

EVACUATION TIME ESTIMATES
From Areas Near
the
Monticello Nuclear Generating Plant

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EVACUATION TIME ESTIMATES

Table of Contents

	Page
General.	1
Evacuation Preparation.	2
Confirmation of Evacuation.	2
Method Used for Determining Time Estimates.	3
Special Facility Evacuation.	3
Table	
Evacuation Time.	5
Map Sectors.	6-15
Appendix.	16
Exit Routes	
Vehicle Travel Rate	

MONTICELLO NUCLEAR GENERATING PLANT

Evacuation Time Estimates

General

The estimated time required for evacuation of people from areas near nuclear power reactors is in response to a letter from the Nuclear Regulatory Commission (B Grimes) dated November 29, 1979, with an attached guidance titled, "Request for evacuation time estimates (after notification) for areas near nuclear power plants."

The estimated time provided herein for both the best conditions and adverse conditions are times required to travel from a residence located within a specific sector, along a predetermined route, to a designated established location outside the sector being evacuated. The states plan now calls for evacuation to a 10 mile distance. In all cases, every evacuation sector defined in this study emanates from the reactor site outward to the prescribed radius.

These estimates were developed under the auspices of the Minnesota Department of Public Safety, Division of Emergency Services, with assistance from the Minnesota Department of Transportation, Emergency Operations Section, who furnished road traffic volume numbers and certain reasonable assumptions in developing the method used for determining the time estimates as outlined in the attachments.

The Table identifies the 10 sectors at the generating plant, the estimated 1980 population involved, exit routes from each sector, and the evacuation time and confirmation time required in each sector.

The ten maps show the area stated in the table and repeat the population, evacuation time, and confirmation time required.

Evacuation Preparation

It is assumed a prior alert will provide time to prepare for the evacuation and therefore the estimates for the general evacuation do not include any time for preparation. These times could vary from packing a hasty bag (20 minutes) to feeding livestock (several hours).

One special evacuation problem is the unwilling evacuee, who must be notified of alternate protective action, such as informing him by message to remain inside with windows and doors closed.

Confirmation of Evacuation

Present plans (state and local) do not address this need specifically; however, during discussions regarding evacuations of residents, a door-to-door check was considered. The time listed in the table for confirmation assumes a reasonable number of emergency vehicles available to perform this task.

METHOD USED FOR DETERMINING TIME ESTIMATES

A process using population densities, local geography, and road capabilities has been used to determine the evacuation times.

1. The Minnesota Department of Transportation (MDOT) emergency operations, assumes that each vehicle carries two occupants average, so all sector population is divided by two in order to determine the vehicles required to evacuate that sector.
2. Exit routes are assigned traffic volume capacity amounts in "vehicles per hour capacity" (VPHC).
3. Vehicle travel rate over exit roads are assigned a speed (MPH) according to the area; it being "rural" or "urban."
4. Adverse conditions; bad weather and seasonal road conditions according to MDOT should increase the evacuation time by 30 percent.
5. If the number of vehicles (half the sector population) is less than the VPHC for the exit route, the time for evacuation depends on the vehicle travel rate. Using the above concepts, the evacuation time estimates have been developed.

Special Facilities Evacuation

The Emergency Medical Services Section of the Minnesota Department of Health provided the names of hospitals and nursing homes within the 10 mile radius of the nuclear plant and provided times required to load and transport patients.

Sequence of Events	Estimated Time Required (Minutes) 75 - 125 Patients
- Incident	
- Notification of MDH, EMS Section	20*
- Notification of Risk Facilities	5*
- Request for Transportation	5
- Transport vehicles to Risk Facilities	40
- Loading Time	90
- Transport to Host Area	40

200 minutes or
3 hours 20 minutes

This estimate makes the assumption that weather conditions are good and the use of enough vehicles to transport everyone without return trips. For the adverse time required to evacuate the above facilities, the 30 percent increase in time used for general evacuation is reasonable. It is assumed that confirmation of removal would be an integral part of the evacuation process carried out at each of the Special Facilities.

