



I. THE ALTERNATIVE SITE ANALYSIS PRESENTED IN THE DRAFT SUPPLEMENT IS INADEQUATE AND INCOMPLETE.

The Staff's Draft Supplement (DS) alternative site analysis for Pilgrim Unit 2 is an unfortunate departure from the reasoned criteria for site selection and comparison which has evolved in recent years within the NRC. The Staff's analysis of the Boston Edison (BECO) site selection process does not conform to NRC standard review practices nor to the approach recommended by the Staff in the recent NRC Workshop on Alternative Site Rulemaking and applied by the NRC Staff in its Seabrook Alternative Site Study (NUREG-0501). The major defect in the Staff's analysis is its conclusion that sites 1, 2, 2A, the 18 complex, 19, and 20 plus Montague constitute an acceptable slate of candidate sites (DS pp. 26-27). Had the criteria outlined in the standard review plan and used in the Seabrook study been properly applied, the Staff conclusion would have been that BECO's slate of candidate sites is inadequate because it does not provide genuine environmental alternatives to Pilgrim 2.

The "Evaluation" portion of the Alternative Sites section of the Environmental Standard Review Plan states that the reviewer will do the following:

. . . determine if the applicant has employed a practicable site-selection process having as its principal objective the identification of candidate sites that would be among the best that could reasonably have been found [within the region of interest] for the proposed plant. This standard implies that all such candidate sites should be licensable." (ESRP p. 9.2-15)

Pursuant to these guidelines and in response to decision of the Commission and the Appeal Board, the NRC Staff has developed a comprehensive and practical set of environmental criteria for the evaluation of alternative sites for nuclear power plants under NEPA. The methodology is designed to ensure the selection of a slate of diverse and genuine environmental alternative sites for further detailed analysis and comparison with the proposed site. See, Seabrook Alternative Site Analysis, NUREG 0501, December, 1978; and "Considerations for Rulemaking on Alternative Sites," NRC Staff Study Document, Workshop on Alternative Site Rulemaking (McLean VA., March 14-16, 1979) (hereinafter "Study Document").

First, the applicant must identify a "region of interest", or specified geographic area to be searched for candidate sites. A region of interest might be defined by several resource considerations, including, for example, state or service territory boundaries, water availability and other environmentally defined criteria. The geographic scope of the region of interest, however, should be defined primarily by environmental considerations, and not arbitrary boundaries of state and service territories. This is especially true in New England, where utilities participate in a regional power pool in which new electrical facilities are needed primarily to augment the overall power grid requirements rather than to

serve the energy needs of one particular utility's load center. ✓

While other environmental resource factors are relevant, the most significant resource factor is usually water availability. In New England, resource areas are defined initially by major watershed and coastal areas. The selection of appropriate resource areas also involves consideration of terrestrial factors associated with a particular water source. For example, a river system might have distinct terrestrial characteristics, including an estuarine region, an extended river valley with floodplains, and a state park. Because the environmental impacts of siting in these areas would be different, the watershed might be divided into three resource areas.

The concept of resource areas is premised on the assumption that sites with common water and land characteristics are usually so similar to one another that they do not offer genuine alternatives. The Staff's criteria attempt to avoid this environmental redundancy by requiring a diversity of resource areas. The region of interest, thus, must be sufficiently broad so as to include geographically distinct resource areas.

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✓ In the Study Document and the Seabrook alternative site analysis, the Staff maintained that environmental considerations should be the primary criteria for defining a sufficient region of interest, so that the environmental goals of NEPA would not be compromised.

Within each resource area, the applicant should identify at least two potentially "licensable" sites. The term "licensable" in this context means that a site must satisfy certain threshold siting criteria in order to qualify for candidate site status. If this initial screening, based on reconnaissance level information, discloses an obvious and serious environmental defect, the site should be rejected and another site from the resource group brought forward. If the discovered defect is not site specific, but rather is common to the resource area (i.e., sufficient water supply), the resource area should be rejected. In this situation, the region of interest then should be expanded to pick up another resource group for consideration. This screening process thus ensures that candidate sites will have an acceptably low magnitude of environmental impacts.

From the two or more similar sites representative of a resource area, only the best site is brought forward for detailed analysis as a candidate site. There is an excellent rationale behind this redundancy criteria:

" . . . If for any reason later detailed analysis revealed a site specific factor which would cause rejection of a site chosen by [this redundancy criteria] the Staff planned to analyze the next best in the group rather than terminate the analysis of the group." Seabrook study, II-2.

A slate of candidate alternative site is then brought forward for a detailed environmental analysis, based on uniform evaluation factors, and compared with the applicant's proposed site. These site selection criteria ensure that candidate

sites are the best that could reasonably have been found, while at the same time assuring that the slate includes genuine environmental alternatives.

The Staff's responsibility, in the first instance, is to conduct an independent review of the applicant's slate of candidate alternative sites and the methodology by which these sites were selected. If the slate does not represent a realistic range of diverse and potentially licensable sites, the Staff should reject the selection as inadequate. In other words, it is not the Staff's task to find new resource areas and candidate sites, and to study them for the applicant. To assume such a role would at once make the Staff a proponent of the applicant's preferred site, and would undermine the independence of the Staff's obligations under NEPA. See, ALAB-479, 7 NRC 791-94; Public Service Company of New Hampshire (Seabrook, Units 1 and 2), CLI-78-8, 5 NRC 503, 525 (1977).

In the Study Document, the Staff recognized the need to separate the tasks of the NRC and the Applicant in the alternative site selection process:

"Under NEPA, as lead agency for the evaluation of nuclear generating facilities, the NRC has the ultimate responsibility for decisionmaking on alternative sites. That ultimate decision regarding alternative sites is to be based on independent analysis. NRC views its joint requirements for independence and decisionmaking as prohibiting its participation in the applicant's selection of resource areas for candidate sites or in the applicant's gathering of substantial amounts of information to be used in the assessment of sites. If the NRC becomes too involved in the applicant's process, it could easily be placed in the role of an advocate for a site, which would impair the agency's independent analysis." (emphasis added) Study Document, p. 9.

This is not to say that the Staff should be solely reliant on information provided by the applicant. Indeed, its obligation to conduct an independent assessment of the applicant's candidate sites requires the Staff to consult information from other sources. Such independent information collection and analysis is performed, however, as a part of the Staff's validation responsibilities. It should not be used to cure the deficiencies in the applicant's site selection process; rather, it should form the basis of validating the accuracy and thoroughness of the applicant's information, or requiring the applicant to expand its site selection. See, Study Document pages 8-11; and "General Considerations and Issues of Significance on the Evaluation of Alternative Sites for Nuclear Generating Stations Under NEPA", NUREG-0499, Supp. 1 (December, 1978) pp. 20-28.

