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(201) 455-8200

January 31, 1980

Director
Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Re: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Estimate of Evacuation Times

Dear Sir:

By letter dated November 29, 1979 from Brian K. Grimes to all Power Reactor Licensees, we were requested to submit evacuation time estimates for the plume exposure pathway surrounding the Oyster Creek plant.

The attached information is submitted in response to the November 29, 1979 letter. We have consulted with State and Local authorities in developing this information, as requested, and believe the time estimates to be conservative due to the general assumptions made; however, due to the limited time available and the complexity of this type of evaluation, we cannot attest to a high degree of confidence in these estimates. Furthermore, due to the current activities regarding emergency planning, our Emergency Plan, as well as those of the State and Local authorities, are undergoing extensive revision and upgrading. Because of the large number of variables involved, it is not possible at this time to project evacuation times with a high degree of certainty; however, in an effort to be responsive to the NRC request, we have made the best estimates possible under the existing conditions.

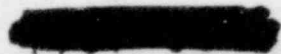
If you should have any additional questions regarding the attached information, please contact James Knubel at (201) 455-8753.

Very truly yours,

Ivan R. Finfrock, Jr.
Ivan R. Finfrock, Jr.
Vice President

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Attachments



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WILLIAM K. HAYES
COORDINATOR

COUNTY OF OCEAN
CIVIL DEFENSE AND DISASTER CONTROL

ROOM 108
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AREA CODE 201
349-3366

Statement of the Ocean County Office
of Civil Defense and Disaster Control

January 31, 1980

I have reviewed the information presented herein and believe it to be a reasonable estimate under the existing conditions; however, this information has been developed on an accelerated basis and may be subject to uncertainties.

William K. Hayes, Coordinator
Ocean County Civil Defense -
Disaster Control

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Introduction

By letter dated November 29, 1979, Jersey Central Power & Light (JCP&L) Company was requested to provide estimates of the evacuation times for a 10 mile area surrounding the Oyster Creek site. In conjunction with local authorities, JCP&L has developed the following data in accordance with the November 29, 1979 letter. As requested, the information has been formatted as closely as possible to that format specified in the request for information.

It should be recognized that although an attempt has been made to provide the most accurate estimates possible, this type of analysis is heavily dependant on multiple variables. The existing plans for evacuation for the area of concern deliniate specific information on evacuation routes, traffic control and equipment availability; however, the plans are general in nature and currently rely on the judgment of initiating authorities as to specific actions taken. Accordingly, general assumptions have been made in the conservative direction in order to be responsive in the limited time available. The times given in this response are believed to be somewhat conservative.

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Time Estimates

In developing the time estimates, an area within a 10 mile radius of Oyster Creek was considered. This area was further divided into an area of 5 mile radius and an area of 2 mile radius. The area within a 2 mile radius of the station was divided into 2 sectors of 180° each. The area within a 2 and 10 mile radius of the station was divided into 4 sectors of 90° each. Figure 1 shows the various areas and sectors imposed on a map of Ocean County, New Jersey. Figure 2 shows the evacuation routes out of the areas of concern as deliniated in the New Jersey DEP's PIPAG

Manual (Procedures for Implementing Protective Action Guides).

Table 1 presents the information requested in the November 29, 1979 request items 1 and 2 under the heading Required Information. The evacuation times were calculated using the Ocean County Estimated population for the year 1975.

Confirmation Time

Presently, the evacuation plan does not require confirming that evacuation has been completed. Past history has shown that approximately 20% of the affected population will not evacuate when advised to do so. State and Local authorities feel that confirmation would unnecessarily expose emergency personnel to danger and, therefore, have not made provisions for confirming that people have left.

Notification Time

Presently, no prompt notification systems have been installed within the 10 mile area around the Station. Notification is made by announcements over various radio stations serving the area (see PIPAG Manual). Notification to evacuate would also be given on a house to house basis (i.e., emergency vehicles with public address equipment, megaphones, etc.) Evacuation would be carried out in a time phased manner. That is, those areas to be evacuated which are closest to the plant would be notified first then proceeding outward until all areas out to 10 miles are notified. A time phased evacuation is necessary in order to maximize the use of evacuation routes without causing congestion which would delay the evacuation effort.

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It is estimated that all people within 5 miles of the plant in the affected sector could be notified within 1 hour and all others out to 10 miles within 2 hours. These times have been incorporated into the Table 1 estimates.