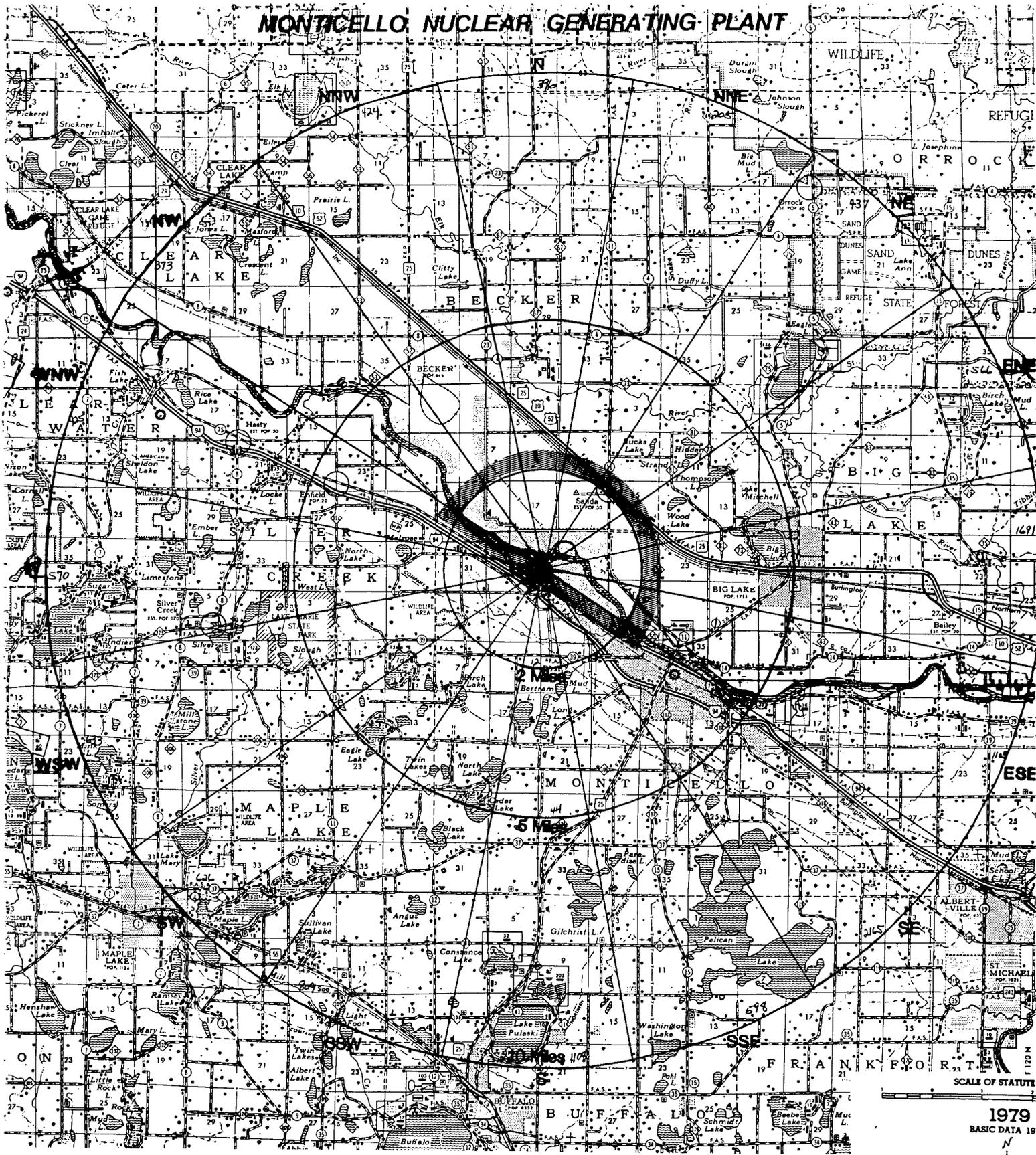
*These notification times were included in this Special Facility Evacuation estimate developed by the Minnesota Department of Health.