Unfortunately, the Staff involved with the Pilgrim DS did not apply the NRC's evaluation criteria vigorously or consistently to BECo's slate of candidate sites. Having found the applicant's slate not wholly acceptable, the staff then seriously overstepped its NEPA duties, and undertook to supplement the deficiencies in the applicant's study with its own analysis of three additional sites, none of which represent genuine alternatives to Pilgrim Unit 2. The Commonwealth believes the staff's analysis is inadequate and inappropriate for the following reasons:

A. The Region of Interest and Resource Areas Considered Do Not Represent a Diverse and Genuine Range of Alternatives for Candidate Site Selection

1. Region of Interest

The Applicant's region of interest, presented in the 1974 study, was limited to eastern Massachusetts. The Staff's initial conclusion was that this limitation was arbitrary, and that the region of interest did not include a sufficient number of resource areas from which to select candidate alternative sites (DS §§2 and 4). Presumably, the Staff's conclusion was reached after finding that the candidate slate of sites from the three resource areas identified by the Applicant did not represent a reasonable range of diverse and genuine alternatives to Pilgrim 2.

At this point, what the Staff should have done is to require the Applicant to consider additional resource areas in its site search. Instead, the Staff accepted a litany of "institutional barriers" presented by the Applicant in defense of its restricted region of interest. Conspicuously absent from the Staff's assessment is any mention of environmentally defined criteria for determining the appropriate scope of BECo's region of interest.

For example, Section 3.1 of the DS discusses the Applicant's justification for limiting its region of interest to eastern Massachusetts. Six "key issues" are identified for restricting the scope of the site search, only three of which are environmentally defined (demography, land requirements, and

cooling water availability). The other three factors were based on state and service territory boundaries and general regional power objectives.

The only one of these six factors discussed by the staff in more than a summary fashion is the institutional barrier of siting a nuclear facility in neighboring New England states. The staff's review of these "legal regulatory and political constraints", appearing on pages 9-11, consists of one basic generic assumption: a foreign utility always will encounter insurmountable "difficulty" in siting a facility in another state. The one piece of factual information referenced by the staff which even arguably supports this general proposition is that "Maine law requires Maine electric companies to own a majority interest in any generating facilities constructed in that state" (DS, p.10).

The Staff assumes, without any supporting documentation, that the existing joint ownership agreement is a permanent treaty which dictates the degree of legal barriers to be encountered in siting a facility in a sister state. For example, the state of Rhode Island is eliminated from the region of interest because state law requires part ownership by a domestic utility. The Staff concludes "because there are no Rhode Island utilities in the joint ownership of Pilgrim 2, the attempt to locate and construct a facility in Rhode Island would be difficult." This conclusion is simply wrong. New England Power Company, which presently owns 11.16% of Pilgrim 2, includes Rhode Island within its service territory. Indeed,

this utility presently has an application before the NRC to build two nuclear units in Rhode Island (Charlestown).

If the history of Seabrook has taught us anything, it is that joint ownership agreements between utilities for nuclear power plants in New England are not fixed in stone. To the contrary, Public Service Company's recent offering of 30% ownership in the Seabrook facility indicates such agreements are more like the drifting sand. Certainly, the ownership agreement alone does not support the Staff's conclusion with respect to legal and political constraints on the site selection process. See, Study Document, pp. 18-22.

The Staff's ultimate conclusion that it would be "difficult" for the Applicant to locate a facility outside Massachusetts is not supported by an adequate discussion of relevant evidence. The conclusion of "difficult" relative to out-of-state siting is equivalent to the "hassle factor", rejected by the Appeal Board in Seabrook. See, ALAB-471, 7 NRC 477, 490-98(1978), modified on other grounds. CL1-78-14, 7 NRC 952 (1978). In deploring the lack of evidence in the record on southern New England sites, the Appeal Board concluded that "surely, it takes more than [hassles] to rule out all out-of-state sites without regard to any environmental or other considerations." Id. 7 NRC at 975-96.

The Staff makes no attempt to discuss environmental and other considerations relevant to defining the appropriate region of interest. All that is revealed in the DS is that the

staff "has reviewed the other factors dictating the applicant's region of interest and concurs that these key issues were appropriate for consideration by BECO." (DS, p.11-12). This is not a "detailed statement of reasons"; it is a vague and incomplete judgment. We submit that NEPA requires more. The Appeal Board has indicated clearly in this case that the Staff not only has the obligation under NEPA to conduct an independent analysis of alternatives, but also to disclose, in the FES, the reasons for its conclusions. ALAB-479, 7 NRC 744 (1978).

The Commonwealth does not mean to imply that utilities can never initiate their site searches within service areas or state boundaries. In some cases, this approach may lead to identification of a sufficient number of diverse resource areas for selection of candidate sites. In New England, however, where states and service territories are small, and power needs are dictated primarily by regional grid requirements, the region of interest should be governed principally by environmental resources and not arbitrary political boundaries. See., Staff Study Document, supra at 18-21.

Using New England as a region of interest, the Staff in Seabrook was able to generate a slate of environmentally diverse alternatives which were potentially licensable. In contrast to the Pilgrim DS, "institutional barriers" in Seabrook were explicitly excluded as a primary screening factor. As a consequence, the Staff in Seabrook was able to

identify a wide range of resource areas within the region of interest. The Staff in Pilgrim, because of the unnatural restrictions on BECo's region of interest, never even considered many of these and other resource areas.

2. Other Potential Resource Areas

The Staff's consideration of potential resource areas, other than the three represented by BECo's slate of candidate sites, is inadequate and without justification. Having accepted the Applicant's conclusion that out-of-state siting would be just too "difficult", the Staff throws in Seabrook and Millstone as candidate sites. The Staff's inclusion of these existing nuclear sites is disingenuous, and is not based on any rational consideration of resource areas. The Staff appears to review these sites for no other reason than to state that it considered New England sites outside of Massachusetts. This is hardly a reasoned response to the Appeal Board's concerns in ALAB-479. If, in fact, resource areas in New Hampshire and Connecticut are appropriate for consideration in this case, the Staff should review them with the same scrutiny and evaluation criteria as other resource areas. This procedure would ensure that the best resource areas would be considered for candidate site selection.

Even given BECo's limited region of interest to the borders of Massachusetts, the Staff fails to consider all the available resource areas within the Commonwealth. For example, the Staff does not even mention the northern Connecticut River region in Massachusetts as a potential resource area. Nor does

it consider the Deerfield River system. The Bear Swamp site is one location within this resource area which at least one New England utility considers a promising candidate for nuclear plant (See, FES for NEP 1 and 2). The Commonwealth submits that further evaluation of these alternative resource areas is warranted, particularly in light of the environmental defects associated with the resource areas analyzed by the Staff.

