

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION



Before the Atomic Safety and Licensing Board

In the Matter of)
LONG ISLAND LIGHTING COMPANY) Docket No. 50-322
(Shoreham Nuclear Power Station,)
Unit 1))

LILCO MOTION FOR
SUMMARY DISPOSITION OF SOC CONTENTION 1

The Contention

By Board Order of June 26, 1980, SOC Contention 1 was
admitted as follows:

Intervenors contend that the emergency planning
zones (EPZ) set forth by the Commission in the
NRC Policy Statement of October 23, 1979 (44
Fed. Reg. 61123) are inadequate for the Shoreham
nuclear plant in that

- a. The 10-mile (radius) EPZ plume exposure
pathway fails to provide adequate
consideration of the following local
conditions: demography, meteorology,
topography, land use characteristics,
access routes, local jurisdictional
boundaries and release time
characteristics.
- b. The 50-mile (radius) EPZ ingestion pathway
fails to provide adequate consideration of
the following local conditions:
demography, meteorology, topography, land

characteristics, and time of year of releases.

Material Facts As To Which
There Is No Genuine Issue To Be Heard

1. The NRC Policy Statement of October 23, 1979 (44 Fed. Reg. 61123) has been superceded by the Commission's final rule on emergency planning. 45 Fed. Reg. 55402 (1980).
2. The Commission's emergency planning rule relies specifically on the work of the Emergency Planning Task Force set out in "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," NUREG-0396, EPA 520/1-78-016 (1978). See 10 CFR § 50.45(s)(1) n.1, 45 Fed. Reg. at 55410.
3. In its final emergency planning rule, the NRC adopted generic emergency planning zones (EPZ) for all large (greater than 250 Mwt) light water reactors: "[T]he plume exposure pathway EPZ for nuclear power plants shall consist of an area about 10 miles (16 km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius " 10 CFR § 50.47(c)(2), 45 Fed. Reg. at 55409 (emphasis added). The generic nature of the EPZ determination is further indicated by the rule's supporting documentation: "[I]t was the consensus of the Task Force that emergency plans could be based upon a generic distance" NUREG-0396 at 16.

4. The NRC recognized that there are site-specific variations among plants and still concluded that it was appropriate to set generic EPZ's. In discussing the fact that low population zones (LPZ's) used in siting nuclear power plants vary from site to site, it was noted that "[w]hile the Task Force recognizes that there are site-to-site variations in LPZs, due in part to varying features of the plant, the Task Force concluded that the size of EPZs need not be site-specific." Id. at III-7.

5. The NRC did not intend to require comprehensive site-specific analyses to determine the size of the EPZ's for individual plants. See Material Facts 3-4. While the NRC did provide for some minor perturbations in the zones to account for "local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries," 10 CFR § 50.33(g), 45 Fed. Reg. at 55408-9, no major case-by-case analyses were mandated. The selection of EPZ's of "about 10 miles" and "about 50 miles" was meant to give some flexibility to emergency planners: "It is expected that the judgment of the planner will be used in determining the precise size and shape of the EPZs considering local conditions" NUREG-0396 at 14. "Although the radius for the EPZ implies a circular area, the actual shape would depend upon the characteristics of a particular site." Id. at 16.

6. In setting generic EPZ's, the Commission specifically considered Class 9 accidents. As stated in NUREG-0396, "[t]he Task Force judgment on the extent of the Emergency Planning Zone is derived from the characteristics of design basis and Class 9 accident consequences." Id. at 16; see also id. at Appendices I, III. It was concluded that "a 10 mile plume EPZ would be appropriate to deal with core melt accidents." Id. at I-41.

7. The NRC determined that the 10 and 50 mile EPZ's were consistent with a "conservative emergency planning policy." 45 Fed. Reg. at 55406.

8. The NRC concluded that emergency response plans should "provide dose savings for a spectrum of accidents that could produce offsite doses in excess of the PAGs [Protective Action Guidelines]." NUREG-0396 at 5. The generic EPZ's included in the emergency planning rule accomplish that goal. Id. at 16.

Argument

A.

By its terms, SOC Contention 1 challenges the adequacy of the EPZ's established by the Commission's Emergency Planning Policy Statement for use at Shoreham. Since the EPZ's prescribed in the policy statement are the same as those now included in the rule, SOC Contention 1 amounts to an attack on

the emergency planning rule. SOC's responses to the Applicant's interrogatories^{1/} further explain its objections to the concept of generically determined EPZ's. In large part, SOC claims that the NRC's EPZ's are inadequate for Shoreham because the NRC allegedly failed to give appropriate consideration to Class 9 accidents. Thus, according to SOC, a complete site-specific accident consequence analysis is required.

The NRC, in its emergency planning rulemaking, set generic emergency planning zones for all large light water nuclear power plants. See Material Facts 3 and 4. The generic determination of the EPZ's included findings that the EPZ sizes selected are appropriately conservative and that public health and safety can be adequately safeguarded by pre-planned emergency measures within the generic zones. See Material Facts 7 and 8. By clear implication, since the NRC found the 10 and 50 mile EPZ's adequate for all large reactors, it found them adequate for Shoreham. By the same token, the NRC's EPZ decision represents a determination that a site-specific accident consequence analysis of the type demanded by SOC is not required. See Material Facts 3-5.2/ In urging this Board

1/ See generally Answers of the Shoreham Opponents Coalition (SOC) to Applicant's Interrogatories Dated May 21, 1981" [SOC's Answers] at A-1 to A-15, attached as Exhibit 1 to this motion.

2/ LILCO has decided to conduct an accident consequence assessment independent of any NRC requirement. The purpose of the study is to confirm the effectiveness of emergency planning

to consider the adequacy of the generic EPZ's and to require a site-specific study to set EPZ's for Shoreham, SOC is challenging the adequacy of the NRC's emergency planning rule. SOC, however, has failed to meet the requirements of 10 CFR § 2.758 for such a challenge. Accordingly, it is impermissible.

