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U.S. NUCLEAR REGULATORY COMMISSION

The Honorable Lawton Chiles
United States Senate
Federal Building
Lakeland, Florida 33801

Dear Senator Chiles:

Your letter of January 15, 1981 requested information in response to a constituent, Ms. Helen Shea Wells of Jensen Beach. Ms. Wells, in her letter to you dated January 6, 1981, appeared concerned about development on Hutchinson Island, in St. Lucie County, within 6 miles of the St. Lucie nuclear power plant and inquired whether or not the NRC had any restrictions about building close to a nuclear plant.

To answer Ms. Wells' question briefly, the NRC does effectively limit development in the immediate vicinity of a nuclear power plant (within the zone known as the exclusion area, and typically involving distances from the reactor of about one-half mile) by requiring that the plant operator have the authority, either by ownership of the area or by a long-term lease, to determine all activities within it. Residents are not permitted within this area, although transportation routes such as roads or waterways may traverse it. However, the plant operator must be able to show that arrangements have been made with local authorities to control traffic on these routes, in the event of emergency. It should be noted that the exclusion area for the 1130 acre St. Lucie site is larger than average and that the minimum distance from the reactors to the exclusion area boundary is about 5100 feet, or almost one mile.

Residents are permitted outside the exclusion area, and while no fixed population limits are required by our regulations at this time, the present and projected population density and distribution is reviewed by the NRC during the licensing process. Future development, whether in the vicinity of nuclear plants or not, is under the control of state or local jurisdictions.

For the St. Lucie site, the NRC staff Safety Evaluation Report on St. Lucie, Unit 2, published in November 1974 contained a section on the population in the site vicinity (a copy of this section of the report is attached). As can be seen from this report, the staff, while noting that the 1974 population on Hutchinson Island was low (no residents within 4 miles of the plant and only 1900 residents on the Island within 5 miles), was aware of future significant population growth in this area. This anticipated growth was taken into consideration and the staff concluded that the St. Lucie plant design, including the

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engineered safety features intended to mitigate the consequences of accidents were of such a nature, that such a population increase could likely be accommodated and meet the NRC's siting requirements. In addition, the staff concluded that even allowing for the large population growth anticipated, the population values would not be in excess of those for reactor sites of similar design.

In summarizing, while the NRC has restrictions on land use and development only within the exclusion area, a substantial anticipated growth in population for the St. Lucie site area was reviewed at the Construction Permit licensing stage for Unit 2 and was found to be acceptable, when considering the plant design as well as the population ranges for other reactor sites.

I trust that this information is responsive to your needs. However, if you desire additional information, we would be pleased to provide it to you.

Sincerely,

(Signed) T. A. Rehm

William J. Dircks
Executive Director for Operations

Enclosure:
Section 2.0 of Safety
Evaluation Report on
St. Lucie

SD OCA 2/17/81

OFFICE	DE:ET:SAB:SAS	DE:ET:SAB	DE:ET:SAB	DE:ADET	DE:D	NRR	EDO
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DATE	2/11/81	2/11/81	2/11/81	2/11/81	2/11/81	2/12/81	2/13/81

2.0 SITE CHARACTERISTICS

2.1 Geography and Demography

2.1.1 Current

The 1132 acre St. Lucie site is located on Hutchinson Island in St. Lucie county on the east coast of Florida, about 8 miles south of Fort Pierce, Florida and 8 miles north of Stuart, Florida. Figure 2.1 is a site location map. Hutchinson Island is generally flat. Much of it consists of swamp covered with dense vegetation characteristic of Florida coastal mangrove swamps. From the ocean shore the land rises slightly to a dune or ridge about 8 to 14 feet above mean low water.

The applicant has specified a minimum exclusion distance of 5100 feet (1554 meters) and has proposed a low population zone (LPZ) distance of 5 miles for the site. Hutchinson Island is sparsely populated within a 5 mile radius of the site and does not contain any population within 4 miles at present. The nearest residence is located approximately 2 miles west of the plant site across the Indian River. Figure 2.2 is a sketch that indicates some features of the area within a distance of 5 miles of the site. The one mile circle approximates the minimum exclusion distance. The exclusion area includes all land owned by the applicant within the property lines shown.