3. The Connecticut River Resource Area.

The inclusion of a Connecticut River site within the region of interest was imperative, but the selection of Montague as the site to represent that resource area was in error. Of several previously-identified sites on the Connecticut River (see FES's for NEP 1 & 2 and Montague 1 & 2), Montague is the only one which has received preliminary negative assessments from EPA and National Marine Fisheries Service with respect to intake impacts on a rare and endangered species. While that potential defect has yet to be determined conclusively, the choice of Montague to represent the Connecticut River resource area is contrary to the criteria of eliminating candidate sites which appear to have serious environmental defects.

Other potential candidate sites within this resource group have been identified and reviewed in environmental impact statements. For example, the Maramos site, located south of Montague on the Connecticut, has been assessed by both the NRC and the Massachusetts Energy Facilities Siting Council. Sites just north of Montague and the Holyoke Pool have also been

evaluated and found suitable. The Staff does not even consider these alternative Connecticut River sites.

Having determined that the Connecticut River was an appropriate resource area within BECo's region of interest, the Staff should have instructed the Applicant to consider alternative sites within this water resource area. It was not appropriate for the Staff to become an advocate of the Applicant by selecting and analyzing a new candidate site (See page 6 supra, citing Study Document, at 8-10. The results of this misadventure are clearly inadequate and unreasoned.

4. Merrimack Resource Area

The Merrimack sites should have been rejected as realistic resource areas by Staff on the basis of two fundamental screening factors: water availability and demography. Both factors were cited by the Staff as criteria for determining the applicant's region of interest. (DS. p. 9.) Regarding water availability, the Staff concluded "we do not consider the Merrimack River to be a dependable year-round water supply" (p. 54). Staff was uncertain whether sites 1, 2, and 2A could ever be viable sites. The DS indicates that without some flow augmentation, the viability of these sites is unlikely. Staff did not know the extent or feasibility of flow augmentation required to prevent unacceptably high thermal inputs during low flow nor did staff know if such augmentation would be cost beneficial.

Had the applicant supplied reconnaissance-level data which answered those uncertainties, and which suggested feasible solutions to the problem, the Staff could have concluded on the basis of concrete information whether the Merrimack sites were "potentially licensable" in terms of water availability. In the absence of such information it is impossible to determine whether the Merrimack River is a legitimate resource area within Massachusetts. See, Seabrook Alternative Site Study (Dec., 1978), II-1-2. However, based on the information presented, the Staff should have eliminated sites 1, 2 and 2A on the basis of not meeting the "potentially licensable" standard.

In terms of demography, Tables 2, 3, and 4 of the DS indicate that all three sites substantially exceed Reg. Guide 4.7 population density trip levels at almost all radial distances from the plant both at times of initial operation and at end of plant life. While the trip levels are not absolute measures of acceptability, they do serve as a guideline for screening candidate sites. See, ALAB-471, 7 NRC 477, 508-10.

The fact that sites 1, 2, and 2A exceed the Reg. Guide 4.7 levels by factors of two or more at some distances should have caused BECo to defer them. However, the sites were not deferred in the 1974 Siting Study because it was completed (February, 1974) before Reg. Guide 4.7 was published even in draft form (September, 1974). BECo's 1974 siting study used the 5/20/40 mile population standard, not the Staff's current Reg. Guide 4.7. As a consequence, sites 1, 2, and 2A were

brought forward as candidate sites when, in fact, they should have been deferred on the grounds of being poor choices in terms of licensability and certainly not a genuine alternative to Pilgrim 2. At a minimum, the fact that all three sites exceeded the trip levels should have prompted the staff to bring forward another site with acceptable population levels within this resource group.

In summary, the Staff was obligated to eliminate sites 1, 2, and 2A because of the water availability and demographic defects of the sites. The staff's findings that (1) in the absence of some definite flow augmentation scheme, the Merrimack is not a reliable year-round water supply, and (2) all three sites have densities well in excess of both trip levels constitute sufficient uncertainty as to potentially licensability to cause the elimination of the Merrimack sites.

5. Buzzards Bay Resource Area.

The Buzzards Bay sites, 19 and 20, according to the DS, share a common serious environmental defect: the use of Buzzards Bay for cooling is likely to result in significant adverse impacts on fishery. On p. 90 of the DS, staff concluded that:

Although the proposed use of closed-cycle cooling at both Site 19 and 20 would substantially reduce mortality related to the entrainment and impingement that would be associated with once-through cooling, the high apparent [sic] by high biological importance of the northern portions of Buzzards Bay may result in the determination that even closed-cycle cooling in this region would still result in significant adverse impacts to the fishery.

In terms of discharge impacts, staff concluded on p. 91 that:

. . . the shallow water, poor circulation and the high density of aquatic organisms in northern Buzzards Bay indicate that a potential does exist for adverse effects to occur during plant operation.

Reconnaissance-level data indicated that even with closed-cycle cooling towers, a plant the size of Pilgrim II would produce significant adverse impacts on the aquatic biota in Buzzards Bay. Clearly that is a serious environmental defect of the resource area which should have triggered the elimination of sites 19 and 20 as candidate sites.

B. The Slate of Candidate Sites Do Not Represent Genuine Alternatives to Pilgrim 2

1. The Staff's review of BECo's candidate site slate, did not attempt to apply the "serious defect" and "redundancy" criteria used in the Seabrook alternative site analysis or the Staff Study Document. As a result, the slate of candidate sites accepted by the Staff in the DS does not offer licensable and genuine alternatives to Pilgrim 2. The most obvious example of the Staff's failure to employ the concept of redundancy in its initial screening of sites is Montague. See, DS §§2, 3, and 4.12. Montague was the only Connecticut River site considered to represent that resource area. Had the Staff included at least two redundant sites for this resource area, it undoubtedly would not have brought Montague forward as a

candidate site for detailed analysis. The presence of the endangered species shortnose sturgeon in the Holyoke Pool at Montague is not an environmental defect at other Connecticut River sites.

2. Sites 1, 2, and 2A are all from the same resource area and each is clearly redundant with respect to the other two. If any sites from that resource area were to be allowed at all, only one of the three should have been elevated to candidate site status.

3. Sites 19 and 20 are also redundant for the same coastal area. The two are not distinct from each other in any significant way. Only the better of the two, probably site 20, should have been brought forward if any Buzzards Bay sites were going to be considered at all.

4. The 18 complex of sites is an extreme example of redundancy. Not only are the sites all from the same resource area, but they are also from the same resource area as the preferred site. Four sites plus the preferred site all located in one town do not constitute genuine environmental alternatives to Pilgrim 2, absent a more reasoned explanation for their inclusion in the slate of candidate sites.