Special Evacuation Problems

Located within 10 miles of the Oyster Creek plant are 1 hospital, 1 nursing home and 22 schools which represent special problems. Also since Oyster Creek is located within Barnegat Bay, the summer population is increased due to the influx of vacationers.

Evacuation of the hospital, nursing home and schools would be carried out in parallel with the general evacuation and it is estimated that these facilities could be evacuated in 1 1/2 - 2 hours. Consideration would also be given to sheltering people at the nursing home since the existing structure has a protection factor of 100+; however, if evacuation is necessary, sufficient ambulances are available to accomplish the evacuation.

The major summer population increase is concentrated in the NE and SE sectors in the 5 to 10 mile area. It is estimated that evacuation times for these areas may increase by a factor of two.

Assumptions

The assumptions used in projecting these estimates were as follows:

1. Population was determined from the 1975 estimated population appearing on the Ocean County Tax Map.
2. Evacuation routes were those delineated in the New Jersey PIPAG Manual (See Figure 2).

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3. A given evacuation route would pass 1000 vehicles/hour/lane with one lane maintained open for emergency access.
4. Each vehicle carried 3.1 people
5. Alerting time within 5 miles of the plant is 1 hour; and, alerting time within 5 to 10 miles of the plant is 2 hours.
6. The population at risk will follow directions from authorities so that the evacuation is accomplished in a time phased manner.
7. Adverse estimates were determined by applying a 1.5 correction factor to the best estimate. This is considered to be a conservative assumption by State and Local authorities.

Method of Calculation

In order to calculate an evacuation time estimate for a particular sector, the population of all areas within that sector were combined and divided by 3.1 to determine the number of vehicles travelling the evacuation routes. The entire population of all areas within the sector was used even though parts of the area were outside the sector in order to be conservative.

The number of lanes available for evacuation was then evaluated utilizing established evacuation routes. Each lane was assumed to pass 1000 vehicles/hour and the time required for all vehicles to pass out of the sector was calculated. The appropriate notification time was then added to the result and was recorded as the best estimate. The adverse estimate was then calculated by applying the 1.5 correction factor.

Actual Evacuation Data

An actual evacuation of Long Beach Island was accomplished on August 9, 1976. The evacuation was accomplished without a detailed plan in

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the middle of summer with an estimated population of 130,000 people. The entire operation was accomplished in six hours utilizing three evacuation lanes.

In applying the foregoing assumptions to the actual evacuation, an estimate of 13.9 hours is projected. Since the actual evacuation was accomplished in 6 hours, it can be seen that the projected estimate is conservative by a factor of 2.3; therefore, the estimates given in this report can be considered conservative.

