonable assurance" that public health and safety are not endangered by the plant's operation.

The Congress also directed NRC to establish, in consultation with FEMA, standards for radiological emergency plans.

The more than 30 nuclear power plants licensed for commercial operation since these requirements were implemented have been licensed

under the first of the two procedures listed above. This general procedure involved (1) FEMA's review and testing of off-site emergency plans submitted to it by state and local governments, (2) NRC's review of utilities' on-site emergency plans, and (3) favorable NRC findings on the overall adequacy of emergency plans and other issues considered in licensing proceedings.

## Emergency Planning at Shoreham

The Shoreham operating license proceeding differs from these earlier cases. The state of New York and Suffolk County did not develop and submit off-site emergency plans to FEMA for its review. The county's decision was based on its determination that unique local conditions on Long Island make effective emergency response impossible. Subsequently, the state decided not to impose a state plan on the county. As a result, LILCO prepared an off-site emergency plan and submitted it directly to NRC for review.

Thus, NRC and FEMA are addressing emergency planning around the Shoreham plant under the alternative procedure the Congress authorized in the absence of a state and local emergency plan adhering to federal planning standards. In this case, NRC requested FEMA to review the utility's off-site emergency plan to assist NRC in determining whether the plan provides reasonable assurance that the Shoreham plant's operation will not endanger public safety.[1]

FEMA has reviewed and tested the effectiveness of LILCO's off-site emergency plan, including six revisions of the plan, using joint FEMA and NRC criteria. All but 5 of the 34 technical deficiencies that FEMA initially identified in the plan, such as the absence of agreements between LILCO and bus and ambulance companies, have been corrected. The test of LILCO's plan revealed 5 deficiencies and 38 areas of lesser importance requiring corrective action. The unique circumstances of the Shoreham case—NRC's requesting FEMA's review of a utility's off-site emergency plan in the absence of state and local plans submitted to FEMA—have led to three major differences in the review of the LILCO plan when compared with other nuclear power plants:

- The exercise testing the effectiveness of the plan was carried out by utility personnel without state and local participation.

[1]In a separate report (GAO/RCED-87-45) we address FEMA actions leading to a decision not to make overall findings on its review of LILCO's emergency plan.

- FEMA did not require the utility to hold a formal public meeting following the test of its plan to inform citizens of test results and obtain their comments—something FEMA requires of state and local governments after they have exercised their off-site emergency plans.
- Because LILCO's legal authority to carry out its off-site emergency plan has been challenged, NRC and FEMA agreed that FEMA would not provide overall findings on the adequacy of the plan or the utility's ability to effectively implement the plan.

Since May 1983, an NRC licensing board has been conducting public hearings on off-site emergency preparedness around the Shoreham plant as a part of the agency's operating license proceeding. These hearings will continue in 1987 on a number of issues, including the test of the LILCO plan. In addition, at NRC's request FEMA continues to review revisions to the LILCO plan. Three basic issues (listed below) to be addressed in future hearings all relate to state and county decisions not to develop off-site plans or help the utility execute its plan:

- Does LILCO have legal authority to assume governmental functions essential to implementing its emergency plan? A New York State lower court and an NRC licensing board have ruled that LILCO does not have the requisite authority. LILCO's appeal of the state court decision was pending at the close of our review.
- Can the LILCO plan be adequately implemented, even if the legal issue is resolved in its favor, given lack of participation by the state and local governments?
- Assuming that both the state and local governments, in the event of an accident, provide "best efforts" to respond in accordance with LILCO's plan, can the plan then meet the test of "reasonable assurance" that public health and safety would be protected?

We conducted our review at FEMA's Region II offices in New York City and at NRC headquarters and its Region I office located, respectively, in Bethesda, Maryland, and King of Prussia, Pennsylvania. We also met with LILCO officials and toured the Shoreham nuclear plant. Our objectives, scope, and methodology are discussed in more detail in appendix II.

We discussed the report's contents with FEMA and NRC officials as it was being developed and incorporated their views as appropriate. However, as requested by your office, we did not obtain official agency comments

on a draft of this report. Unless you publicly announce its contents earlier, we do not plan to distribute this report until 30 days from its issuance date. At that time, we will send copies to the Chairman, NRC; the Director, FEMA; appropriate congressional committees; and to other interested parties.

Sincerely yours,

J. Dexter Peach
Assistant Comptroller General

# Contents



**Abbreviations**

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| EPA | Environmental Protection Agency |
| FEMA | Federal Emergency Management Agency |
| GAO | General Accounting Office |
| LILCO | Long Island Lighting Company |
| P.L. | Public Law |
| NRC | Nuclear Regulatory Commission |
| TMI | Three Mile Island |

# Emergency Planning Around the Shoreham Nuclear Power Station

## Historical Perspective on Emergency Planning

The March 1979 accident at the Three Mile Island (TMI) nuclear power plant near Harrisburg, Pennsylvania, demonstrated the need for communities near nuclear plants to be prepared for accident-related emergencies and pointed out major deficiencies in the general state of emergency planning and preparedness at all governmental levels. Before the accident, off-site emergency plans were not a prerequisite for licensing nuclear power plants. The Atomic Energy Act of 1954, as amended, which sets out the Nuclear Regulatory Commission's (NRC) basic authority for regulating nuclear power, did not require state and local government off-site emergency plans or require NRC to review such plans in the licensing process. NRC did, however, require utilities to prepare on-site emergency plans, including establishing links to off-site state and local authorities.