In conclusion, the draft supplement evidences a lack of any reasoned criteria used by the Staff to evaluate alternative sites. The failure to apply a more logical procedure for screening sites results, unfortunately, in an unacceptable slate of candidate sites for detailed analysis and comparison

with the Rocky Point site. The Commonwealth submits that the Staff's acceptance of this poor slate of candidate sites and the method by which they were selected does not conform with the high standards of NEPA for alternative site analyses.

- II. BECAUSE OF THE DENSELY POPULATED AREA SURROUNDING THE PROPOSED ROCKY POINT FACILITY AND ITS UNIQUE SITE CHARACTERISTICS, A CLASS 9 ACCIDENT RISK ANALYSIS SHOULD HAVE BEEN UNDERTAKEN AS PART OF THE NEPA REVIEW PROCESS.

For the reasons set forth in Appendix A of its Draft Supplement to the Pilgrim Unit II Final Environmental Statement, the Staff has concluded that neither NEPA nor the NRC's own regulations and procedures require an evaluation of the consequences of Class 9 accidents in comparing Rocky Point with its alternative sites. This judgment is presumably based upon the Annex to Appendix D of 10 CFR Part 50, and the fact that the demographic figures submitted by BECo indicate that the weighted population density of the area surrounding Rocky Point is not sufficiently high to trigger the special site comparison procedures required under Regulatory Guide 4.7. It is the Commonwealth's contention that the Staff's failure to analyze the relative consequences of Class 9 accidents at the various candidate sites is in clear contravention of the emerging regulatory trend with respect to the treatment of such accidents under NEPA, is based upon population figures that are inaccurate and outdated, and demonstrates a willful indifference to a number of unique circumstances associated with the Rocky Point site.

A. The Original Assertion of the Proposed Annex to Appendix D of 10 CFR Part 50, that the Likelihood of Class 9 Accidents is too Remote to Warrant Consideration of Their Consequences in the NEPA Review Process, Has Been Substantially Repudiated By Recent NRC Decisions and Changes in Regulatory Policy

Any analysis of the current regulatory approach to Class 9 accidents must start with the "proposed" Annex to Appendix D of 10 CFR Part 50. This document was issued by the AEC for public comment over seven years ago, has since been treated as an "interim" statement of policy, and will presumably disappear altogether some day, the victim of a ever-increasing number of exceptions to its cavalier dismissal of Class 9 accidents. The Annex divided all radiological accidents into nine classes, and with respect to accidents of the ninth class (breach of containment or core melt) held that the probability of their occurrence was "so small that their environmental risk is extremely low." Accordingly, the Annex concluded that the alternative sites analysis mandated by NEPA need not address the environmental consequences of such events.

Whatever the Annex's assessment of Class 9 accident probability, the NRC has never been unmindful of the frightful consequences such events could have in areas of high population density, and it has always been a matter of policy to locate nuclear reactors away from population centers. See Statement of Considerations, 10 CFR Part 100, 27 FR 3509 (April 12,

1962). Indeed, in 1973 the NRC Staff rejected a proposed site on Newbold Island specifically because an alternative site was found to be significantly less populous and thus less vulnerable to the catastrophic consequences of a serious radiological accident.

Shortly thereafter, the NRC issued Regulatory Guide 4.7, which contained specific guidelines with respect to population density surrounding the sites of proposed nuclear reactors. Without explicitly referring to the Annex and the AEC's earlier judgment concerning Class 9 accident probabilities, Reg. Guide 4.7 proposed that if projected population densities within a thirty-mile radius of a potential site exceeded 500 persons per square mile at the time of initial operation and 1,000 persons per square mile at its retirement, then "special attention should be given to the consideration of alternative sites with lower population densities."

What remained unclear, however, was just what was meant by "special consideration", and the extent to which this directive qualified the Annex's earlier proscription against consideration of Class 9 accidents. Clearly, if preoccupation with population density signalled an intention to minimize the public safety and environmental hazards flowing from a serious reactor accident, then among other things "special consideration" surely must have meant an in-depth analysis, under NEPA, of the consequences of such accidents, especially those extreme accidents denominated Class 9.

Because Reg. Guide 4.7 was silent as to its effect on the Annex's treatment of Class 9 accidents, however, the matter remained clouded until 1978, when a number of NRC proceedings and decisions provided considerable refinement of the issue. For the light that they now shed on the Pilgrim II alternative sites analysis, these events will be briefly summarized:

1. December, 1977; the Perryman Application

In 1977, the Baltimore Gas and Electric Company sought early site review for its proposed Perryman reactor. Because population densities surrounding the site exceeded the guidelines set forth in Reg. Guide 4.7, the Staff concluded that a quantitative evaluation of accident consequences was called for, and included in that study those catastrophic events that had previously been dismissed, pursuant to the proposed Annex, as so unlikely as to not warrant consideration. Based on the methodology developed in the 1972 Reactor Safety Study, the Staff concluded that Perryman would have to be rejected in favor of an alternative site that demonstrated a significantly reduced threat to the surrounding population in the event of a serious radiological accident. The precedent, therefore, was unmistakably established: whenever the trip levels contained in Reg. Guide 4.7 were exceeded, an analysis of Class 9 accidents would have to be performed, notwithstanding the earlier pronouncement of the Annex to the contrary; in short, whatever the probabilities of such accidents, their potential consequences for highly populated areas could no longer be ignored.

2. March, 1978; Commission Action Paper, SECY 78-137

Shortly after rejection of the Perryman site, the Staff formalized the policy that had evolved in the course of that proceeding. After reviewing NRC policy concerning reactor sites in high population areas, discussing the Newbold and Perryman situations and detailing the analytical tools available to it in dealing with such applications, the Staff proposed disregarding the Annex's ban on Class 9 accident assessments under NEPA whenever the area surrounding a proposed site demonstrated a relatively high population density. Rather, "assessment of the relative differences in Class 9 accident risks should be included as one element of the site comparisons". SECY 78-137, page 1. As with the Perryman review, the Staff's concern "was not based on a uniquely high probability of accident but rather on unique circumstances which increase the potential consequences and thus the overall risk." Id., page 4. Whatever prior case law had to say about the necessity under NEPA to perform such an evaluation in the face of the Staff's refusal to do so, "this does not preclude the Staff from going beyond the strict requirements of the law when it will assist in performing its NEPA review." Id., page 5.

3. August, 1978; Decision of the Atomic Safety and Licensing Appeal Board, In the Matter of Offshore Power Systems, ALAB-489, and Subsequent Certification of the Class 9 Issue to the Commission.