Table

EVACUATION TIME ESTIMATES IN THE AREA NEAR THE
MONTICELLO NUCLEAR GENERATING PLANT

Evac Zone Map	Sectors		Sectors	Population	Exit Routes	Evacuation Time (minutes)		
	Distance	Degrees				Best/Adverse/Confirm		
M - 1	0 - 2 miles	180	NW-ESE	266	Co Rd 11 T.H.-25			10/15/30
M - 2	0 - 2 miles	180	SE-WNW	509	Co Rd 75 T.H.-94			15/20/40
M - 3	0 - 5 miles	90	NW-NNE	1099	Co Rd 11, Co Rd 23 T.H.-10			30/40/80
M - 4	0 - 5 miles	90	NE-ESE	1766	Co Rd 11, 14, 73 T.H.-10 T.H. -25			35/45/90
M - 5	0 - 5 miles	90	SE-SSW	4573	Co Rd 75, Co Rd 106 T.H.-94 T.H. -25			45/54/110
M - 6	0 - 5 miles	90	SW-WNW	1133	Co Rd 75, 39, 111 T.H.-94			30/40/80
M - 7	0 - 10 miles	90	NW-NNE	2855	Co Rd 8, 53, 23, 11, 4 T.H. -10			60/80/160
M - 8	0 - 10 miles	90	NE-ESE	6609	Co Rd 5, 43, 14, 39 T.H.-10			75/100/200
M - 9	0 - 10 miles	90	SE-SSW	8890	Co Rd 12, 15, 37, 119 T.H.-94, T.H. -25			90/120/240
M - 10	0 - 10 miles	90	SW-WNW	3620	Co Rd 11, 37, 106, 8, 39 T.H.-94			65/85/170