NRC assisted state and local governments in preparing and maintaining off-site emergency plans, and provided guidance and training to assist them in preparing such plans. Nevertheless, until the TMI accident, NRC's basic position was that state and local emergency plans were not required for it to determine whether a nuclear plant could be operated without undue risk to public health and safety.

In a report issued about the same time as the TMI accident, we pointed out that although 41 states had some type of nuclear emergency plan, there was considerable doubt as to the preparedness of state and local governments.[1] Therefore, we recommended that

- the newly created Federal Emergency Management Agency (FEMA) assume responsibility for making policy and coordinating emergency response planning around nuclear facilities,
- NRC allow nuclear plants to begin operation only where state and local emergency response plans adequately address NRC planning guidance for off-site emergency plans, and
- NRC establish an emergency planning zone of about 10 miles around all nuclear plants as recommended by an NRC/Environmental Protection Agency (EPA) task force.

Under the statutory, executive, and administrative policies established since the TMI accident, each of these recommendations has largely been implemented.

[1] Areas Around Nuclear Facilities Should Be Better Prepared for Radiological Emergencies (EMD-78-110, Mar. 30, 1979).

## FEMA's Role Established

Under the President's Reorganization Plan No. 3 of 1978, FEMA was established to serve as a single point of contact for state and local governments regarding federal emergency planning and preparedness activities. The President's Commission on the Accident at Three Mile Island recommended that federal authority and responsibility for off-site nuclear power plant emergency planning and preparedness be consolidated in FEMA. In response to that recommendation, on December 7, 1979, the President directed FEMA to lead all federal off-site emergency activities. By June 1980, FEMA was directed to thoroughly review off-site emergency plans in all states with operating nuclear plants and to complete a review of state plans related to plants nearing completion as soon as possible. To implement the President's directive, in January 1980, NRC and FEMA entered into a memorandum of understanding, subsequently amended in November 1980, establishing that

- FEMA will coordinate all federal planning for the off-site impact of radiological emergencies;
- FEMA will take the lead in assessing off-site plans and preparedness, make findings and determinations as to the adequacy and capability of implementing off-site plans, and communicate its findings to NRC;
- NRC will review FEMA findings and determinations, in conjunction with its own findings on a utility's on-site emergency plans, and make determinations on the overall state of emergency preparedness; and
- NRC will use its overall findings and determinations to make radiological health and safety decisions in the issuance of nuclear power plant licenses and the continued operation of licensed plants.

In November 1980, FEMA and NRC also published federal criteria for assessing nuclear emergency planning and preparedness called Criteria for Preparation and Evaluation of Radiological EmergencyResponse Plans and Preparedness in Support of Nuclear Power Plants, NUREG-0654/FEMA-REP-1, Revision 1—commonly referred to as NUREG-0654. The criteria include 16 planning standards—15 related to both on-site and off-site safety and 1 related to just on-site safety. These standards are further broken down into 196 elements, or criteria, that generally describe the intent of the standard. NRC's regulations and the joint criteria require that emergency plans be prepared covering each community within a 10-mile radius of a commercial nuclear power plant. In addition, state plans are required to address measures necessary to deal with the potential for ingestion of radioactively contaminated foods and water out to a distance of 50 miles.

As part of NRC's licensing process, FEMA reviews and makes findings and determinations on the adequacy of off-site emergency preparedness under the provisions of its regulations for reviewing and approving state and local radiological plans and preparedness. (44 C.F.R. 350.) This process is initiated when a Governor or designee submits state and local plans for FEMA's review. The review process includes (1) an evaluation of the plans for compliance with NUREG-0654 standards and criteria by a Regional Assistance Committee chaired by FEMA and composed of representatives of other federal agencies, (2) at least one federally observed exercise that tests the state and local governments' ability to implement major portions of their plans, and (3) a public meeting held by the state and local governments (and attended by FEMA) that provides citizens an opportunity to learn about and comment on the plan and the exercise.

Under its agreement with NRC, FEMA will furnish NRC, upon request, its interim findings and determinations on off-site emergency preparedness issues if the formal review has not been completed. The agreement also allows NRC to request FEMA's review of emergency plans prepared by states, local governments, or utilities and submitted directly to NRC.