In June of 1973 the NRC received the first application for a license to manufacture commercial floating nuclear power

plants (FNP). Because floating plants involved such a unique departure from land-based siting, the Staff concluded that the proscription contained in the Annex against evaluation of the consequences of Class 9 accidents was inapplicable, undertook an extensive study of the problem (the Liquid Pathway Generic Study, NUREG-0440 [LPGS]), and in the FNP Final Environmental Statement found that

the unlikely but possible occurrence of a core melt accident at estuarine and riverine areas could result in a direct release of radioactive material, such that the consequences to the environment would be unacceptable. FES III, p. XIV.

In other words, although there was no appreciable difference between land-based and floating nuclear plants with respect to the likelihood of a serious radiological accident, the consequences of such an event at an FNP were found to be so potentially disastrous as to warrant a Class evaluation in the cost-benefit analysis mandated by NEPA, as well as extensive design modifications to mitigate the effects of any such accidents.

The question of the propriety of the Staff's decision to undertake such an evaluation has been certified to the Commission by the Appeal Board, and is addressed in an extensive brief filed by the Staff, a brief that vigorously defends its authority (and indeed obligation) to evaluate the impact of Class 9 accidents whenever it appears that unique design and siting mode characteristics would tend to lead, in

the event of an accident, to more severe consequences that might otherwise be anticipated.<sup>2/</sup> For the Staff, the concept of risk necessarily involves consideration of both probability that an event will occur and the severity of consequences should that event in fact occur:

Common sense dictates that there must be a point beyond which the consequences of a Class 9 accident become susceptible to candid evaluation in an environmental impact statement. And it should not matter whether the reactor in question is a land-based plant or an FNP. Brief of the Staff, page 37 (emphasis added).

4. September, 1978; The Risk Assessment Review Group Report.

According to the "proposed" Annex, the probability of a Class 9 accident ever occurring "is so small [its] environmental risk is extremely low." The Annex, however, was no more than a summary classification of accident categories; to the extent that any scientifically-derived support for the Annex's characterization of Class 9 accident probabilities has been developed, it can be found only in the Reactor Safety Study, WASH-1400. From its very promulgation, however, the data base, methodology and conclusions of WASH 1400 became the subject of such debate and peer criticism that an independent

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<sup>2/</sup>Indeed, it was the Staff's position before the Appeal Board that it was already established policy, as revealed in the NRC's Standard Review Plan, to reject proposed sites in highly populated areas because of the potential consequences of Class 9 accidents. See ALAB 489, at 223-224.

panel of scientists was commissioned to review the entire subject. The recently released final report of the Risk Assessment Review Group, NUREG/CR-0400, found WASH-1400 to fall far short of its intended purpose, that of providing a valid scientific assessment of the probabilities and sequences of accidents in water cooled nuclear power reactors. For purposes of these comments, it suffices to note that among other shortcomings the quantitative risk assessment methodology developed in WASH-1400 was held to be scientifically indefensible, thus undermining whatever documentation it might have been said to provide the Annex's otherwise unsupported assertion that Class 9 accidents are so unlikely as to not warrant consideration during the NEPA review process.

In summary, the following conclusions can be drawn from the 1978 proceedings:

1) Where population density figures for a proposed nuclear reactor site exceed the trip levels contained in Reg. Guide 4.7, then the Staff has committed itself to "special consideration" of other sites, including a quantitative analysis of the impact of a Class 9 accident on each of the alternative sites (Perryman Application and SECY 78-137).<sup>3/</sup>

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<sup>3/</sup>Indeed, the Staff has not unreasonably taken the position that even a site whose population density figures fall somewhat below the Reg. Guide's trip levels should not be summarily dismissed as ineligible for further Class 9 consideration. In a November 28, 1973 letter from John F. O'Leary, Director of Licensing (attached to SECY 78-137 as Enclosure B) it is noted that for cases which just exceed or fall below [the population density guidelines ultimately incorporated in Reg. Guide 4.7] an examination of the particular population distribution may be required in determining whether to implement [the "special consideration"] procedures.

2) Regardless of population density levels, the unique characteristics of a reactor design or site may engender such threshold concern with the consequences of a Class 9 accident as to justify a complete study of the matter as part of the NEPA review process (In the matter of Offshore Power Systems).

3) Whatever the operative effect of the proposed Annex and its treatment of Class 9 accidents after Perryman, SECY 78-137 and the OPS case, its scientific foundation (i.e., the Reactor Safety Study) has been thoroughly discredited by the Risk Assessment Review Group Report.

B. Both the High Population Levels Surrounding the Proposed Rocky Point Facility and its Unique Site Characteristics Should Cause a Class 9 Accident Consequence Evaluation to be Done as Part of the Pilgrim II NEPA Review Process.

Seen in light of the above-described shift in regulatory policy, the Staff's treatment of the Class 9 issue in the Pilgrim II DS is a matter of grave concern to the Commonwealth. We start with the lesson seemingly to be learned from the proceedings of 1978: far from being the bogeyman of

die-hard nuclear opponents, Class 9 accidents are increasingly viewed as so potentially catastrophic that the NRC itself, in all the above-mentioned instances, has gradually moved towards a policy of including such matters in the NEPA review process, at least in those instances where (1) the trip levels of Reg. Guide 4.7 are exceeded or (2) other unique characteristics of the proposed site indicate that a Class 9 accident could have far more disastrous consequences than otherwise might be anticipated. If this is indeed the trend of nuclear regulatory policy, it is welcomed by the Commonwealth. It does, however, make the Staff's approach to the Pilgrim II alternative sites analysis all the more perplexing.

1. In Determining Whether the Population Density Trip Levels of Reg. Guide 4.7 Were Exceeded, The Data Base, Population Calculations and Weighting Methods Used by the Staff All Served To Impermissibly Diminish the Rocky Point Population Figures.

Our first concern lies with the data base and methodology used by the Staff in concluding that the population density surrounding the Rocky Point site was not sufficiently heavy to trigger a Class 9 accident analysis as part of the Pilgrim II NEPA review. It seems obvious by now that the trip levels contained in Reg. Guide 4.7 serve a very significant function with respect to reactor safety. Because some residual risk will remain even after all reasonably attainable safety measures are built into the design of a proposed nuclear power reactor, careful evaluation of the size and distribution of the population surrounding that reactor has emerged as the NRC's primary means of ensuring that the consequences of any accident

more severe than design-basis events are mitigated as much as possible, including the siting of the proposed reactor in a less populous area. If population density is to serve as the threshold indicator of residual risk and the potential consequences of a Class 9 accident, however, then it obviously should not be determined in a grudging and mechanical manner. In Pilgrim II, unfortunately, this appears to be precisely what happened: the Staff has utilized both a restrictive methodology and a faulty data base that can't help but bury any indication that a Class 9 evaluation of Rocky Point and its alternative sites is warranted.

a. Population Evaluation Techniques

As a preliminary matter, the Commonwealth objects to the Staff's entire evaluation of BECo's demographic analysis. The evaluation is found in Section 3.3.3 of the DS and for the most part is confusing and inconclusive, providing the reader with no basis for assessing the accuracy of the population values presented. In short, Section 3.3.3 obscures far more than it reveals, and leaves the Commonwealth with no real assurance that any valid demographic analysis of Rocky Point and its alternative sites has been performed.