B.

LILCO believes that nothing further needs to be said to support the summary disposition of SOC Contention 1, pursuant to 10 CFR § 2.749. Nonetheless, brief response to the emergency planning points raised in SCC's answers to the Company's May 21 interrogatories may be useful.

(1) SOC's reliance on the Kemeny Commission's criticism of the adequacy of low population zones (LPZ's) as a reason for requiring site-specific analyses, SOC's Answers at A-3, is irrelevant since the NRC no longer uses LPZ's for emergency planning purposes. See NUREG-0396 at III-5 to -8. (2) SOC's reliance on the Rogovin Report's suggestion that "ten miles is not an appropriate cutoff distance for emergency planning," SOC's Answers at A-3, is also unpersuasive; the Rogovin criticism as well as the Kemeny Report were considered by the NRC in the emergency planning rulemaking. See 45 Fed. Reg. at

measures for Shoreham within the generic EPZ's and to explore ways in which the planning might be improved. The study will not explore EPZ's in excess of the NRC's generic requirements.

55402. (3) SOC's argument that Class 9 accidents were not considered in the emergency planning rulemaking is wrong; Class 9 accidents were taken into account in setting the EPZ's. See Material Fact 6. (4) SOC's attempt to support its challenge to the emergency planning rule by citing a study done by California's Office of Emergency Services (OES) is misleading since the report is based on a rejection of assumptions used by the NRC with no explanation why the OES assumptions are better than the NRC's. SOC Answers at A-9. In any event, the NRC's assumptions are controlling here. And (5) SOC rejects the degree of safety the Commission inherently accepted in adopting the emergency planning rule, not because the risk was shown to be too large but rather because it could be further reduced.^{3/}

In short, SOC argues that the NRC failed in its emergency planning rulemaking effort. But a review of the NRC's rulemaking record shows, to the contrary, that it did consider a broad range of factors (including Class 9 accidents); that it did have ample support for its use of the various factors, and that it did make a reasoned judgment as to the acceptable level of risk inherent in adopting the final emergency planning regulations. See generally 45 Fed. Reg. 55402-13; NUREG-0396;

^{3/} The NRC noted in NUREG-0396 that selection of a 10 mile plume exposure EPZ results in approximately a 30% chance of exceeding a one REM whole body dose in the extremely unlikely event of a core melt accident. NUREG-0396 at I-38. SOC wants more. See SOC's Answers at A-12. Again, the NRC's judgment of acceptable risk is controlling here.

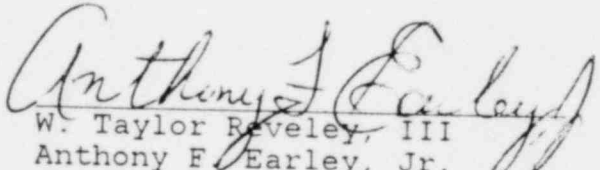
Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG-0654, FEMA-REP-1, Rev. 1, (1980); Summary of Public Comments and NRC Staff Analysis Relating to Rulemaking on Emergency Planning for Nuclear Power Plants, NUREG-0684 (1980).

Conclusion

SOC's allegation that the NRC's generically determined EPZ's are inadequate for Shoreham and its insistence on a site-specific EPZ determination challenge the NRC's final emergency planning rule, in disregard of the requirements of 10 CFR § 2.758(a). Accordingly, no genuine issue remains to be heard concerning SOC Contention 1, and it should be summarily resolved under § 2.749.

Respectfully submitted,

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DATED: July 13, 1981

A. SOC CONTENTION 1

The Shoreham-specific emergency planning criteria have not yet been developed by LILCO, by local authorities including Suffolk County, or by state authorities. Furthermore, neither the NRC or FEMA review of emergency preparedness has been conducted at this time. Thus, the Shoreham-specific distance criteria which will be utilized as the basis of the combined applicant, state, and local plans has not yet been documented and, as a result, SOC answers to this interrogatory are premature. However, SOC will provide responses in so far as practical on the basis that the applicant, state, and local authorities will develop the emergency planning zones of about ten and fifty miles for plume and ingestion as provided as guidance in NUREG-0654.*

First, SOC contends that neither the Staff or LILCO have conducted a Shoreham site-specific accident consequence assessment utilizing the NRC's CRAC Code (from WASH-1400) or equivalent. Such an analysis based on site-specific core inventory, release fractions, release time estimates, shielding factors, health treatment facilities, demography, topography, meteorology, land characteristics, access routes, and local jurisdictional boundaries is necessary to develop the appropriate plume exposure and ingestion Emergency Planning Zones (EPZ). As discussed by the Staff in the Shoreham SER**, LILCO has not yet submitted emergency plans required by the new regulations which were published in the Federal Register on August 19, 1980, and became effective on November 3, 1980. The regulations contain a revised Appendix E to 10 CFR Part 50, "Emergency Planning and Preparedness for Production and Utilization Facilities," which establishes minimum requirements for an acceptable state of on-site emergency preparedness, and a new Section 50.47, "Emergency Plans," which specifies standards which must be met for both on-site and offsite emergency response. This latter section incorporates the joint NRC/FEMA standards for use in evaluating state and local radiological emergency plans and preparedness. The Staff also acknowledges NRC and FEMA have agreed that FEMA will make a finding and determination as to the adequacy of state and local government emergency response plans. NRC will determine

* NUREG-0654 (FEMA-REP-1), Rev. 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, page 17, for example.

** NUREG-0420, Shoreham SER, page 13-1.

the adequacy of state and local government emergency response plans with respect to the standards listed in Section 50.47(b) of 10 CFR Part 50, the requirements of Appendix E to 10 CFR Part 50, and the guidance contained in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," dated November, 1980. After the above determinations by NRC and FEMA, the staff will make a finding in the licensing process as to the overall and integrated state of preparedness. Such a review will be published, at some future time by the Staff in a Supplement to the Shoreham SER.