## Off-Site Emergency Plans Required

In 1980 the Congress established a requirement for off-site emergency planning around nuclear power plants. Section 109 of the NRC Authorization Act for Fiscal Year 1980 (P.L. 96-295), approved by the President on June 30, 1980, allows NRC to issue a nuclear plant operating license only if it determines that there exists either a

- related state or local emergency preparedness plan that provides for responding to accidents at the specific plant and complies with NRC emergency planning guidelines or
- in the absence of such a plan, a state, local, or utility plan which provides reasonable assurance that public health and safety are not endangered by the plant's operation.

The act also directed NRC to establish standards for state radiological emergency plans. Furthermore, the act required NRC to establish standards and to make the first determination in consultation with FEMA and other appropriate agencies. The act did not require such consultation in making the alternative, or second, determination. In NRC's authorization acts for fiscal years 1982 and 1983 (P.L. 97-415, Section 5) and fiscal years 1984 and 1985 (P.L. 98-553, Section 108), the Congress continued NRC's authority to issue an operating license, in the absense of a FEMA-

approved state or local emergency plan, if NRC determined that a state, local, or utility plan provided reasonable assurance that public health and safety would not be endangered by the plant's operation.

Until the current review of off-site emergency response planning around the Shoreham Nuclear Power Station, all NRC nuclear plant operating license proceedings subsequent to the 1980 NRC authorization act have involved NRC consideration, in consultation with FEMA, of off-site nuclear plans prepared by state and local governments. Although in some instances local governments have not participated in developing plans, on these occasions, state governments have developed and demonstrated compensatory plans. This procedure basically involves

- a FEMA review of off-site plans submitted directly to it by a state, an exercise testing the effectiveness of the plans, and transmittal of FEMA's findings on the adequacy of the plans to NRC;
- an NRC review of a utility's on-site emergency plan;
- an NRC determination on the overall adequacy of emergency response planning, taking into account FEMA's review and interim or final findings; and
- an NRC licensing decision on the basis of all appropriate radiological health and safety factors, including emergency preparedness.

The adequacy of off-site emergency planning around the Shoreham plant is being addressed by NRC under the second basic procedure permitted in its recent authorization acts. This procedure involves, in the absence of a state or local plan that addresses FEMA's off-site planning standards, NRC consideration of any other state, local, or utility plan submitted to it. Under this procedure, the basic test of the adequacy of the plan is whether it provides "reasonable assurance" that public health and safety are not endangered by the plant's operation.

Under either of the two basic procedures, the final decision on the adequacy of overall emergency response planning, as well as other radiological health and safety issues, rests with NRC. NRC regulations require that—except for loading fuel and operating a plant at low power for testing purposes—no operating license for a nuclear power reactor will be issued unless NRC can be reasonably assured that adequate protective measures can and will be taken in the event of a radiological accident. (10 C.F.R. 50.47.)

## Emergency Planning Zones Established

In 1976 state emergency planners asked NRC to determine the most severe accident basis for which off-site planning should be developed. In response, NRC and EPA formed a joint task force to develop a technical basis for emergency planning. A key principle adopted by the task force was that emergency plans should be designed to permit predetermined protective actions if projected radiation exposure doses from accidents appeared to meet or exceed established EPA "Protective Action Guides." These guides represent the projected doses to individuals in the general population which warrant specific protective actions such as sheltering or evacuation. For example, EPA's existing guides stated that populations within the predetermined area should be evacuated when radiation exposure doses to the whole body or the thyroid are projected to be at or above 5 rem[2] and 25 rem, respectively. For purposes of comparison, NRC regulations require that no member of the general public be subject to more than 0.5 rem of whole body radiation exposure per year from normal nuclear plant operations.

The task force issued its report in December 1978.[3] The major conclusion was that planning zones should be established at distances out to about 10 and 50 miles from a nuclear power plant. The area within the 10-mile radius was intended as the zone for which emergency actions such as evacuation or sheltering would be taken to protect the population from direct radiation exposure to the plume, or radioactive cloud, released as a result of a nuclear power plant accident. The actual size and shape of the zone would depend on site-specific characteristics. The 50-mile radius represented the planning zone in which protective actions would be taken to preclude radiation exposure resulting from ingestion of radioactively contaminated water or foods such as milk and fresh vegetables.

The rationale considered in recommending these planning zones was primarily based on analyses of the expected consequences of a wide range of potential accidents. The task force also gave some consideration to the likely occurrence of accidents involving loss of the reactor's coolant. Such accidents are typically the most severe potential accidents that NRC considers from a design safety standpoint in licensing nuclear power plants. The task force concluded that a level of exposure of 5 rems to the whole body, the level at which EPA guides called for evacuation,

[2]A rem is one measure of the dose of radiation to body tissues.

[3]Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Reactors (NUREG-0396/EPA-520/1/78/016).