First, the Staff's discussion fails to reveal precisely what "population guidelines" were used by BECo. We are told at page 17 of the DS that BECo's 1974 Study employed two types of guidelines, one of which is described as "cumulative population values as a function of distance", and the other as an

"envelope of population distributions of sites" developed in the Indian Point and Newbold Island proceedings, without further explanation of the actual population figures developed in those other cases. As to the "cumulative population guidelines", the only reference provided is to a "trade newsletter" published in 1973. Furthermore, there is no disclosure of the values derived by BECo in employing either of these guidelines, or the relative significance attributed to these different values by the Staff.

Further complicating the matter, the Staff's discussion fails to disclose that between the 1974 study and the 1978 update no less than four different guidelines were used. In the 1974 study, as noted above, BECo used the envelope approach and the cumulative population method to calculate population densities out to 40 miles; no consideration was given to transient populations or to growth trends and rates. In the 1978 update of that study, on the other hand, the applicant calculated population out to 30 miles using three different methods: weighted cumulative population, weighted average density and a statistical method called the "site population factor." The update considers seasonal residents in some towns, but ignores other transients.

It is impossible to discern from the information provided in the DS which population estimates are credible, if any. Nor does Section 3.3.3 provide any explanation of how the assumptions behind and results of these statistics can be tested and compared. For example, the site population factor

is a population index used to compare population distributions around sites by weighing the population within each one mile ring from the site by decreasing functions with distance out to 30 miles. In contrast, the weighted cumulative population method used in the 1974 study and the update considers cumulative populations out to 40 miles. Because of the spatial difference between these techniques and the assumptions with respect to transients, the results can differ substantially.

The Staff indicates at page 17 of the DS that it "modified" the cumulative population values from the 1974 Siting Study, without further elaboration. Reference is made to Appendix A, which discusses NRC Regulatory Guide 4.7, but which does not even mention the cumulative population values derived by BECo nor the Staff's modifications thereto. Indeed, Reg. Guide 4.7 differs substantially as a population index from the cumulative population method. The latter method considers whether cumulative population projections for the life of the plant will exceed 30,000 within 5 miles, 500,000 within 20 miles or 2,000,000 within 40 miles. The average population densities (per square mile) derived from this method are approximately 380 at 5 miles, 397 at 20 miles and 400 at 40 miles; population projections which exceed these guidelines requires a detailed study of economic and population growth patterns. In contrast, Reg. Guide 4.7 considers average population densities out to 30 miles, based on a "trip level" of 500 persons/sq. mile at the time of initial plant operation and 1,000 persons/sq mile at the end of plant life. Although

the threshold average population densities for the two methods thus differ substantially, the Staff gives no indication as to how the two might be correlated or the significance of relying on one as opposed to the other.

The staff's consideration of population trends and future growth patterns is similarly obscure. The accuracy of population growth projections made in 1979 for 1985 and 2018, when based on 1970 census data, requires at a minimum a current revised estimate of the growth rate for each site. In the DS, the Staff discloses only that these growth factors were not quantified in the Applicant's 1974 study, but apparently were considered in the 1978 update. We are told at page 20 of the DS that the updated population growth projections ranged from 10% per decade at one site to 17% at another, but the actual population growth estimates for Rocky Point and its alternative sites are neither detailed nor discussed. In particular, the Staff fails to reveal the criteria used to estimate growth rates for the Pilgrim 2 site, a significant omission in light of the Staff's previous attention to the rapid population growth rates in the Plymouth area. See FES §2.2.1 and SER §2.1. At the very least, the Staff should state its reasons for acceptance of the growth rates used.

The Staff states on page 19 of the DS that it conducted an "independent evaluation" of the population surrounding the six alternative sites, and compared its results to those presented in BECo's 1978 update. We are told that the two population estimates compared favorably, but we are not told

which population estimates the Staff is comparing, i.e., the PSAR used for Table 1, the 1974 study or the 1978 update. The source of the Staff's evaluation is not revealed. A comparison of the statistics reviewed by the Commonwealth indicates there are substantial variations between available population projections. Again, the Draft Supplement supplies only the Staff's conclusions; neither the Staff nor BECo disclose the underlying basis for or the results of their population projections, therefore making an independent evaluation of these population estimates impossible.

It is significant to note that the Staff does not assert that it conducted an independent or new assessment of the population at Rocky Point. In fact, sections 4.1 and 4.2 of the Draft Supplement indicate quite the opposite. In section 4.1, the Staff's discussion of population at the Pilgrim 2 site is confined to a description of Table 1, which is derived solely from the Applicant's PSAR. Section 4.2 purports to represent the Staff's own analysis of Rocky Point, and in two brief paragraphs the Staff asserts that it evaluated "new information" relating to the site and concluded "the previous Staff documents and testimony were still valid" (DS p. 36). The source of this new information is neither revealed nor discussed. The Commonwealth submits that this analysis is perfunctory at best, and does not comply with the mandate of NEPA.

Finally, the Staff's assessment of transient populations is thoroughly inadequate. Regulatory Guide 4.7 provides that significant transient population must be included in the calculation of average population densities. Significant transient populations presumably include workers, tourists and seasonal residents, since the Reg. Guide explicitly discounts only persons passing through the area. For the area surrounding Rocky Point, particularly Cape Cod and the Plymouth historical district, one would assume that the transient population would be substantial and serve to significantly affect population density figures. Section 3.3.3, however, provides no information upon which to assess the significance of transients.

For example, the staff states on page 19 of the DS that seasonal transient population was included in the Applicant's 1978 update, and was deemed to be a "significant factor" at three of the candidate coastal sites. The staff concludes that while the update failed to account for daily recreational visitors and tourists, the inclusion of these transients would not alter the ultimate population distributions. The draft supplement discloses no basis for this conclusion, which certainty could not have been founded on the staff's "independent evaluation", since that analysis included only "cumulative resident populations." In addition, the following pertinent questions are not addressed:

1. What is the transient population for workers, tourists, and seasonal residents for Rocky Point and the candidate sites?