The President's Commission on the Accident at Three Mile Island (Kemeny Commission)* noted that a central concept in the then current siting policy of the NRC is that reactors should be located in a "low population zone" (LPZ), an area around the plant in which appropriate protective action could be taken for the residents in the event of an accident. However, Kemeny concluded that the concept is implemented in a strange, unnatural, and round-about manner. To determine the size of the LPZ, the utility calculates the amount of radiation released into the containment in a very serious hypothetical accident but assumes no failure of the containment. Using geographical and meteorological data, the utility then calculates that area within which an individual would receive 25,000 millirems or more to the whole body, during the entire course of the accident. This area is the LPZ. The 25,000-millirem standard is an extremely large dose, many times more serious than that received by any individual during the entire TMI accident.

The Kemeny Commission believed that the LPZ approach has serious shortcomings. First, because of the extremely large dose by which its size is determined, the LPZs for many nuclear power plants are relatively small areas, two miles in the case of TMI as well as Shoreham. Second, if an accident as serious as the one used to calculate the LPZ were actually to occur, it is evident that many people living outside the LPZ would receive smaller, but still massive doses of radiation. Third, the TMI accident shows that the LPZ has little relevance to the protection to the public -- the NRC itself was considering evacuation distances as far as 20 miles, even though the accident was far less serious than those postulated during siting. Kemeny therefore concluded

* Kemeny, John, et al, Report of the President's Commission on the Accident at Three Mile Island, pages 16-17.

that the entire concept is flawed and recommended that the LPZ concept be abandoned in siting and in emergency planning. As an alternative, Kemeny proposed and SOC concurs that a variety of possible accidents should be considered during siting, particularly "smaller" accidents which have a higher probability of occurring. For each such accident, one should calculate on a site-specific basis probable levels of radiation releases at a variety of distances to decide the kinds of protective action that are necessary and feasible. Such protective actions may range from evacuation of an area around the plant, to the distribution of potassium iodide to protect the thyroid gland from radioactive iodine, to a simple instruction to people several miles from the plant to stay indoors for a specified period of time. Only such a site-specific analysis can predict the true consequences of a radiological accident.

Another major review group formed by the NRC after the TMI accident, the Commission's Special Inquiry Group, directed by Mitchell Rogovin, has also suggested that ten miles is not an appropriate cutoff distance for emergency planning.* For a further discussion of some of the deficiencies in the logic which went into the choice of a ten mile cutoff distance, see T. Lombardo, T. Perry, "Mitigating the Effects of a Nuclear Accident," Spectrum, July, 1980, page 30.

Neither the Shoreham safety analysis nor the NRC's NEPA review for Shoreham considered Class 9 (very large) accidents. As a result of the Class 9 accident at TMI-2 and the NRC's Risk Assessment Review Group's conclusion (NUREG/CR-0400) that estimates of the absolute probabilities of accidents in WASH-1400 (NRC's Reactor Safety Study) are not reliable, the NRC has no theoretical or practical basis for excluding the safety and environmental assessment of Class 9 accidents at Shoreham. In an interim policy statement by the NRC (Federal Register, June 13, 1980), the NRC has decided to approach this problem on a plant-by-plant basis considering the potential consequences for large accidents at specific sites. However, no Shoreham assessment prior to fuel loading is presently contemplated. This is a serious omission.

In the course of preparing WASH-1400, major insights into the nature of reactor risk were discerned. One of the significant

* Rogovin, Mitchell, et al, Three Mile Island: A Report to the Commissioners and to the Public, page 133.

conclusions of the study is that the risk to the public from nuclear power reactors arises primarily from core meltdown accidents (Class 9 accidents). In a subsequent program undertaken by Brookhaven National Laboratory (BNL), Science Applications, Inc. (SAI), and Battelle Columbus Laboratories (BCL), the risk contribution of Class 3 to 8 accidents was examined.* Class 3 to 8 accidents,** incidents that may be expected to occur over the lifetime of a plant and which do not exceed the design bases of the plant, are analyzed in safety analysis reports and environmental reports. As illustrated in Table A-1,

TABLE A-1
COMPARISON OF EXPECTED RELEASES

	Risk, weighted Curies/reactor-year***
Normal operational release	1.7
Class 3-8 accidents	
Actuarial data	0.05
Extrapolated	<u>0.05-0.2</u>
Total	0.1-0.3
Class 9 accidents	540

* R.E. Hall, et al, A Risk Assessment of a Pressurized-Water Reactor for Class 3-8 Accidents, NRC Report NUREG/CR-0603, Brookhaven National Laboratory, NTIS, October, 1979.

** U.S. Atomic Energy Commission, Consideration of Accident in Implementation of the National Environmental Policy Act of 1979--Discussion of Accidents in Applicant's Environmental Reports: Assumptions, Annex to Appendix D, Title 10, Code of Federal Regulations, Part 50, Federal Register, 36(231): 22851-22854 (Dec. 1, 1971).

*** The units of weighted curies used in this table involve a summation of all the important radionuclides weighted by a factor to account for the relative effect of that radionuclide to iodine-131 in producing latent fatalities (including fatalities from malignant thyroid tumors). Although these weighting factors would actually be dependent on the conditions of a specific accident, they provide a convenient approximate means of measuring accident consequences.

the results of this study indicate that, on the basis of expected value, Class 9 accidents are predicted to have a much greater impact on human health and the environment than either Class 3 to 8 accidents or normal releases, despite the low probability of core meltdown. While the plant analyzed was a PWR, we believe the conclusions are also applicable to the Shoreham BWR.