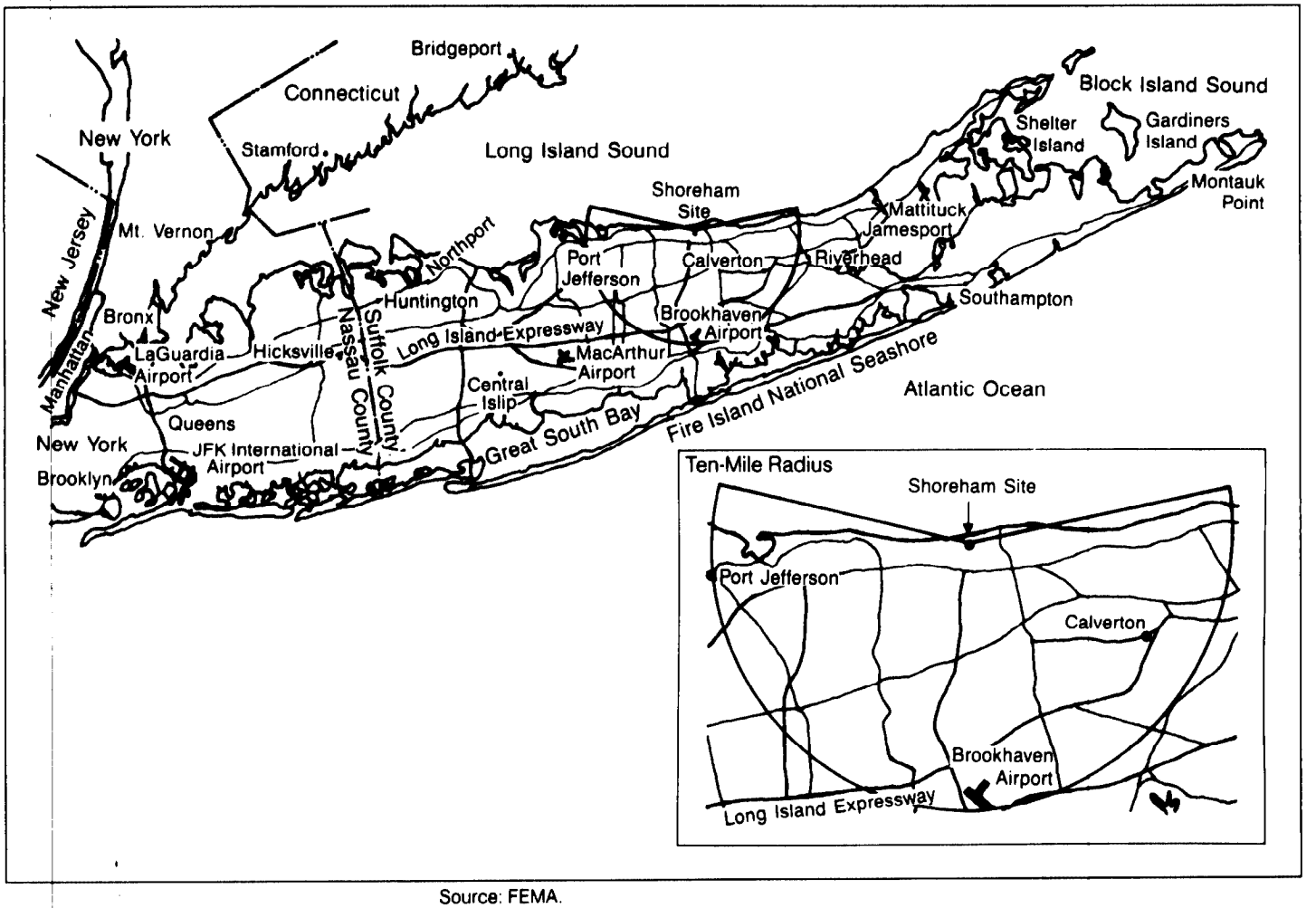
would not be exceeded beyond 10 miles for loss-of-coolant accidents analyzed for sites included in the study. In addition, the task force considered severe accidents involving melting of the reactor fuel that have the potential for causing serious injuries and deaths. According to the task force report, earlier studies indicate that actions such as sheltering or evacuation within about 10 miles of a plant would result in "significant savings" of early injuries or deaths from even the most severe accident-related atmospheric releases for those accidents studied.

In October 1979 and January 1980, respectively, NRC and EPA adopted the guidance contained in the joint task force report. That report remains as the principal technical basis for the current requirement of basing off-site emergency planning in areas generally within 10 miles for direct exposure to radioactive plumes, and 50 miles for indirect exposures from ingestion of contaminated foods and water. Recently, however, NRC has indicated that it will reassess its emergency planning requirements in light of new insights gained from research on severe accidents and any pertinent information from the April 1986 Chernobyl nuclear plant accident in the Soviet Union. At present, NRC's reassessment has not progressed far enough to develop a position on whether the size of the 10-mile plume exposure zone should be changed.