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

10, 15, 30

BEST/ADVERSE/CONFIRM

266

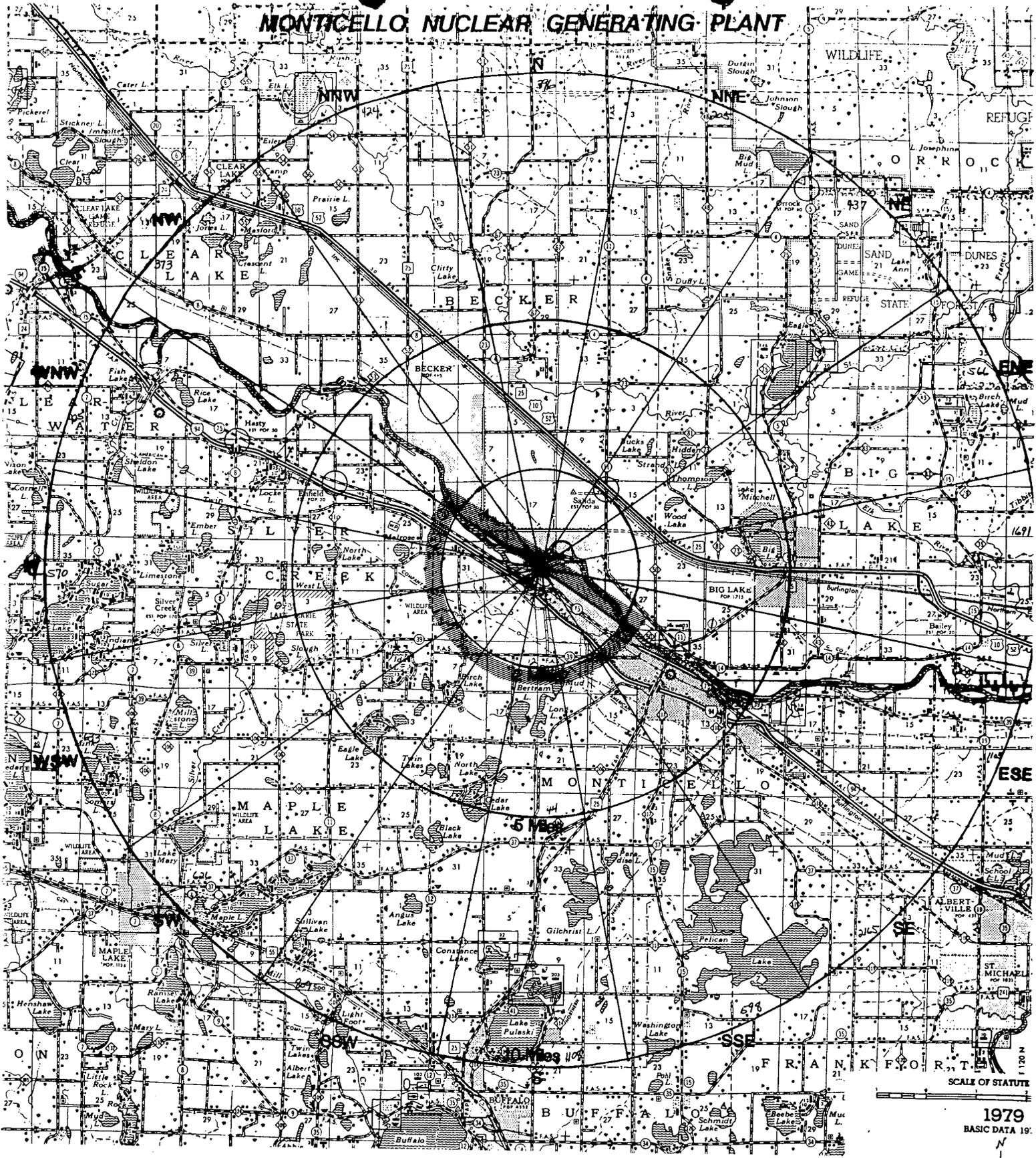
POPULATION

EVAC AREA

M-1

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT



SCALE OF STATUTE

1979
BASIC DATA 19'

MINUTES

15, 20, 40

BEST/ADVERSE/CONFIRM

EVAC AREA

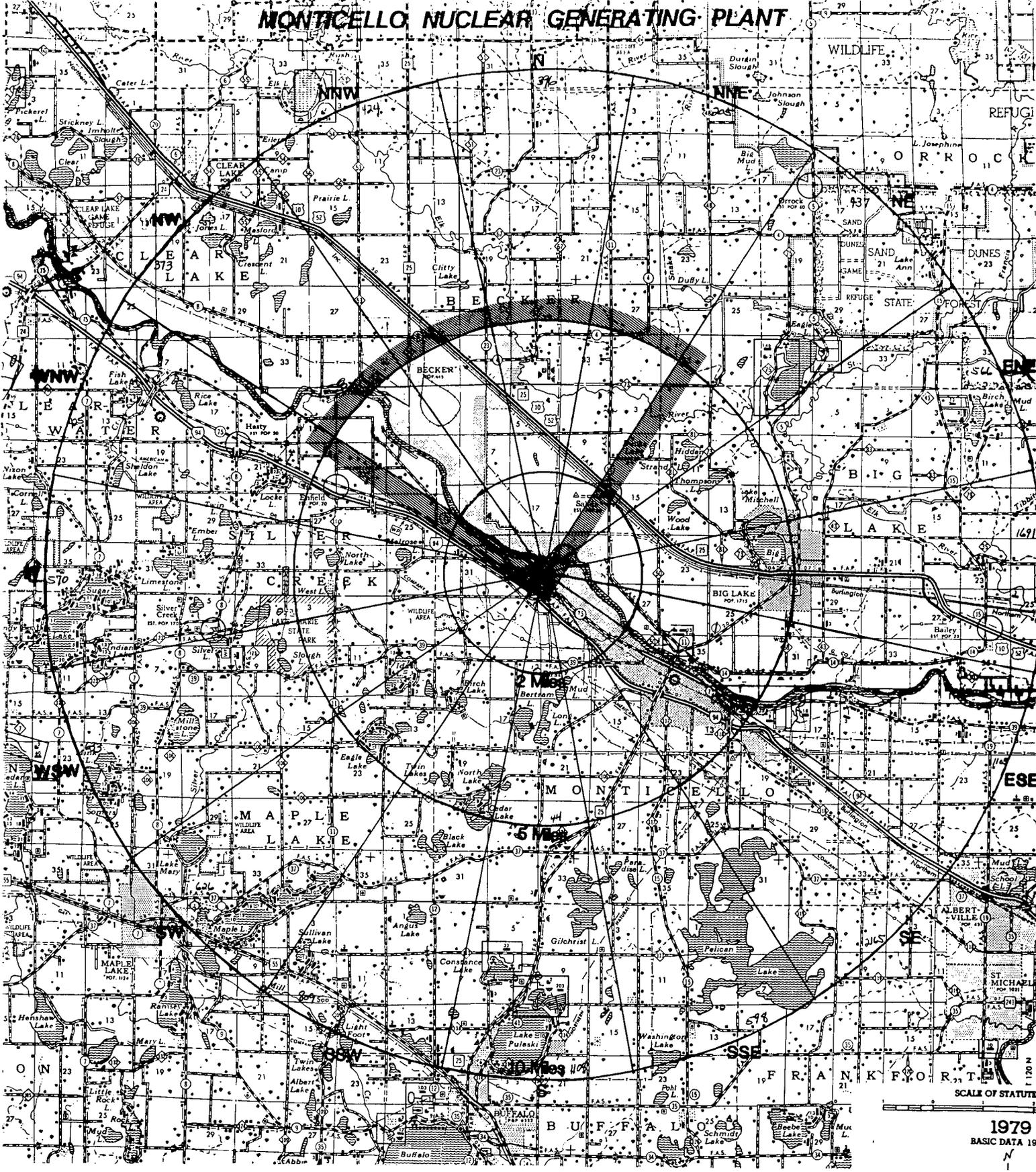
M-2

(See Table)