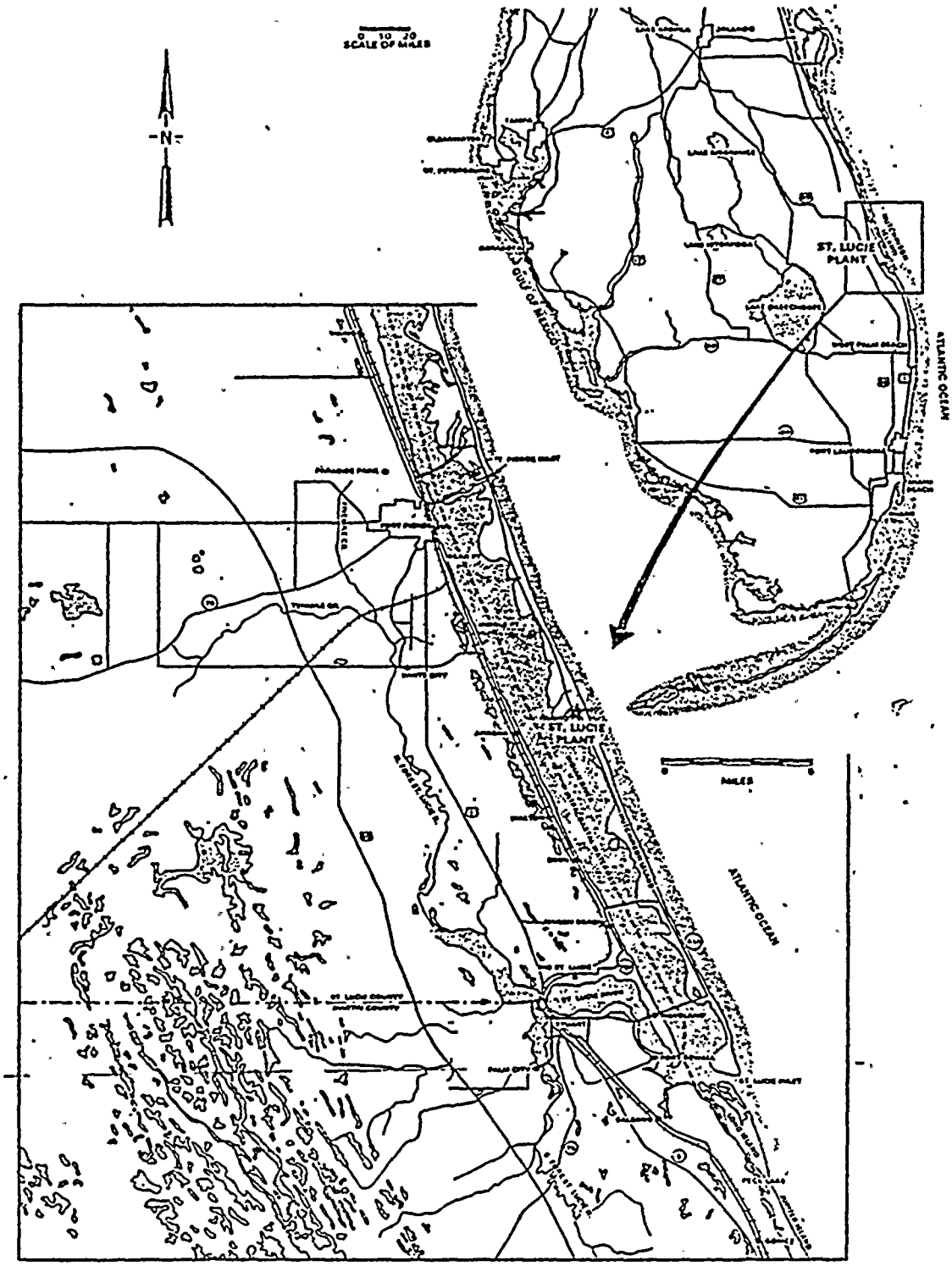

FIGURE 2.1 SITE LOCATION MAP

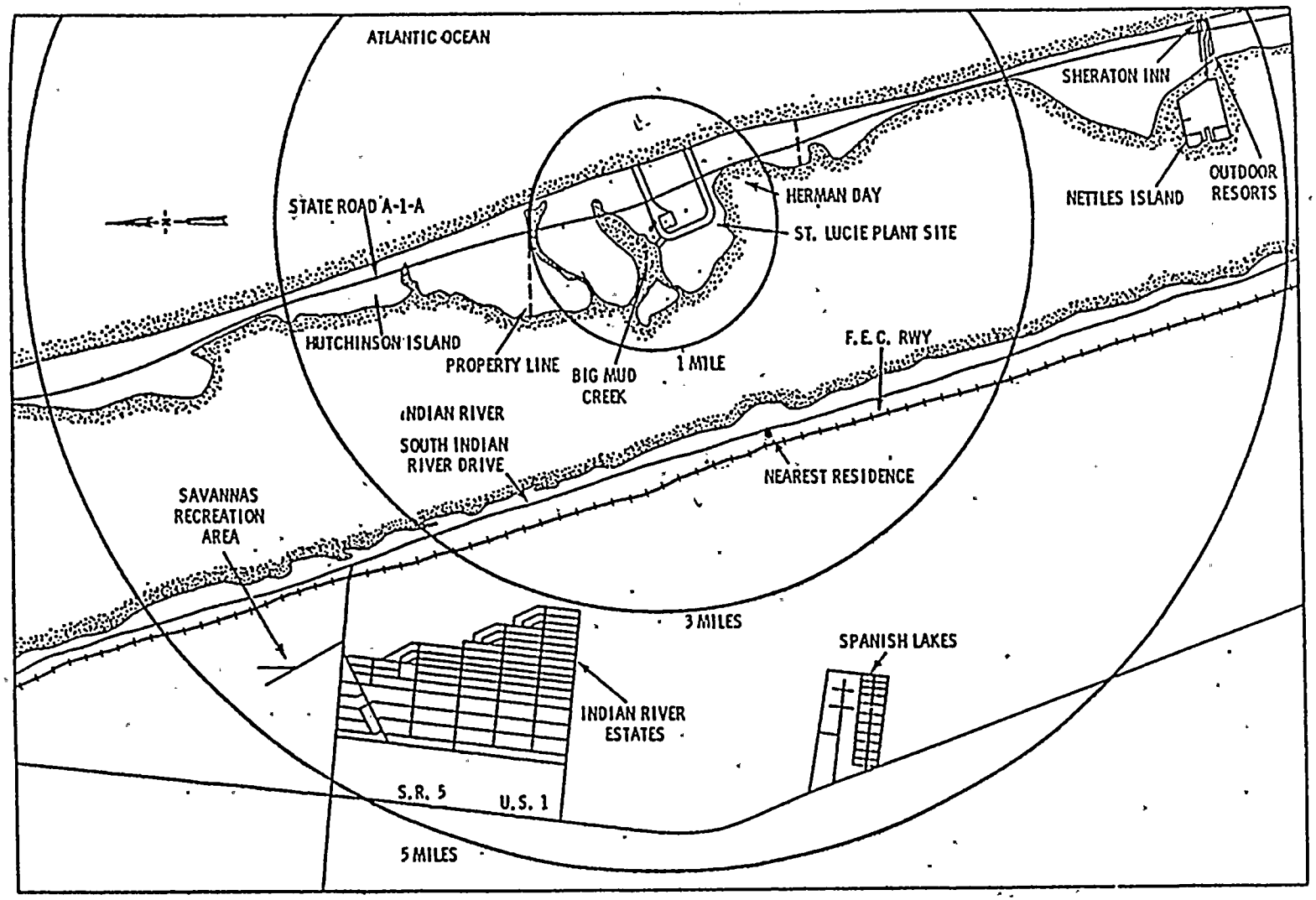

FIGURE 2-2 SITE LOCATION, 5-MILE RADIUS

The applicant stated that 1970 resident population within 50 miles was 301,155, and that the population within the five mile LPZ was about 1,160. The applicant stated that the population center distance as defined by 10 CFR Part 100 is the distance to the city of Fort Pierce, Florida (1970 population was approximately 30,000), 8 miles northwest of the facility.

The Atlantic Ocean on the eastern side of the island is used for transportation, boating and fishing. The Indian River, which is actually a long thin tidal lagoon running parallel with the south-eastern coast of Florida between the mainland and a series of offshore islands, is used as a part of the intracoastal waterway and for recreational activities.

The Savannas Recreation Area, 5 miles west-northwest of the St. Lucie site, is used for picnicking, swimming, boating, and camping. The maximum number of nonresidents currently using this area is estimated by the applicant to be about 500. The applicant reported that overnight campers totaled 9,000 during a one year period, while 160,000 day visitors per year were reported. Public beaches and park areas are located on the north end of Hutchinson Island. The nearest park, Douglas Memorial, is more than 5 miles from the plant and is lightly used, averaging 25-50 visitors per day during the summer. South of the plant site are commercial campgrounds for travel trailers.