## NRC and FEMA Review of Off-Site Emergency Planning at Shoreham

The Shoreham nuclear plant is located in Suffolk County, Long Island, New York, about 55 miles east of New York City. (See fig. I.1.) NRC issued the Long Island Lighting Company (LILCO), owner of the plant, a construction permit in April 1973. LILCO applied for an NRC operating license in September 1975, and NRC began reviewing the license application in January 1976. Plant construction was essentially completed in 1983, but NRC had not completed its review of the operating license application at that time. The plant has the potential to generate 809 megawatts of electricity, which represents about 30 percent of yearly LILCO system requirements. In July 1985, NRC licensed LILCO to conduct low-power (less than 5 percent) testing of the Shoreham plant, which has been completed. Full-power operations cannot begin, however, without an NRC license to operate at full power. Through July 1986, LILCO had expended about $4.6 billion on Shoreham, including plant construction, personnel training costs, and operating costs incurred while awaiting a full-power license from NRC. LILCO estimates that it is paying about $1.3 million per day in debt service on Shoreham.

**Figure I.1: General Location Map**




Source: FEMA.

## New York State and Suffolk County Are Not Participating in Emergency Planning

Suffolk County initially participated in emergency planning around Shoreham and, in September 1981, the county legislature agreed to LILCO's request that the county develop a radiological emergency response plan. The utility provided funds to develop the plan; however, in 1982 the county returned the funds and decided to independently develop a plan. A draft of the plan, which cost the county nearly $600,000, was completed in December 1982. In light of the plan's findings, the Suffolk County Executive stated in February 1983 that the unique local conditions of Long Island make it impossible to protect the public safety if a serious accident occurred at the Shoreham plant. The executive cited the difficulty of evacuating large numbers of people,

including both those who might be instructed to evacuate and those who would evacuate on their own initiative, on a limited number of roads running through a narrow island (i.e., Long Island). Shortly thereafter, the county legislature resolved not to adopt or implement any radiological emergency plan for Shoreham and asked NRC to terminate the Shoreham operating license proceeding. NRC denied the county's petition. In addition, the Governor of New York announced that he would not impose a state plan on the county. This represented the first instance in the United States in which both state and local governments have refused to participate in emergency preparedness planning around a nuclear power plant.

In the absence of state and local off-site emergency plans, LILCO submitted its own off-site emergency plan directly to NRC in May 1983. Some members of Congress, NRC commissioners, and FEMA officials, as well as local communities and public interest groups, have questioned whether a utility plan could be effectively implemented if rejected by state and local authorities. On the other hand, the House Appropriations Committee, in approving fiscal year 1984 funding for FEMA, stated that the fact that a governmental entity cannot or will not perform a particular role or roles in preparing, submitting, or implementing off-site emergency preparedness plans should not, by itself, constitute a sufficient basis for FEMA to determine that the plans—or portions of them—are inadequate. For its part, NRC determined that it was required by statute to evaluate the plan prepared by LILCO. Therefore, in May 1983, NRC appointed an Atomic Safety and Licensing Board[4] to conduct public hearings on off-site emergency planning at Shoreham.

## NRC Requested FEMA to Review LILCO's Plan

In the summer of 1983, NRC invoked the provisions of its memorandum of understanding with FEMA and requested FEMA to evaluate the LILCO plan and provide findings and determinations as to whether the LILCO emergency response plan for Shoreham was adequate and capable of implementation. NRC requested FEMA's findings and determinations within 3 weeks because it then believed that if FEMA's review could be completed by then, and following FEMA's review, if all off-site emergency preparedness issues could be addressed in public hearings and resolved in favor of LILCO, a license permitting full-power operations at Shoreham could be issued in November 1983.

[4]Atomic Safety and Licensing Boards, comprised of one person qualified to conduct administrative proceedings and two persons with technical qualifications, conduct such hearings as directed by the Nuclear Regulatory Commission and make such intermediate or final agency decisions in licensing and enforcement proceedings as the Commission may authorize.

The LILCO plan—called the Shoreham Nuclear Power Station Offsite Radiological Emergency Response Plan—was submitted to NRC without the endorsement of Suffolk County or New York State. The plan proposed to deploy an organization composed primarily of LILCO employees and outside parties, such as the Red Cross, to carry out all off-site aspects of the plan, including functions normally carried out by state and local personnel, in the event of a radiological emergency at Shoreham. The plan estimated that about 160,000 persons resided within the 10-mile planning zone during the summer and that about 139,000 persons resided there during the winter. According to FEMA officials, the plan did not rely on the assistance of state and county personnel in the event of an accident at Shoreham but did provide for the participation of either or both levels of government if they elected to participate.

FEMA reviewed the LILCO plan in accordance with the joint NRC/FEMA criteria listed in NUREG-0654 and transmitted the results of its initial review to NRC on June 23, 1983. For this initial review, FEMA used the resources of the Department of Energy's Argonne National Laboratory rather than a Regional Assistance Committee. In terms of these criteria, FEMA found that the LILCO plan had 34 inadequacies. FEMA also identified two preconditions that had to be met for a finding as to whether the plan is capable of being implemented and whether LILCO has the ability to implement the plan:

- A determination of whether LILCO has the appropriate legal authority to assume management and implementation of an off-site emergency response plan.
- A demonstration through a full-scale exercise, that LILCO has the ability to implement an off-site plan that has been found to be adequate.