2. What is the scope of the study area? Why is 30 miles used rather than 40 miles? A 40 mile radial study area would have included about all of Cape Cod, while the 30 mile radius actually used only a portion of the Cape population.

3. How were the different types of transient populations weighted? Were transients weighted according to the fraction of time they are in the study area, or were some additional factors used? Does the weight accorded to transient population depend on which of the population guidelines is employed?

4. What is the criteria used to determine whether a transient population is a significant factor in making population projections?

5. Why are worker and tourists not considered as significant transient populations?

6. How were transient populations calculated in Table 1 of the Draft Supplement? The table indicates that the only source for the population values presented was the Applicant's PSAR. The PSAR considered transient population within a radius of five miles from the site, however, and the Staff provides no explanation of how transient population was extrapolated from 5 to 30 miles. Table 1 suggests that the population values include "seasonal population," but the basis for this assertion is not shown. Does a "seasonal population" include all classes of transients, such as workers,

tourists and seasonal residents"? It is impossible to evaluate the accuracy of Table 1 in the absence of such information.

The answers to the above questions would serve as the basis for a rational discussion of the comparative population densities. We submit that NEPA requires no less.

b. The Updated Rocky Point Population Figures.

It also appears that the Staff has chosen to ignore the most recent population figures compiled by BECo, figures that at the very least call into question those contained in the Draft Supplement. Because of an outstanding confidentiality agreement concerning BECo's latest demographic study, the Commonwealth can go no further in discussing it. It will, however, be moving shortly to make this study or at least portions thereof part of the record, so that its impact on the Class 9 issue can be raised during the forthcoming evidentiary hearings.

c. The Seasonal Variations in Population Levels.

As will be more fully discussed below with reference to the unique site characteristics associated with Rocky Point, the area immediately surrounding BECo's proposed site is deluged with both summer residents and transient tourists visiting the many historical sites in the Town of Plymouth, just 4.5 miles from the proposed site.<sup>4/</sup>

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<sup>4/</sup>In 1972, according to the Pilgrim II Safety Evaluation Report, there were approximately 7,000 summer residents living within five miles of the Rocky Point Site. In addition, the report estimates that approximately 300,000 tourists per year visit the immediate Plymouth area alone. Pilgrim II SER, pp. 2-5.

In addition, most of Cape Cod lie well within the 30 mile radial ring used by the NRC in determining population density pursuant to Reg. Guide 4.7, with Provincetown itself lying just twenty miles away, across Cape Cod Bay. In arriving at its population density figures, however, the Staff employed a weighting scheme that so undervalued the true impact of this summer influx as to render these figures meaningless as an indicator with respect to the need to undertake a Class 9 analysis. Weighting factors of 1.0 were used for permanent residents, 0.25 for seasonal residents and 0.003 for tourists and bathers visiting the area for the day, and while such an approach may provide some indication of the probabilities of exposure to offsite radiological doses in the event of a serious reactor accident, it thoroughly compromises the utility of population density as a triggering device for the undertaking of a Class 9 accident analysis. In essence, the weighting method employed by the staff represents nothing more than a gamble that a Class 9 accident will not occur at a time when the beaches, roads and tourist attractions of the Plymouth area and Cape Cod are inundated with summer visitors. This approach, the Commonwealth submits, is hardly the conservative methodology the Staff purports to bring to the problem of accident risk.

d. The Impact of Rocky Point's Coastal Location on Average Density Figures.

Just as the Staff's treatment of transients represents a gamble with respect to the time of year that a serious

radiological accident might occur, its inclusion of the waters off Rocky Point in calculating average population density figures amounts to another highly questionable probabilistic assumption. That assumption, roughly stated, is that in the event of a serious accident, the radioactive plume from the reactor will travel in any direction with an equal probability, including out to sea. By including water area in the density formula, the average density figures reflect that probabilistic assumption.

While we recognize that probabilities are the cornerstone of NRC licensing logic, we are also aware that probability is only one part of a risk analysis. The other element is consequence. By including the water area, the density calculations roughly reflect the land versus water probabilities but grossly understate the consequence of a land route in terms of actual population densities at risk. In other words, if a radioactive plume traveled inland, the fact that the water area in the region has a zero density would mean nothing in terms of the actual consequences of the accident. Netting out water area, the actual population densities around the plant at most radial distances are now well in excess of 500 persons per square mile.

In light of the Staff's similar downplaying of transient populations, it can hardly be said that the Rocky Point population density figures retain any validity as an indicator of the need for a Class 9 accident evaluation. The truth of the matter is that the Staff has misused the very device it proposed relying on to

identify those circumstances where such an evaluation would be necessary, to the great detriment of the citizens of Massachusetts.

e. The "Factor of Two"

Finally, although its impact on the trip levels contained in Reg. Guide 4.7 is somewhat problematic, mention should be made of the Staff's increasing and troublesome use of the so-called "factor of two." Having made a commitment to consider the residual risk to the public posed by Class 9 accidents whenever the trip levels contained in Reg. Guide 4.7 are exceeded, the staff then adopts a totally arbitrary threshold for determining the significance of that risk for the primary and alternative sites. This threshold test is called the "factor of two," and operates as follows: in order for the difference in population densities between two sites to be "significant", the alternative site must have a population density which is at least a factor of two lower than the primary site at each radial distance out to 30 miles (DS, Appendix A, at 188).

There is absolutely no discernable rationale for this method of comparison. First, it is important to understand what population values do and do not indicate in terms of the potential consequences of a Class 9 accident. The actual consequences of a major accident depend upon many factors, including population density and distribution, meteorological conditions, the rate at which persons can be evacuated from the area of impact, access to travel routes, and other site

characteristics. As noted above, the Staff has come to use population density as a surrogate for consideration of all these factors, although recognizing population, by itself, is at best an imprecise measure of the actual risks involved (DS p. 187).

Population density is thus only a crude measure of the residual risk associated with the accidental release of radioactivity. That does not mean, however, that population measurements themselves are crude. Indeed, population is a factor which can be assessed fairly objectively. The Staff appears to be blurring the elementary distinction between the accuracy of population estimates and the imprecision inherent in using population figures as the sole indicator of the many other variables associated with Class 9 accident consequences.

The Staff's use of factor of two indicates a clear misinterpretation of what was done in the Perryman alternative sites review. In Perryman, the population density of the primary site was found to exceed the trip levels of Reg. Guide 4.7., and led the Staff team in that case to use of the Reactor Safety Study Consequence Model (WASH-1400) to evaluate differences in accident risks between sites. Although subject to considerable criticism, the RSS model, or CRAC code, at least provides a more comprehensive assessment of risk than population density values can. For sites exceeding Reg. Guide 4.7's guidelines, of course, this higher degree of precision and accuracy is essential.