The nearest campground is located approximately 5 miles from the St. Lucie site. The applicant estimated the capacity of this campground to be about 150 persons. A public beach and park are located approximately 7 miles south of the nuclear generating station.

The applicant estimates that while 50-100 persons will walk along the narrow ocean beach adjacent to the plant site each day their walk duration will not exceed an hour. Ducks are hunted in season by a few hunters on Hutchinson Island within a few miles of the plant. Shell fishing in the Indian River is currently prohibited by an order of the Florida State Board of Health. The Fort Pierce-St. Lucie County Chamber of Commerce reports that two-thirds of the county is devoted to agricultural industry; 41 percent pasture land, 23 percent citrus crops, and 1 percent vegetables.

The Regulatory staff performed an independent study of 1974 population distribution in the vicinity of the site. We estimated a population of 71,900 within 10 miles of the plant, 14,100 within 6-1/2 miles and 7,100 within 5 miles. Of the 7,100 within 5 miles, 5,200 are located on the mainland and 1,900 are located on Hutchinson Island between 4 and 5 miles south of the plant.

On the basis of 10 CFR Part 100 definitions of the population center distance (8 miles), the exclusion area distance (5100 feet), and the LPZ distance (5 miles), our estimate of 1974 population

distribution, our analysis of the onsite meteorological data from which relative concentration factors were calculated (Section 2.3 of this report), and the calculated potential radiological dose consequences of design basis accidents (Section 15.0 of this report), we have concluded that the exclusion area distance is acceptable and that the LPZ distance is acceptable at this time. However, as discussed in Section 2.1.2 of this report, local population growth could result in a reduction of the population center distances during the operating lifetime of the plant which could result in a lower LPZ distance.

2.1.2 Future

The applicant projects that the resident population within 50 miles will increase from the 1970 level of 301,155 to 741,400 by the year 2000, which would be an increase of 146 percent in 30 years. This increase is greater than the 82 percent growth projected by the Bureau of Economic Analysis, Economic Area No. 36 (Miami, Florida). We project a population level of approximately 1,100,000 in the year 2000, or an increase of 268 percent.

The applicant's original cumulative population estimates included a projected population of 2800 in the year 2000 within a 5 mile radius of the plant. However, development activities underway suggested a larger population could develop and at an accelerated rate. We therefore requested the applicant to estimate "stable" or "ultimate" population levels that could be reached during the lifetime of the St. Lucie Plant. The response based on a Hutchinson Island planning study as shown in Figure 2.3 and the applicant's estimate of developable

land areas was a projected Hutchinson Island population of over 22,000 within a 5 mile radius of the plant as shown in Table 2.1. As shown in Figure 2.3, this plan included two small proposed high density areas within 2 miles of the plant and the applicant estimated the usable land area could result in over 7800 residents within 2 miles. Some of these residents could be located in high density areas adjacent to the applicant's site boundary, somewhat more than a mile from the plant.

Many factors, not known with certainty at this time, could cause these "ultimate" population levels to be somewhat more or less than 22,000 within the lifetime of the plant, and could affect the number of years it will take for the population to reach a "stable" level. Existing zoning would allow this level to reach about 30,000. The Regulatory staff has reviewed planning studies and local population growth factors, and has estimated a 1990 population level of 12,700. Therefore, we consider it possible that stable population levels ranging from a substantial fraction up to 22,000 could develop within a 5 mile radius during the operating lifetime of the plant. We consider it likely that if population levels of this magnitude were to actually develop, a population center distance in accordance with 10 CFR Part 100 might be significantly less than the present 8 mile distance. We therefore concluded that a future LPZ distance as low as one mile should be considered for the plant design to assure that the site would be in accordance with 10 CFR Part 100 throughout the life of the plant.