Finally, FEMA established a position that a nongovernment off-site emergency plan could be considered adequate if the plan has no inadequacies when evaluated against FEMA/NRC criteria.

Between September and December 1983, NRC submitted revisions 1, 2, and 3 of the LILCO plan to FEMA and requested a Regional Assistance Committee review of those revisions. While the review was in process, the Governor of New York announced that the state opposed approval of LILCO's plan because, in its opinion, the utility lacked the legal authority to implement the plan. Shortly thereafter, FEMA asked NRC whether the review of the plan should continue, be modified, or be terminated in view of the state's position. NRC requested that FEMA continue

to review the plan, stating that FEMA's review would be an essential ingredient in the licensing board's determination on the adequacy of LILCO's plan and the utility's ability to implement it.

In March 1984, FEMA transmitted to NRC the Regional Assistance Committee's review of revision 3 of LILCO's plan. The committee was chaired by a staff person from FEMA's Region II office and included representatives from the Departments of Agriculture, Energy, Health and Human Services, the Interior, and Transportation; EPA; and NRC. The committee rated 109 elements of the amended plan and found 32 inadequacies. In addition, the legal authority issue affected 24 elements. Inadequacies the committee found in the plan included the following:

- No discussion took place of alternate evacuation routes to be used by nonessential Shoreham plant personnel in the event of inclement weather and certain specific radiological conditions.
- Not all reception centers identified in the plan were at least 5 miles beyond the 10-mile zone as required by NUREG-0654.
- No letters of agreement with bus and ambulance companies had been written; only letters of intent to enter into contracts are contained in the plan.
- The plan needed revision with regard to protective actions to be followed within the 50-mile ingestion pathway.
- It was questionable whether the monitoring equipment listed in the plan would be sufficient to process all evacuees within the 12-hour time limit required by NUREG-0654.
- The plan did not indicate whether cited medical facilities and personnel have the capability to evaluate and treat radiation exposure.

Subsequently, as requested by NRC, between November 1984 and February 1986, FEMA reported on LILCO plan revisions 4, 5, and 6. Identified inadequacies decreased from the 32 in revision 3, to 5 in revision 6. Concerns related to LILCO's authority to assume responsibility for a number of activities in the plan, however, continued to affect 24 elements. These concerns included the following:

- Making command and control decisions.
- Coordinating with state and local governments in New York and contiguous states.
- Seeking a declaration of a state of emergency and requesting state and federal assistance.
- Alerting and notifying the public.

- Arranging for agreements with organizations like bus companies, schools, and hospitals.

Regarding the legal authority issues, in February 1985 the New York State Supreme Court[5] ruled that LILCO does not have the legal authority to exercise governmental functions included in its off-site emergency plan. LILCO's appeal of that decision is pending. In a related matter, a U.S. District Court in New York ruled in March 1985 that the state and county could not be forced to participate in emergency planning. Finally, in August of 1985, NRC's licensing board responsible for making initial NRC decisions on emergency preparedness issues stated that, although it had seen no demographic, geographic, or other evidence on which to conclude that an effective off-site emergency plan would be impossible to develop and implement for the Shoreham plant, a serious defect in the LILCO plan is the opposition of the state and county. The licensing board found that it would be unlawful for LILCO to undertake certain functions—such as controlling traffic and instructing the public during an emergency—that are routinely performed by law enforcement personnel or state and local officials, and that LILCO's lack of legal authority to implement its off-site plan precluded a finding of reasonable assurance that the public health and safety would be protected in the event of a radiological emergency. As discussed later, LILCO's authority to implement its plan without state and local government participation remains a major issue in the NRC operating license proceeding.

## FEMA Exercised the LILCO Plan

In November 1984, LILCO requested NRC to ask FEMA to begin planning for an exercise of the emergency plan for Shoreham. FEMA was initially reluctant to exercise the LILCO plan because not all previously identified planning deficiencies had been resolved. In addition, as discussed above, the courts and an NRC licensing board issued decisions related to the legal authority issue. In June 1985, however, NRC determined that despite the legal authority issue, there was no reason why LILCO should not be allowed to exercise those parts of the plan that it could legally exercise and that the exercise could yield meaningful results. Later in June, NRC requested that FEMA schedule as full an exercise of the LILCO plan as feasible, emphasizing response capabilities within the 10-mile plume exposure zone.

[5]In the state of New York, the highest court is the Court of Appeals. Lower courts include the Appellate Division of the Supreme Court and the Supreme Court.

On October 29, 1985, FEMA informed NRC that the inadequacies identified during its review of revision 5 of LILCO's plan did not preclude the conduct of an exercise. FEMA pointed out, however, that the reluctance of county and state officials to participate and the legal authority issue would place special parameters on the conduct of the exercise. Such an exercise, FEMA went on, would be dramatically different from typical exercises at other nuclear plant sites and would not allow it to reach a finding of reasonable assurance. FEMA also concluded that conducting an exercise could provide information to NRC as to LILCO's on-site and off-site emergency response capabilities. FEMA presented NRC with two exercise options:

- Option 1. Set aside all functions and exercise objectives related to issues of LILCO's legal authority and state and local government participation. Only functions outlined for LILCO would be exercised.
- Option 2. Include all functions and normal exercise objectives. Federal personnel would simulate the roles of key state or local officials unable or unwilling to participate.