Using the same weighting factors for the different radio-nuclides as in Table A-1, the total radioactivity potentially available for release from the containment atmosphere at one hour in a core meltdown accident is 10^8 weighted Ci. The major fraction of the risk calculated in WASH-1400 originated from meltdown accidents in which the containment failed during or shortly after core meltdown, before significant deposition (greater than an order of magnitude reduction) could take place. In contrast, the amount of radioactivity that would be released to the environment from Class 3 to 8 accident (the Shoreham design basis accidents) would be very small, typically less than 1 weighted Ci. Although these accidents have been predicted to occur with frequency up to as much as four orders of magnitude greater than core meltdown accidents involving large atmosphere releases of radioactivity, the difference in consequences still would be approximately seven orders of magnitude. Thus the risk, measured by the product of probability and consequence, for Class 9 accidents is predicted to be much greater. Therefore, emergency planning measures must be developed to mitigate the consequences of these releases.

It is also relevant and important to note that the WASH-1400 Evacuation Model presumes more extensive evacuation than the ten miles presently assumed to be proposed by LILCO. The introductory mention of evacuation in WASH-1400 states: "In the case of a potentially serious accidental release, it is assumed that people living within about 25 miles of the plant, and located in the direction of the wind, would be evacuated...."*

Other references to evacuation are in WASH-1400, Appendix VI, where it is explained that credit is taken for evacuation in all directions to five miles and in a downwind 45° section to 25 miles in order to concentrate evacuation facilities where they will do the most good.** The 25-mile limitation precluded the WASH-1400 authors considering evacuation from any U.S. city

* WASH-1400, Main Report, page 51.

** WASH-1400, Appendix VI, page 11-4.

larger than Cincinnati. (Approximate population of 450,000 in 1970.) However, the WASH-1400 authors did assert that large U.S. cities, such as New York, Boston, Philadelphia, Chicago, and Los Angeles, with reactors at their edges, cannot reasonably be evacuated in less than one week.*

Further, unlike the Shoreham site-specific conditions, the WASH-1400 authors assumed in the evacuation model that the population movement is always radially outward from the reactor, i.e., there is no crosswind movement. During the evacuation, the population is assumed to be unshielded from exposure to airborne radioactive material both externally and through inhalation and to be shielded from exposure to ground contamination due to surface roughness and the automobile. If the evacuating population is overtaken by the cloud of radioactive material, it is assumed that people will have moved outside of the contaminated area within a four-hour period. Beyond 25 miles, the people are assumed to be relocated within seven days if the chronic dose due to exposure to ground deposited radionuclides exceeds a specified value. However, if the dose accumulated within the first seven days due to exposure to contaminated ground exceeds 200 rads, then the people are assumed to be relocated within one day.

Three categories of potential health effects are calculated in WASH-1400: early and continuing somatic effects, late somatic effects (cancers), and genetic effects. Since early and continuing somatic effects are usually observed after large, acute doses of radiation (e.g., whole-body doses of 100 rads), they would be limited to persons within 50 miles (not 10 miles) or so of the reactor even for the largest conceivable release.** Conversely, late somatic and genetic effects may result from very low doses albeit with low incidence. Consequently, these effects may occur at long distances from the reactor.

No figures are presented in WASH-1400 for the conditional probability of a latent death resulting from a BWR release as a function of distance. However, WASH-1400, Figure VI 13-26 shows the conditional probability for an individual of dying from latent cancer as a function of distance from a reactor given the PWR-1A and PWR-1B releases. The probability of latent cancer fatalities is relatively constant out to about 100 miles from the reactor

* WASH-1400, Appendix VI, page 11-5.