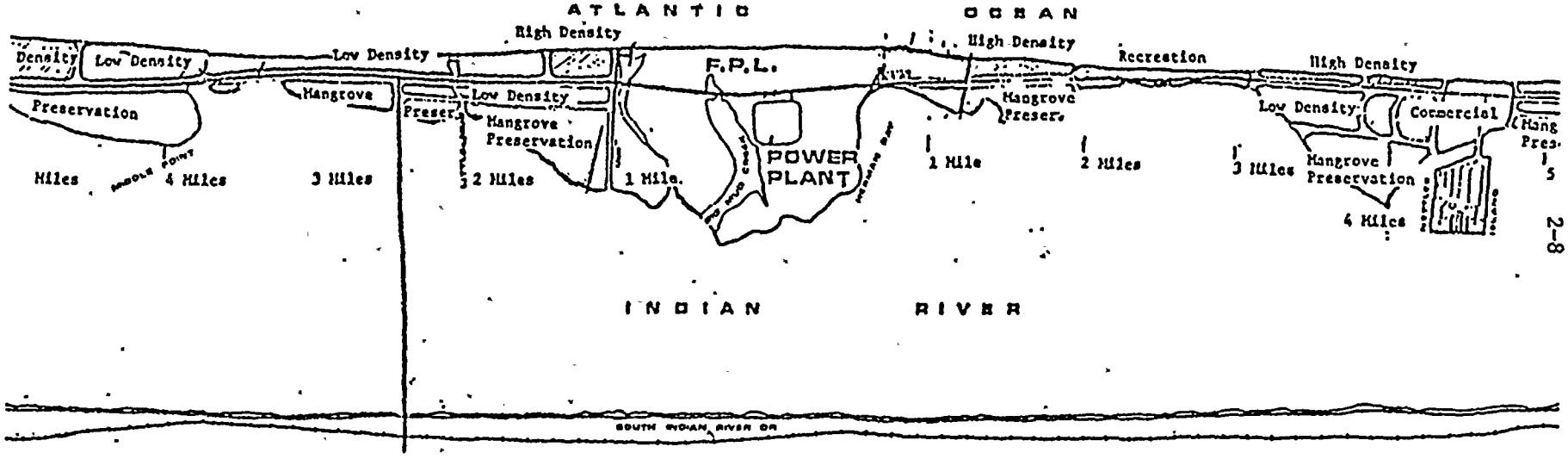

FIGURE 2.3 HUTCHINSON ISLAND PLANNING STUDY

TABLE 2.1

HUTCHINSON ISLAND ZONING STUDY
AND POTENTIAL POPULATION

LOCATION FROM ST. LUCIE PLANT	POTENTIAL AREA AVAILABLE FOR BUILDING (acres)		POTENTIAL MAXIMUM POPULATION	
	3 units/acre	18 units/acre	1 mi. Ring	Cumulation
1-2 mi. south	80	82	3123	3123
2-3 mi. south	0	0	0	3123
3-4 mi. south	138	44	2440	5563
4-5 mi. south	192	36	2873	8436
1-2 mi. north	132	122	4717	4717
2-3 mi. north	97	78	3085	7802
3-4 mi. north	78	0	426	8228
4-5 mi. north	0	171	5602	13830
0-5 Miles Total:				22266

Our review experience for engineered safety features for similar plants is that technical specifications for operation of the plant and design features similar to those approved for other licensed plants can be used in the St. Lucie plant to assure that calculated offsite doses will not exceed the LPZ guideline values of 10 CFR Part 100 for a distance of one mile. As described in Section 15.0 of this report, the applicant has committed to provide such changes in the facility design.

If the LPZ distance were ever reduced to one mile, the LPZ would be a very small area with few, if any, potential residents. However, because of the potential for concentrated population levels just beyond one mile and the higher 30-day exposures calculated for a distance of one mile than for a distance of 5 miles, we have advised the applicant that we will require that his emergency plans continue to provide assurance that adequate protective actions for residents on Hutchinson Island outside a distance of one mile can be taken (See Section 13.3).

As described in Section 2.3, we have completed a preliminary evaluation of the atmospheric dispersion of a warm air mass carried over a cool body of water. This evaluation indicates that a person two miles from the plant on the opposite side of Indian River could under certain postulated meteorological conditions receive a dose approaching the calculated dose for a person on Hutchinson Island one mile from the plant. We therefore have advised the applicant that we will require that his emergency plans continue to provide assurance that adequate protective actions for residents on the mainland adjacent to the Indian River can be taken.

The Regulatory staff also developed an independent estimate of potential future population levels within a 50 mile radius of the site. In Figure 2.4, our cumulative population projection for the years 1980 and 2020 and the applicant's projections for the year 2000 are shown with cumulative population projections for two other sites, Indian Point and Zion, that have been reviewed and found acceptable. On the basis that our projections are well below those for other sites found acceptable at distances of 5 to 50 miles, we conclude that the site is acceptable with respect to population in the surrounding area.