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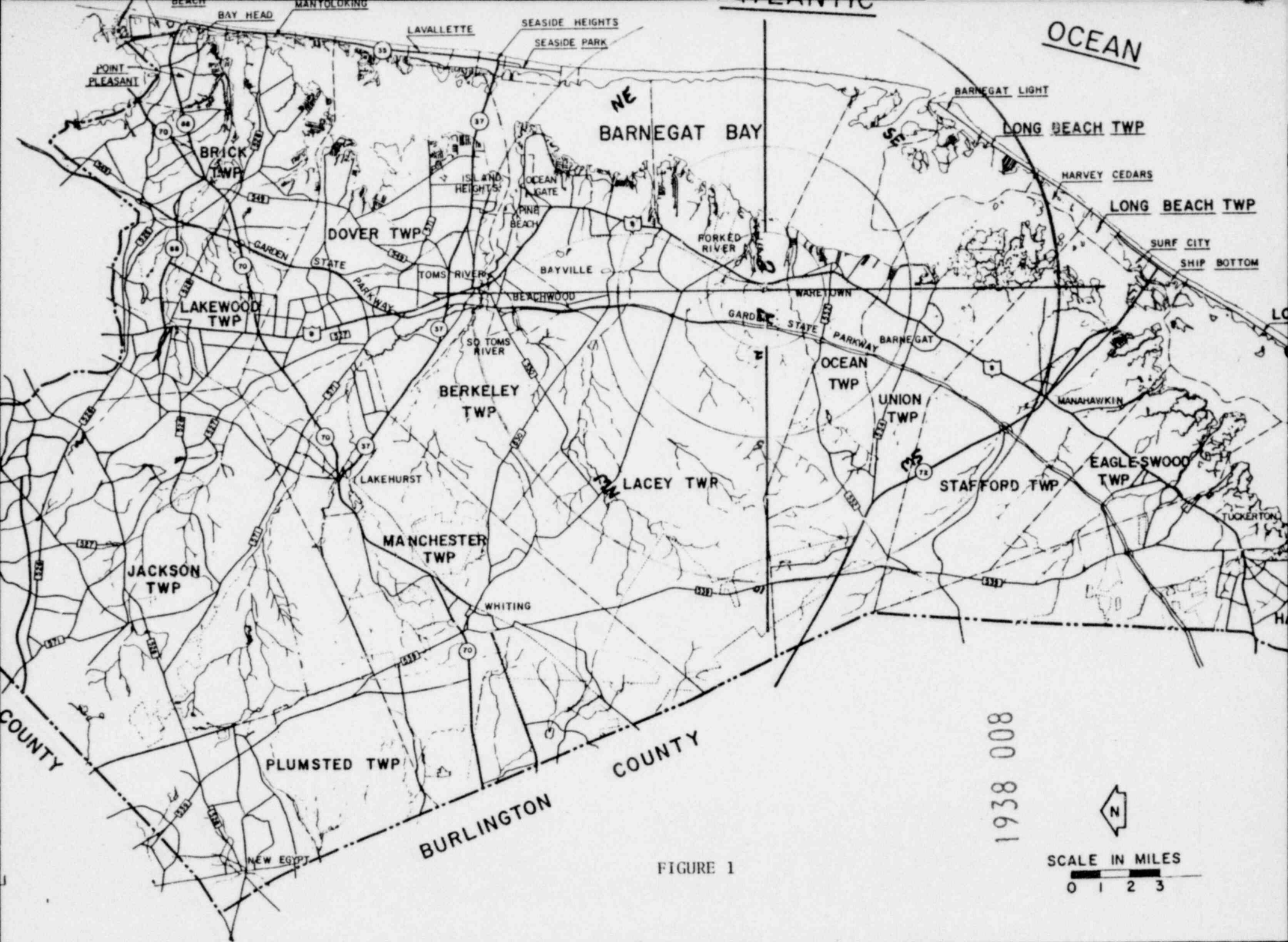
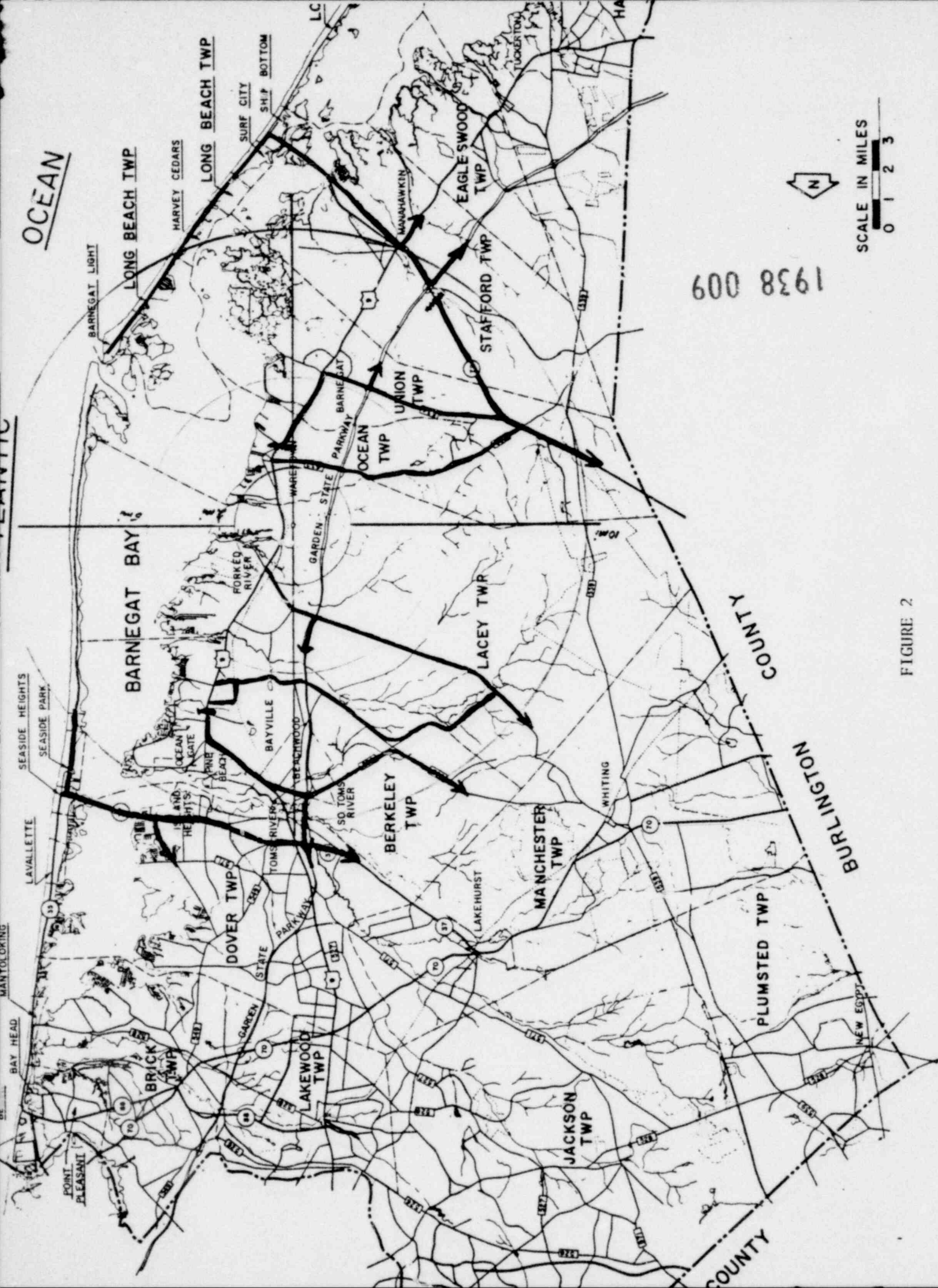