In November 1985, NRC requested FEMA to conduct as full an exercise as feasible at Shoreham consistent with the approach outlined in the second option. Such an exercise, NRC noted, would be useful in the licensing process.

Opposition to the proposed exercise was expressed by Suffolk County and New York State government officials and various members of Congress. Other members, however, were in favor of the exercise, indicating that state and local governments should not be permitted to veto the operation of a commercial nuclear plant simply by refusing to participate in preparing, exercising, or implementing emergency preparedness plans. FEMA testified before a congressional subcommittee in November 1985 that since NRC requested an exercise, FEMA was obligated to conduct one both under its memorandum of understanding and as NRC's off-site preparedness consultant.

The principal difference between the proposed exercise of the LILCO plan and those at other nuclear plants was that the planning and conduct of the off-site portion would be done by the utility instead of by state and local personnel.

A full-scale exercise was conducted on February 13, 1986, and was assessed using evaluation criteria contained in NUREG-0654, as well as standard objectives used in other exercises. The exercise involved

approximately 1,300 participants, not including about 65 representatives of federal agencies who directed and evaluated the exercise and simulated the roles of state and local officials. These simulations were limited to testing whether LILCO personnel could accommodate and respond to state and local officials during an emergency. The exercise evaluated the following operations:

- Local Emergency Response Organization Emergency Operation Center.
- Emergency Operation Facility.
- Brookhaven Area Office.
- Emergency News Center.
- Patchogue, Port Jefferson, and Riverhead Staging Areas.
- Emergency Worker Decontamination Facility.
- Reception Center.
- Congregate Care Centers.
- Medical drill.
- Bus evacuation of school children and general population.
- Evacuation of the mobility-impaired.
- Traffic control points.
- Route alerting.
- Impediments to evacuation.
- Radiological field monitoring.

The FEMA exercise assessment report noted 5 deficiencies and 38 areas requiring corrective action. The five deficiencies follow:

- Responding to a traffic impediment was not done in a timely manner.
- Copying capability at the Emergency News Center was insufficient.
- Dispatching of bus drivers was untimely.
- Wrong bus routes were followed.
- Dispatching of traffic guides was untimely.

FEMA defines deficiencies as inadequacies that would result in a finding that off-site emergency preparedness was not adequate. Areas requiring corrective action are also inadequacies but are not considered to affect public health and safety.

At a briefing on the exercise held for participants, the public, and the media, FEMA's Region II Director said that because the plan cannot be implemented without state and local participation, FEMA cannot determine that there is reasonable assurance that the public's health and safety can be protected. FEMA headquarters, however, had agreed with NRC to make no overall finding with respect to the exercise assessment.

Therefore, it requested the Regional Director to delete this overall finding from the draft post-exercise assessment report. He refused and subsequently resigned because of the issue.

The post-exercise assessment report was submitted to NRC on April 17, 1986, with neither a positive nor negative finding of reasonable assurance. The report did point out, however, that the exercise was limited without state and local government participation and, therefore, FEMA could not measure the capabilities and preparedness of state and local governments if they were to be called on to respond. The report also indicated that demonstration of more than one-third of the official exercise objectives was affected by the legal authority issue.

FEMA did not require LILCO to conduct a formal public meeting after the exercise of LILCO's plan, although FEMA requires state and local governments to hold such meetings after their emergency plans are exercised. FEMA's position on this matter was that the public meeting requirement only pertains to its reviews of state and local emergency plans conducted in accordance with its regulations for such reviews. FEMA's exercise report, however, will be the subject of hearings open to the public before an NRC licensing board. On June 6, 1986, NRC ordered immediate hearings on LILCO's exercise of the emergency plan for Shoreham. LILCO submitted revision 7 of its off-site emergency plan to NRC on June 20, 1986. The purpose of this revision was to resolve deficiencies identified by the FEMA exercise assessment requiring plan and/or procedure changes. According to FEMA officials, LILCO has also submitted revision 8 of its plan. As of October 1, 1986, FEMA had not begun its review of either of these revisions. According to FEMA and NRC officials, the public hearings are not likely to begin until early 1987. FEMA could also be called upon to conduct a remedial exercise of the plan at some time in the future.