** NUREG-0340, Overview of the Reactor Safety Study Consequence Model, page 16.

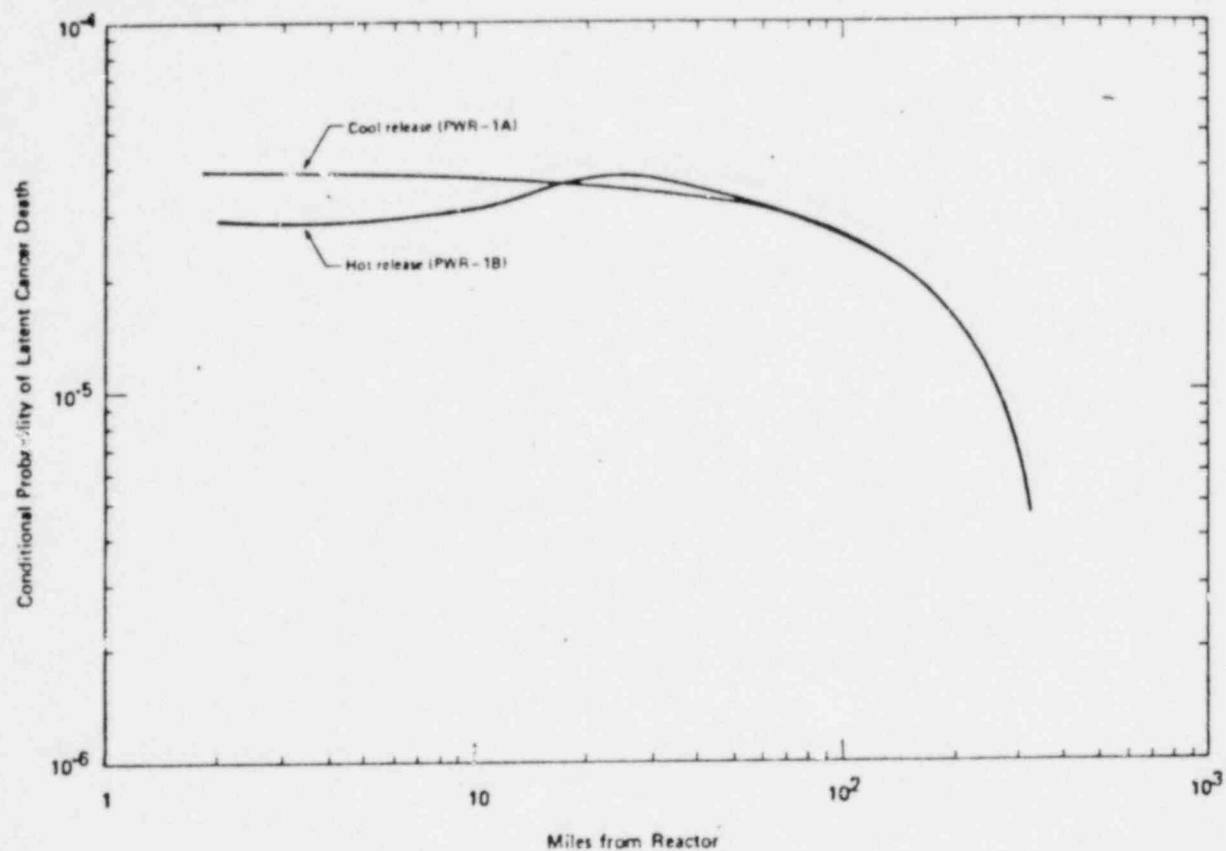


FIGURE VI 13-26 Conditional probability of latent cancer death given a PWR-1A or PWR-1B release. (Approximately, absolute mortality probabilities are 10^{-6} per reactor year times stated ones).

Source: WASH-1400, Appendix VI, page 13-37.

beyond which it decreases rapidly. The small difference between the two curves is due to the different heat rates in the PWR-1A and PWR-1B releases. With the large heat rate in the PWR-1B release, it is less likely for an individual close to the reactor to be subject to significant doses. Therefore, the probability for a latent cancer death would be lower close to the reactor for the hot release case (PWR-1B) than for the cool release case (PWR-1A). A similar result would be expected for a BWR-1 release from Shoreham. Thus, for Shoreham, the number of latent fatalities and health effects is roughly proportional to the population living between 25 and 100 miles from the reactor and to the associated mitigation measures for this group.

Site-specific consequence analyses as recommended herein have been conducted for the California nuclear plants. The California results confirm that the 10 and 50 mile EPZ's are not appropriately conservative. Following the March 28, 1979, accident at Three Mile Island, Governor Brown formed a task force to study California's emergency preparedness for nuclear power plant accidents. One of the task force's principle recommendations was that site-specific analyses be conducted of the consequences of hypothetical serious nuclear power plant accidents. As required by subsequent legislation, a site-specific study of this nature has been conducted by the State Office of Emergency Services (OES). Based on the results of this Study, the OES has recommended Emergency Planning Zones (EPZ's) for each of the nuclear power plant sites. The rationale behind the selection of these EPZ's is presented in the following portion of this response.

As noted in the OES report, the selection of the ten-mile radius (for the plume exposure EPZ) by the NRC/FEMA was based primarily on the following considerations:

- a. projected doses from the traditional design basis accidents would not exceed Protection Action Guide levels outside the zone;
- b. projected doses from most core melt sequences would not exceed Protective Action Guide levels outside the zone;
- c. for the worse core melt sequences, immediate life threatening doses would generally not occur outside the zone;
- d. detailed planning within 10 miles would provide a substantial base for expansion of response efforts in the event that this proved necessary.*

* NUREG-0654, page 9.

Based upon the site-specific results of the State's study, the OES analyzed the impact of a similar set of hypothesized accidents on the areas about each of the California sites. EPZ's were developed upon this site-specific basis rather than the generic basis used by the NRC/FEMA. Based upon the site-specific results, the OES concluded EPZ's should be extended beyond the basic 10 mile NRC/FEMA requirements. The outer boundaries of the extended EPZ's presented above for the three large reactor sites in the State with ratings comparable to Shoreham vary in distance from about 18 to 35 miles from the reactors, as shown in Table A-2.

TABLE A-2

DOWNWIND DISTANCES FROM REACTOR SITE WHERE
PROBABILITY OF EXCEEDING SPECIFIED WHOLEBODY DOSE
IS 0.01 (1%) FOR CORE-MELT ACCIDENTS*

<u>Reactor</u>	<u>Melt-Through</u> <u>0.5 rem</u>	<u>Penetration</u> <u>Leaks</u> <u>25 rem</u>	<u>Major</u> <u>Containment</u> <u>Failure</u> <u>200 rem</u>
Diablo Canyon	4.5 miles	20 miles	26 miles
Rancho Seco	5 miles	18 miles	28 miles
San Onofre 1	8.5 miles	13 miles	18 miles
San Onofre 2, 3	4 miles	18 miles	35 miles

The decision to extend the EPZ boundaries beyond the zone dimensions required by NRC/FEMA was based upon a disagreement in the application of the (c) and (d) considerations above that were used by the NRC/FEMA in their election of the basic 10 miles radius for the EPZ. As indicated by the dose-distance relationships developed during the study, the results of the State's study of the California site-specific consequences showed basic agreement

* Cunningham, Alex, Emergency Planning Zones for Serious Nuclear Power Plant Accidents, California OES, November, 1980, Table 4.1.

with observations (a) and (b) of the NRC/FEMA selection consideration presented above. That is, the State's results indicated there was at least a 99.9% probability that the projected doses from the most probably (melt-through) accident sequences would not be expected to exceed Protective Action Guide (PAG) levels beyond a basic 10 mile EPZ boundary. In this regard, the State's results supported the first two of the NRC/FEMA observations.

However, the OES concluded that prudence dictates that the EPZ's be extended so that advance planning can be performed to aid in resolving the potential problems associated with the more severe types of accidents, the penetration leakage and major containment failure classifications. The very severe accidents in these classifications make up about 10 to 20% of all the hypothesized core-meltdown accidents, even for relatively new reactor designs. It did not seem prudent to restrict planning attention to responding only to the potential for incurring immediate life threatening radiation doses for such severe accidents. Thus, the extended zones were selected so that the potential for incurring health impacting doses was reduced not only for early fatalities, but also for early injuries and delayed cancer effects as well.