FIGURE 1



OCEAN

LONG BEACH TWP

LONG BEACH TWP

BARNEGAT BAY

BARNEGAT BAY

BRICK TWP

DOVER TWP

LAKWOOD TWP

BERKELEY TWP

LACEY TWP

OCEAN TWP

UNION TWP

STAFFORD TWP

EAGLEWOOD TWP

MANCHESTER TWP

JACKSON TWP

COUNTY

BURLINGTON COUNTY

PLUMSTED TWP

COUNTY



SCALE IN MILES



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FIGURE 2

Table 1

Evacuation Time Estimates

Sector (two mile radius)	General Evacuation Time (hours)	Total Evacuation Time*(hours)
	<u>Best/Adverse</u>	<u>Best/Adverse</u>
A	1.5/2.25	1.5/2.0
B	2.7/4.05	0/0
(Five mile radius)		
NE	3.5/5.25	1.5/2.0
SE	2.0/3.0	0/0
SW	1.5/2.25	2.0/2.0
NW	1.8/2.7	0/0
(Ten mile radius)		
NE	6.0/9.0	1.5/2.0
SE	3.4/5.1	0/0
SW	2.5/3.75	1.5/2.0
NW	3.6/5.4	1.5/2.0

*estimated time to evacuate hospitals, schools, etc. concurrent with general evacuation

Table 2

SchoolsSchools Within 2 Mile Radius

<u>School</u>	<u>Enrollment*</u>	<u>Walkers</u>	<u>Distance</u>	<u>Heading</u>
Forked River School	662	100	2	016°
Waretown Elementary	105		1 3/4	175°
Ocean Township Elementary	252		1 3/4	175°

Schools Within 5 Mile Radius

Barnegat Blvd. Elementary	938	400	5	202°
Elizabeth B. Edwards Elementary	333	75	4 1/4	190°
Lanoka Harbor Township School	896		3 5/8	011°
Ocean Center (Voc)	221		2 3/4	235°

Schools Within 10 Mile Radius

Bayville Elementary	476	95	7 3/8	016°
Clara B. Worth	510	2	5 3/8	019°
H & M Potter	637	159	7 1/2	021°
Central Regional H.S.	2866		5 1/4	357°
Island Heights Elementary	137		9 1/2	015°
Ocean Gate Elementary	139		8 1/8	020°
Seaside Park Elementary	127		9 3/4	038°
Southern Regional H.S. & M.S.	2720		8	200°
Stafford Elementary	614		8 1/4	200°
Stafford Inter.	466		8 7/8	210°
Pine Beach Elementary	582		9 1/2	015°
Toms River Elementary	672		9 3/4	000°
Washington Street	534		9 3/4	009°
Toms River H. S.	1700		9 3/4	000°
Admiral Farragut	163		8 3/4	010°

*Based on 1979-80 Enrollment