In summary, we conclude on the basis of 10 CFR Part 100 definitions that (1) the site is acceptable with current population levels, (2) with additional engineered safety features to be provided by the applicant, reductions in the LPZ distance to about one mile could be made without exceeding the guideline dose values of 10 CFR Part 100 during the plant

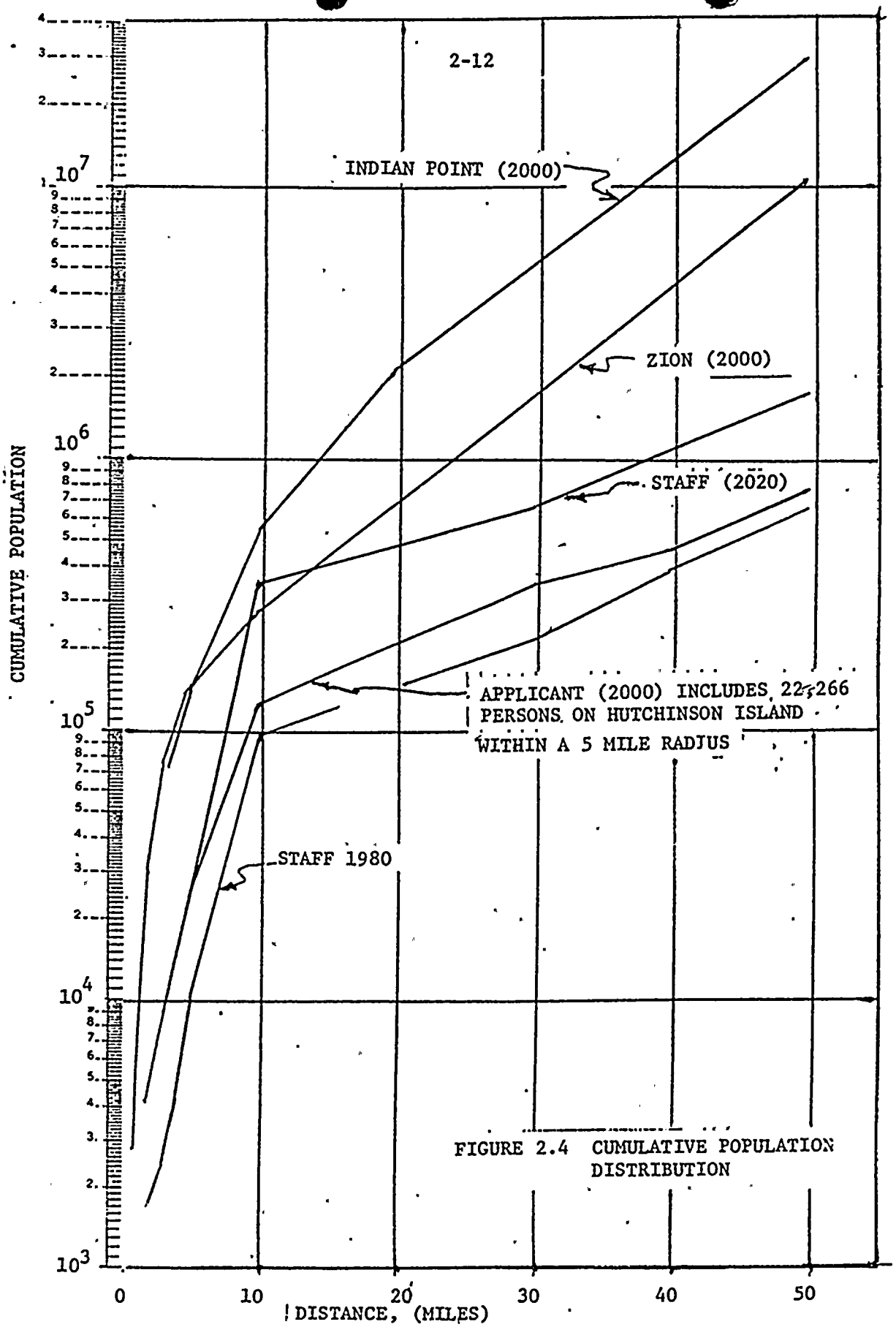

FIGURE 2.4 CUMULATIVE POPULATION DISTRIBUTION

lifetime, and (3) a one-mile LPZ distance would accomodate population growth. We further conclude that there is reasonable probability that appropriate protective measures could be taken in behalf of residents in the vicinity of the site.