A direct comparison of NRC/FEMA generic estimates of dose-distance-probability relationships with the State's site-specific results is presented in OES Figure 4-13. The results of the two different sets of CRAC calculations made by the NRC and the State show basic similarities, but also some substantial differences. The NRC results appear to have been smoothed to follow the general outlines of their CRAC results, while the State's dose-distance-probability data shown represent the direct, unmodified output from CRAC (for the Rancho Seco site in the particular example shown). The results presented in the figure (for both the NRC's and the State's data) represent the combined output of the codes for all accident classifications (major containment failure, penetration leakage, and melt-through categories). The results have been combined to reflect the appropriate weighting factors of the relative probabilities of receiving accidental doses from each and all of the accident classifications.*

As the NRC observed in NUREG-0396, there is about a 30% chance of exceeding the (1 rem) PAG level at the basic 10

* Cunningham, Alex, page 66.

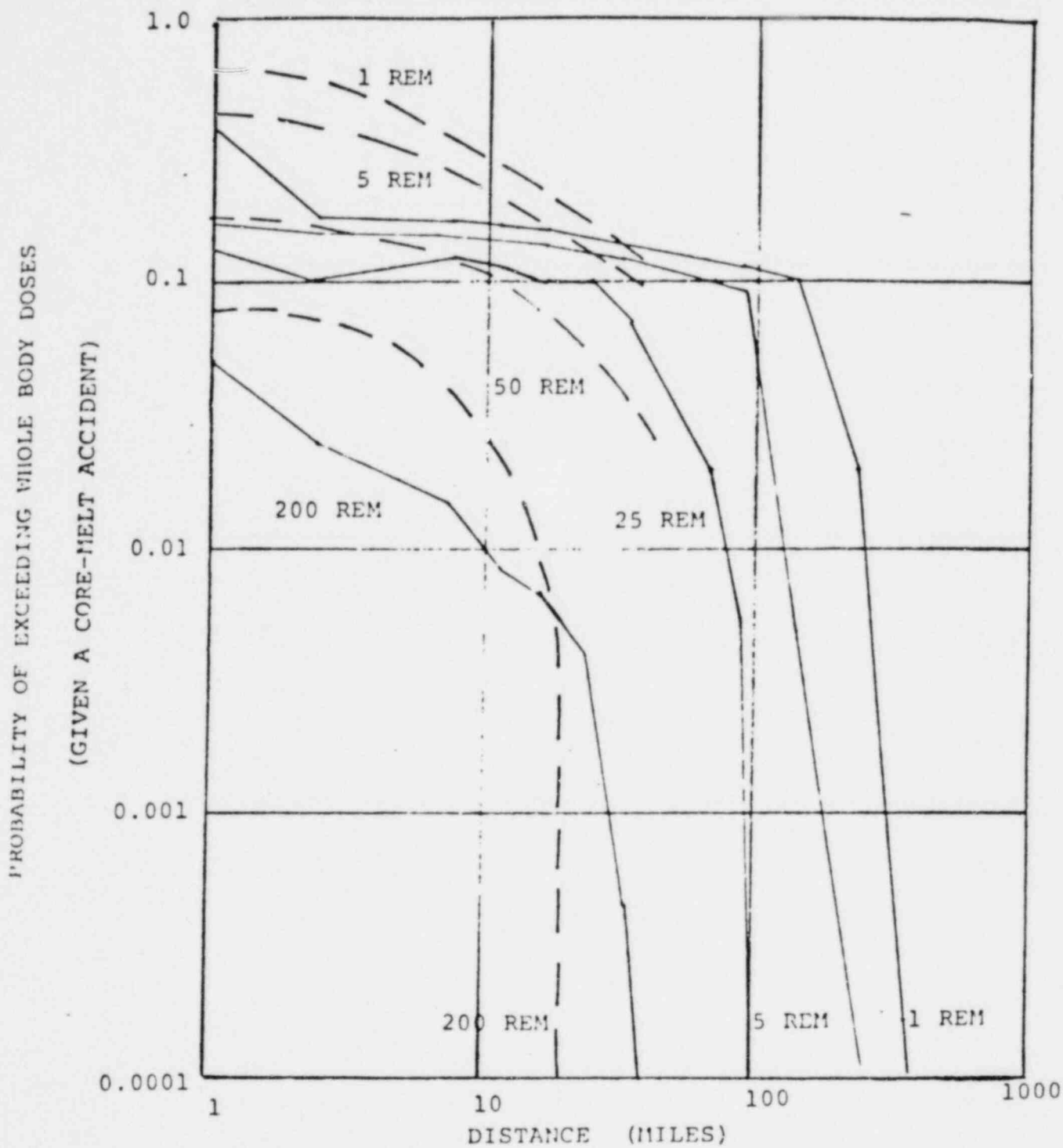


Figure 4-13 WHOLE BODY DOSE ESTIMATES

— STATE STUDY
 ---- NUREG - 0396

miles plume exposure EPZ boundary, according to their own data. The State's data would indicate a somewhat lower probability of about 20% at the same distance. At the same 10 miles distance, the NRC results suggest a probability of about 10% of exceeding a 50 rem dose, and about a 3% probability of exceeding 200 rem. Based upon the NRC's and the State's data, adopting extended EPZ boundaries with distances from the reactor of about 18 to 35 miles would reduce the probability of early fatalities by a factor of 0.1 or more (to a probability of about 0.1% of exceeding 200 rem); the probability of early injuries (at 25 rem) would be reduced by a factor of about 0.5 to 0.25 (to a probability of about 7 to 9%); and the probability of exceeding PAG doses would be reduced about a factor of from 0.5 to 0.8 (to a probability of about 15%). Thus, extending the EPZ boundaries results in a prudent reduction in the probabilities of early health effects and a substantial reduction in the probability of delayed health effects (associated with 0.5 to 1 rem PAG dose limits).

Thus, based on the foregoing, SOC concludes that there is substantial precedent for the prudence of conducting a Shoreham-specific consequence analysis to develop the appropriate emergency planning EPZ's. Further, we believe that such an analysis would indicate that the Plume Exposure EPZ of 10 miles and an Ingestion EPZ of 50 miles is not conservative and does not result in adequate protection of the public health and safety.