With respect to the lack of state and county participation and the resulting legal authority issue, NRC's Commissioners issued a decision on July 24, 1986, stating that in evaluating the LILCO plan, NRC can reasonably be assumed that some "best effort" state and county response in the event of an actual accident would be made. The decision also held that the "best efforts" would utilize the LILCO plan as the best source for emergency planning information and procedures because the LILCO plan is clearly superior to no plan at all. The Commission was unwilling to assume, however, that this kind of best effort government response would necessarily be adequate. Given questions on such matters as the familiarity of state and county officials with the LILCO plan and how

much delay can be expected in alerting the public and making decisions on protective actions, the Commission has ordered further evidentiary hearings on this issue, known as the "realism" issue. NRC does not expect to make a final licensing decision on Shoreham until late 1987 at the earliest.

## Observations

The debate over off-site emergency preparedness around the Shoreham plant continues. Suffolk County still holds the position that adequate emergency planning on Long Island is impossible, and the county and New York State are not participating in planning or testing the effectiveness of LILCO's plan. Without state and local government participation, LILCO's legal authority to implement its own emergency plan for Shoreham became a significant issue. The New York State Supreme Court ruled that LILCO does not have the legal authority to assume functions normally carried out by state and local governments. LILCO has appealed that decision. An NRC licensing board initial decision on off-site emergency preparedness licensing issues accepted the court ruling and, in fact, made a preliminary finding subject to further NRC review that the state's and county's refusal to participate had created a situation whereby, in the licensing board's opinion, it is impossible to determine whether the plan could be effectively implemented even if the legal authority question were resolved in LILCO's favor.

Because New York State and Suffolk County have elected not to prepare off-site emergency plans, several major differences exist in the way off-site emergency planning is being addressed at Shoreham in comparison to previously licensed nuclear plants.

A key difference is that NRC and FEMA are considering an off-site plan prepared by a utility, rather than state and local governments, and the plan was submitted to NRC rather than to FEMA. At NRC's request, FEMA is reviewing the plan to assist NRC in making a final determination on the adequacy of the utility's on-site and off-site emergency plans. In essence, in the absence of state and local emergency plans, NRC will eventually determine, as permitted by the Atomic Energy Act and as contemplated by its recent authorization acts, whether LILCO's off-site plan reasonably assures that public health and safety are not endangered by operation of the Shoreham plant. With this basic difference in mind, three significant differences have occurred in FEMA's technical review and exercise of this plan as compared with other plans:

- The exercise testing the effectiveness of LILCO's plan was carried out by LILCO personnel without state and local participation.
- FEMA did not require LILCO to hold a formal public meeting following the exercise to inform citizens of test results and obtain their comments—something FEMA requires of state and local governments after they have exercised their off-site emergency plans.
- In providing NRC with the results of its review and exercise of LILCO's plan, FEMA did not provide NRC with overall findings on the adequacy of LILCO's plan or the utility's ability to implement the plan.

The NRC and FEMA review of off-site emergency preparedness at Shoreham is on-going, and no final NRC decisions have been made. Clearly, NRC is breaking new ground as the Shoreham proceeding is the first case in which NRC is attempting to determine, in the absence of state and local plans, whether an off-site emergency plan prepared by a utility reasonably assures that public health and safety will not be endangered by the plant's operation.

# Objectives, Scope, and Methodology

In light of the April 1986 accident at the Soviet Union's Chernobyl nuclear power plant, on May 2, 1986, Senator Alfonse D'Amato asked us for a report addressing several aspects of the regulation of commercial nuclear power plants and nuclear reactors under the jurisdiction of the Department of Energy. This report addresses that part of the Senator's request pertaining to federal procedures for reviewing, testing, and approving emergency response plans around commercial nuclear power plants, with particular emphasis on the Shoreham Nuclear Power Station on Long Island, New York.

As agreed with Senator D'Amato's office, our objectives were to examine the procedures followed to date in preparing, reviewing, and testing the off-site emergency response plan for the Shoreham plant and to determine whether and how the procedures differed from those used at other commercial nuclear power plants.

We reviewed pertinent federal statutes, regulations, and criteria for preparing and evaluating radiological emergency response plans. We also reviewed the memorandum of understanding between NRC and FEMA dealing with off-site emergency planning issues. At FEMA Region II (New York, N.Y.), we reviewed files detailing how the Shoreham plan was prepared, reviewed, and tested, and the reactions of organizations and individuals to how the process was carried out. Documents in these files originated from NRC, FEMA, FEMA's Regional Assistance Committee, the state of New York, Suffolk County, LILCO, members of Congress, and others. We discussed the process of preparing, reviewing, and testing the Shoreham plan with FEMA Region II officials in New York, N.Y., including the former Chairman of the Regional Assistance Committee that evaluated it.

We also discussed general aspects of off-site emergency planning and the specifics of the review of emergency planning at the Shoreham plant with officials of NRC's Office of Inspection and Enforcement (Bethesda, Md.) and NRC's Region I (King of Prussia, Pa.). In addition, we met with LILCO officials and toured the Shoreham Nuclear Power Station.

We discussed the contents of this report with agency officials as it was being developed and incorporated their views where appropriate. However, as requested by your office, we did not obtain official comments on the report.

Our review was conducted between July and October 1986 and was performed in accordance with generally accepted government auditing standards.

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