The Staff in Perryman stressed that the results of its site specific risk analysis, because based on the RSS consequence model, should be viewed with caution. The model was developed to estimate total societal risks, and the applicability of the model to a specific site had not yet been fully assessed. Given these uncertainties and limitations, the Staff noted that "no significance should be drawn from small calculated differences (e.g., factors of two or so) between sites". Commissioner Action Paper, SECY-78-137 (March 7, 1978), p. 6. The Staff concluded, however, that the "RSS consequence mode' permits a better assessment of site-to-site comparisons than the usual rules of thumb, such a population density or population density times wind direction frequency. Id.

Enclosure F.

The Staff's use of a significance factor of two in Perryman thus prescind from the uncertainties associated with the use of the RSS model for the purpose of specific site comparisons; to use it in analyzing the Pilgrim II population density figures is clearly an overextension and misapplication of the Perryman process.

The Staff attempted to explain its rationale for the factor of two in the Seabrook alternative site hearings, held in January of this year. During cross examination by the Appeal Board, the Staff claimed that the factor of two was in fact a substitute for cost, in terms of either dollars per man-rem or the long term effect of radiation exposures on the gene pool. (Seabrook, Tr. 402). In order for significant

differences in cost to occur, the Staff determined that differences in population of at least a factor of two were required, but it simply cannot be justified on this basis. As the Perryman results clearly show, cost in terms of dollars per man-rem is but one aspect of the residual risk to the public and is only one of three general types of effects resulting from a major accident considered by the RSS model, the other two being acute injuries and property damage. To adequately determine the residual risk to population and the site environs, all of these consequences must be considered.

Having fashioned a threshold test which it cannot justify, the Staff imposes the additional requirement that an alternative site must have a population density which is a factor of two lower than the primary site at each one mile radial distance out to thirty miles. To require the factor of two to be satisfied at all distances is absurd, and undermines any meaningful comparison of site populations. The Appeal Board in Seabrook also encountered great difficulty in comprehending the logic behind this requirement (Seabrook, Tr. 414-20). When asked to explain why population densities at all thirty radial distances were more important than at specific mileage points, the Staff was unable to provide an explanation, and admitted that such an approval was "a step beyond what we have done" (Seabrook, Tr. 413).

A comparison of the Pilgrim site with the Montague site demonstrates the problems arising from the Staff's insistence on looking at population densities within each radial ring out

to thirty miles. While Montague fails to meet the factor of two requirement in the 0-5 mile range, over the entire thirty mile radial area that would be subjected to the consequences of a Class 9 accident Pilgrim has more than twice the population of Montague. The differences in total population are highly significant, therefore, but because of fortuitous differences in population density at each one mile radial ring, the factor of two is not met, and the population differences between the two sites are deemed insignificant.

The Staff itself has recognized that the factor of two lacks a rational justification. In its Proposed Appeal Board Decision on the Seabrook alternative site analysis, the staff explicitly rejected its own method of population comparison. At page 21, the Staff acknowledges that it "was not able to adequately explain why its test of significance difference is an appropriate one from the standpoint of residual risk of accidents." Indeed, the Staff's proposed conclusion is that "in the absence of a more specific policy statement or regulation from the Commission, we are hesitant to embrace the specifics of the Staff's approach on the basis of the record now before us." ("NRC Staff Proposed Appeal Board Decision," February 9, 1979, pp. 20-21).

The Commonwealth notes that the significance factor applied in the Seabrook Alternative Site Study, NUREG-0501, is almost identical to that appearing in Appendix A of Pilgrim II Draft Supplement. The Staff's rejection of this test of population significance in Seabrook dictates that it must be also abandoned in the analysis of population for Pilgrim II.

2. The Unique Terrestrial and Demographic Characteristics of the Rocky Point Site Require that a Class 9 Accident Analysis be Undertaken as Part of the Pilgrim II NEPA Review Process

In its Draft Supplement, the Staff relied exclusively on the trip levels contained in Reg. Guide 4.7 as a threshold indicator of Class 9 accident risk, thus avoiding any consideration of the unique population distribution and land use characteristics found within a thirty-mile radius of the Rocky Point site, circumstances which by themselves should have served to trigger a thorough study of the consequences of a Class 9 accident at Rocky Point and its alternative sites.

a. Unique Population Distribution Characteristics

The Rocky Point site is located on the fringe of two of New England's favorite summer playgrounds: the Plymouth Rock area and Cape Cod. The most densely populated sections of the Cape lie within ten to thirty miles of the site, and the Cape's summer population is now roughly triple that of its 150,000 winter residents (not counting summer day trippers). By 1995, the summer population should reach 570,000, excluding day trippers. In practical terms, if a radioactive plume drifted toward the Cape between Memorial Day and Labor Day in any year, well over 400,000 disorganized people would risk exposure -- not the probabilistic 100,000 (.25 x 400,000) people at the Reg. Guide calculations suggest.

b. Transportation Characteristics and Evacuability

Cape Cod is linked to the mainland by two bridges which, under normal summer weekend conditions, are sorely inadequate to handle the normal flow of vehicles going to and from the Cape. On the mainland side, the two bridges empty into two highways. One highway (Rte. 25) runs west toward Wareham, while the other (Rt. 3) runs in a northerly direction directly toward Plymouth.

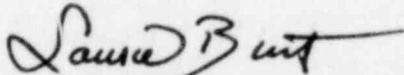
In the event of a serious accident during the summer, if a plume were to travel in a southeasterly direction toward the Sandwich-Barnstable area, persons wishing to flee the Cape would be forced to travel in closer to the plant in order to reach the bridges to the mainland. Once over a bridge, all traffic would have to be routed onto Rte 25, since Rte. 3 would only funnel traffic toward the site. Rte. 25, of course, is incapable of handling such a volume of traffic, and would cause traffic to back up closer and closer to the site.

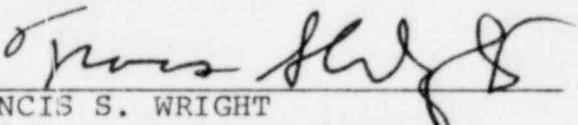
Initial checking with the Massachusetts Department of Public Works on the capacity of the two bridges to handle a major evacuation flow yielded pessimistic results. Assuming four persons per car (c. 400,000) and excluding day visitors, evacuation from the Cape was conservatively estimated to take over sixteen hours.

The Commonwealth believes that the potential of having nearly half a million disorganized people, including thousands of children and retired elderly, bottlenecked within ten to thirty miles of the site constitutes a unique site characteristic. That characteristic should have been

considered by the Staff, but was avoided as a result of the Staff's exclusive reliance on the population density criteria found in Reg. Guide 4.7.

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