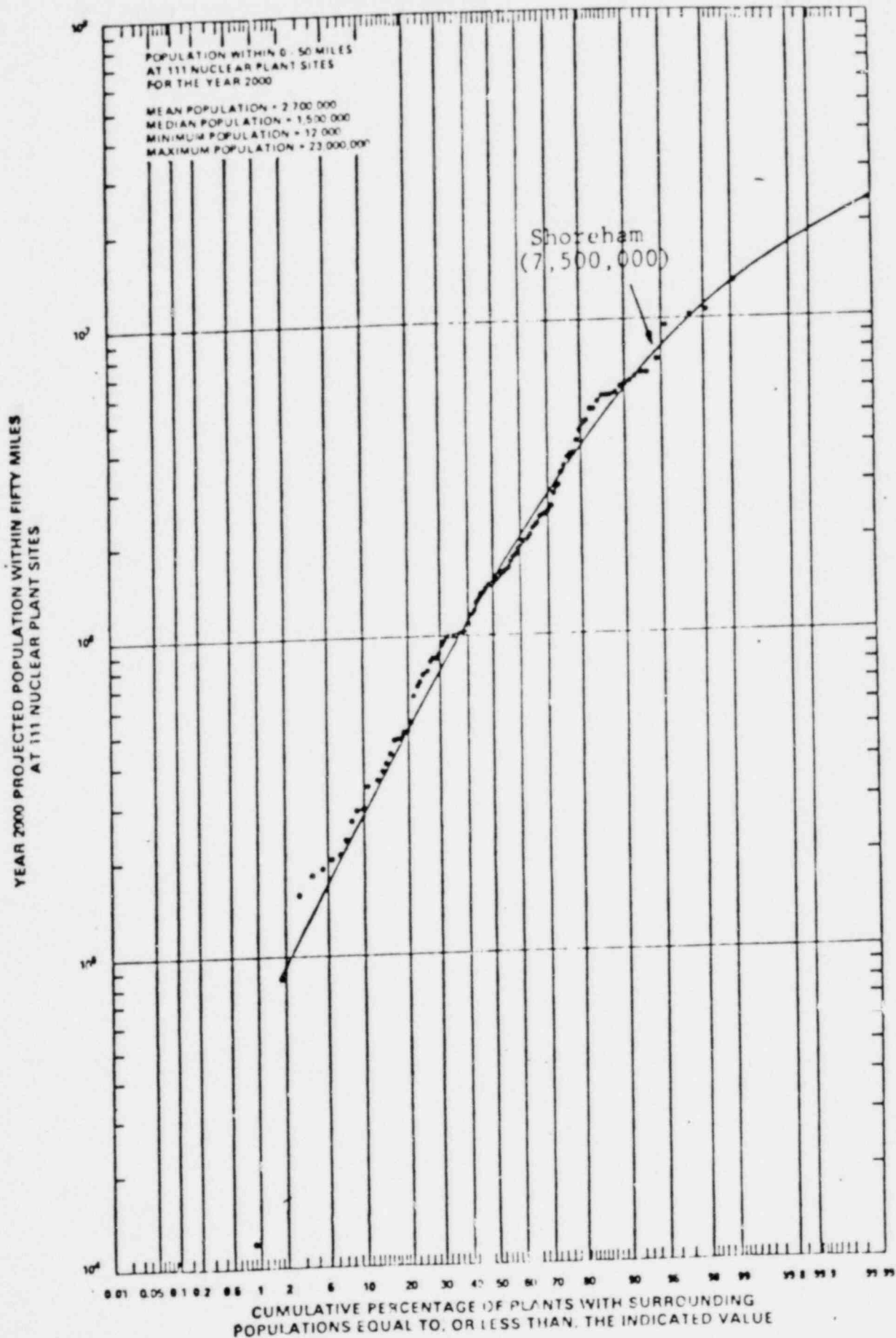
The supplemental responses to the specific interrogatories are as follows:

- A.1 Site-specific modeling of the impact of population on Class 9 accident consequences has not been conducted by LILCO or reviewed by the NRC. The NRC has reviewed only the population in the low population zone as related to emergency planning.* The Shoreham site has exceptionally high projected population. In the year 2000 it will have a population within 50 miles that puts it in the top 5% of all reactors; within 10 miles it is in the top 20% (see Figures III and IV). If population and the resulting consequences are considered in the NRC decision to require implementation of Class 9 mitigation techniques, Shoreham would be a prime candidate.

* NUREG-0420, page 2-6.

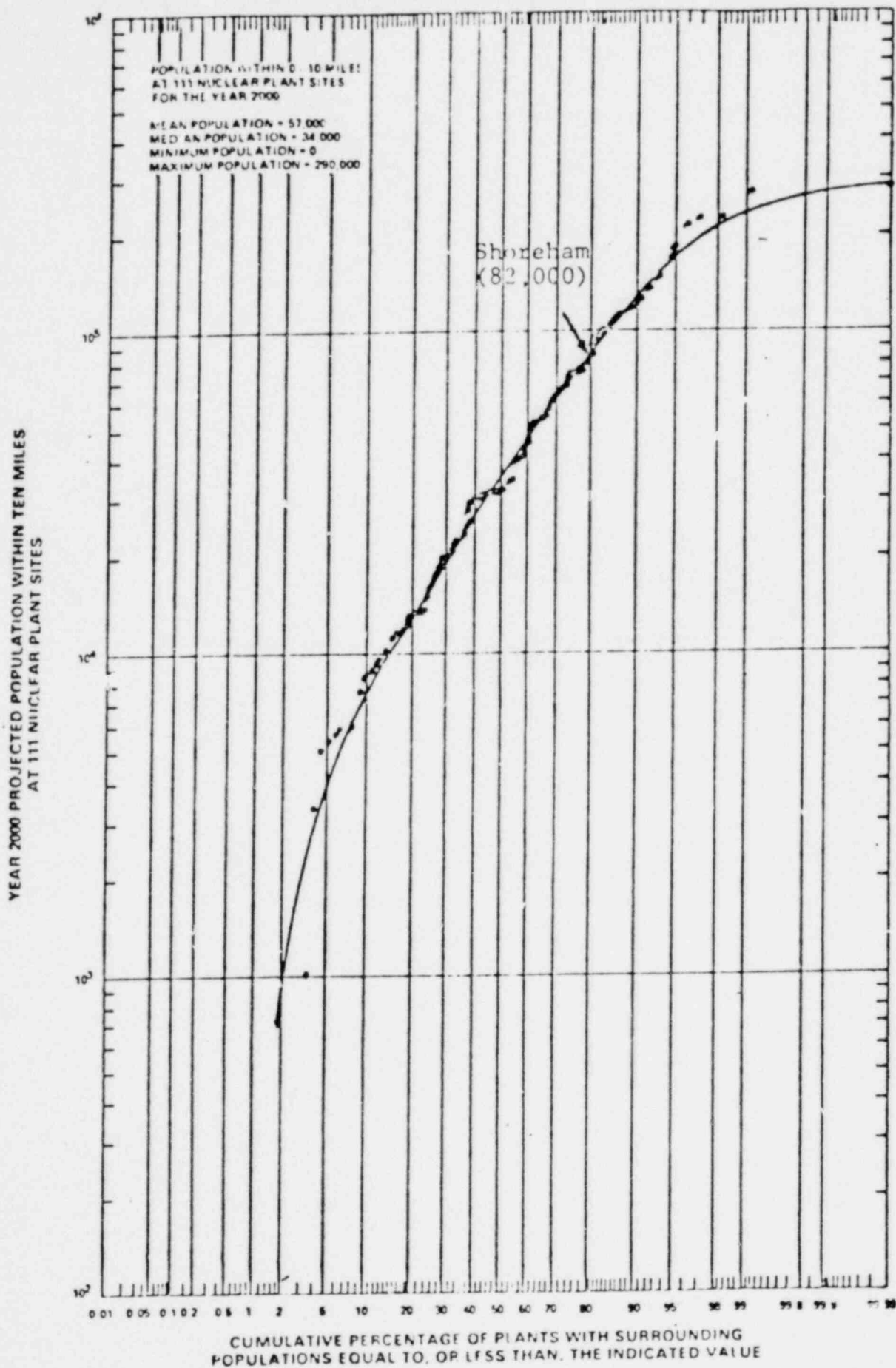
FIGURE 111

COMPARISON OF POPULATION LEVELS WITHIN 50 MILES OF REACTOR SITES



Source: NUREG-0348

FIGURE IV
COMPARISON OF POPULATION WITHIN TEN MILES OF REACTOR SITES



Source: NUREG-0349

- A.2: Site-specific modeling of the impact of meteorology on the consequences of releases resulting from Class 9 accidents has not been conducted by LILCO or reviewed by the NRC. As discussed in the preceding, the DBA releases represent less than one millionth the potential releases.
- A.3: No site-specific modeling of the effects of topography on plume dispersion within the 100 mile radius (approximately) of the Shoreham site have been conducted by LILCO or reviewed by the NRC. Also, the effect of the Long Island Sound water on deposition velocity of radioactive materials is extremely uncertain.
- A.4 and A.5: No site-specific modeling of the impact of land use characteristics and local access routes on the accident mitigation measures resulting from releases due to a Class 9 accident have been developed by LILCO or evaluated by the NRC. The NRC has only reviewed the road networks and land use factors (as related to emergency planning) for the LPZ.*
- A.6: Local and State (New York, Connecticut, and Rhode Island) emergency plans for even the 50 mile radius from the plant have yet to be submitted or reviewed by NRC/FEMA as set forth in the current regulatory requirements in Appendix E to 10 CFR 50. Thus, coordination of State and local jurisdictions during and following an emergency at Shoreham have not yet been demonstrated. Also, LILCO has not provided the "implementing" emergency procedures as recently set forth in Section V of the emergency planning regulations.
- A.7: No Shoreham-specific analyses of plume lift-off and plume dispersion for releases resulting from Class 9 accidents based on Shoreham-specific release times and release energies have been developed by LILCO or reviewed by the NRC.
- A.8: The Policy Statement has been superseded by the NRC Final Rule on Emergency Planning (45 FR 55402) of August 19, 1980, which has an effective date of November 3, 1980.

* NUREG-0420, page 2-6.

A.9: See answer to A.8.

A.10: Same as answers to A.1 through A.9.

A.11 The facts and documents on which SOC now re-
and lies are described in detail in the general
A.12: response to this interrogatory. The facts
and documents on which SOC expects to rely *
during the Shoreham hearings will include
the preceding as supplemented by facts and
documents provided by LILCO and the NRC on
this docket in the future, and by facts and
documents provided by LILCO and the NRC in
response to any forthcoming SOC discovery
request.

A.13: The documents on which SOC now relies are
described in the foregoing. Since the docu-
ments are publically available, no copies
have been provided by SOC.

A.14, SOC has not yet decided which witnesses it
A.15, will utilize in the hearings. When this de-
and cision is made the response to these interro-
A.16: gatories will be supplemented with the re-
requested information. To the extent that SOC's
present consultants are assisting in review-
ing and/or responding to these interrogatories,
their resumes are attached hereto.

A.17 SOC first engaged the services of their con-
and sultants, MHB Technical Associates, in Decem-
A.18: ber, 1979, and has had a continuing discussion
with them regarding the contentions in this
case. However, as of this writing, the con-
sultants have not made any reports to SOC re-
lated to this contention. General studies or
observations that SOC now relies or expects
to rely on during the Shoreham hearing are set
forth in the preceding. Also, see response to
A.11 and A.12.

*To the extent they are now known.