509

POPULATION

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

30 / 40 / 80

BEST/ADVERSE/CONFIRM

1099

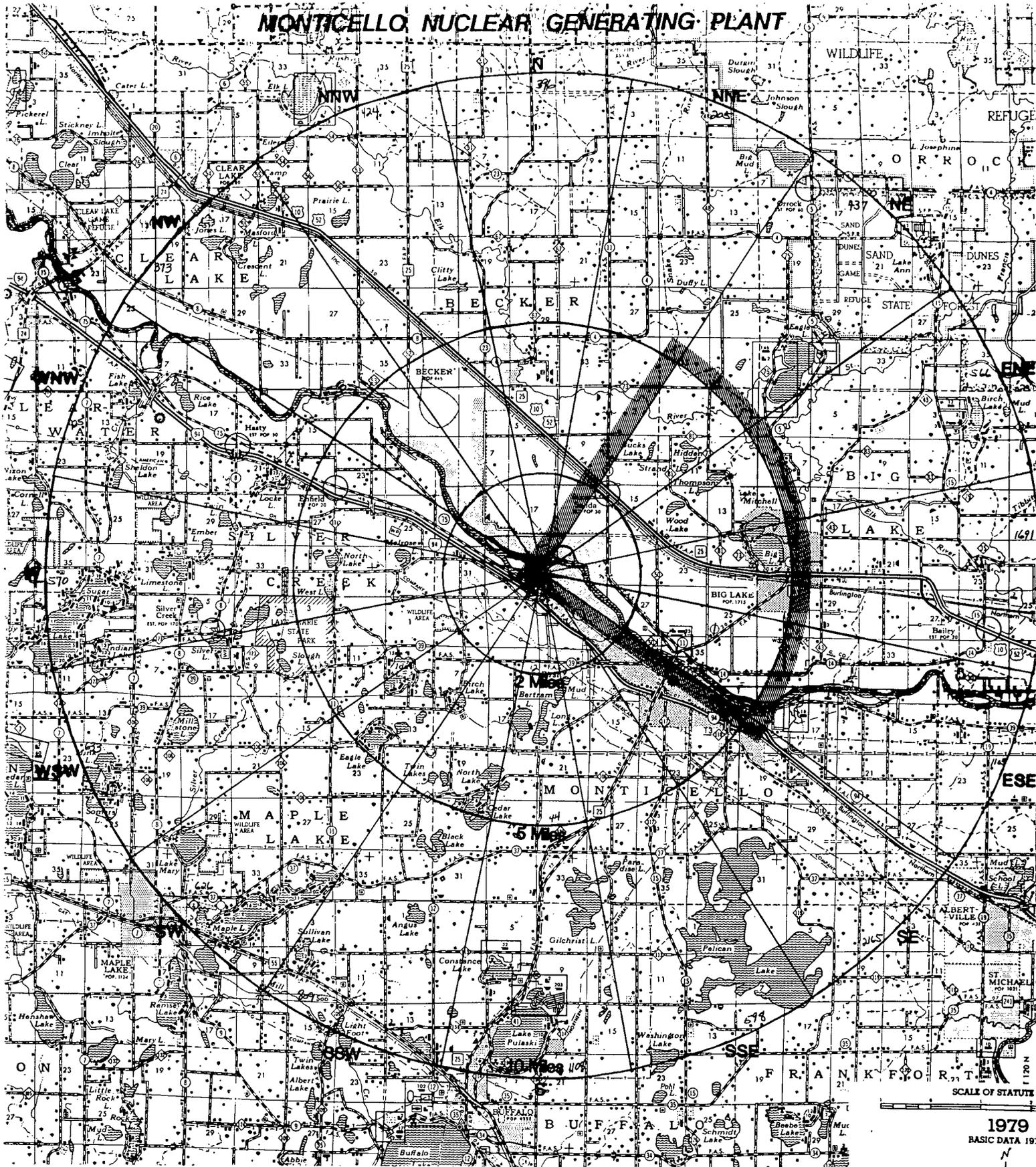
POPULATION

EVAC AREA

M-3

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

35, 45, 90

BEST/ADVERSE/CONFIRM

1766

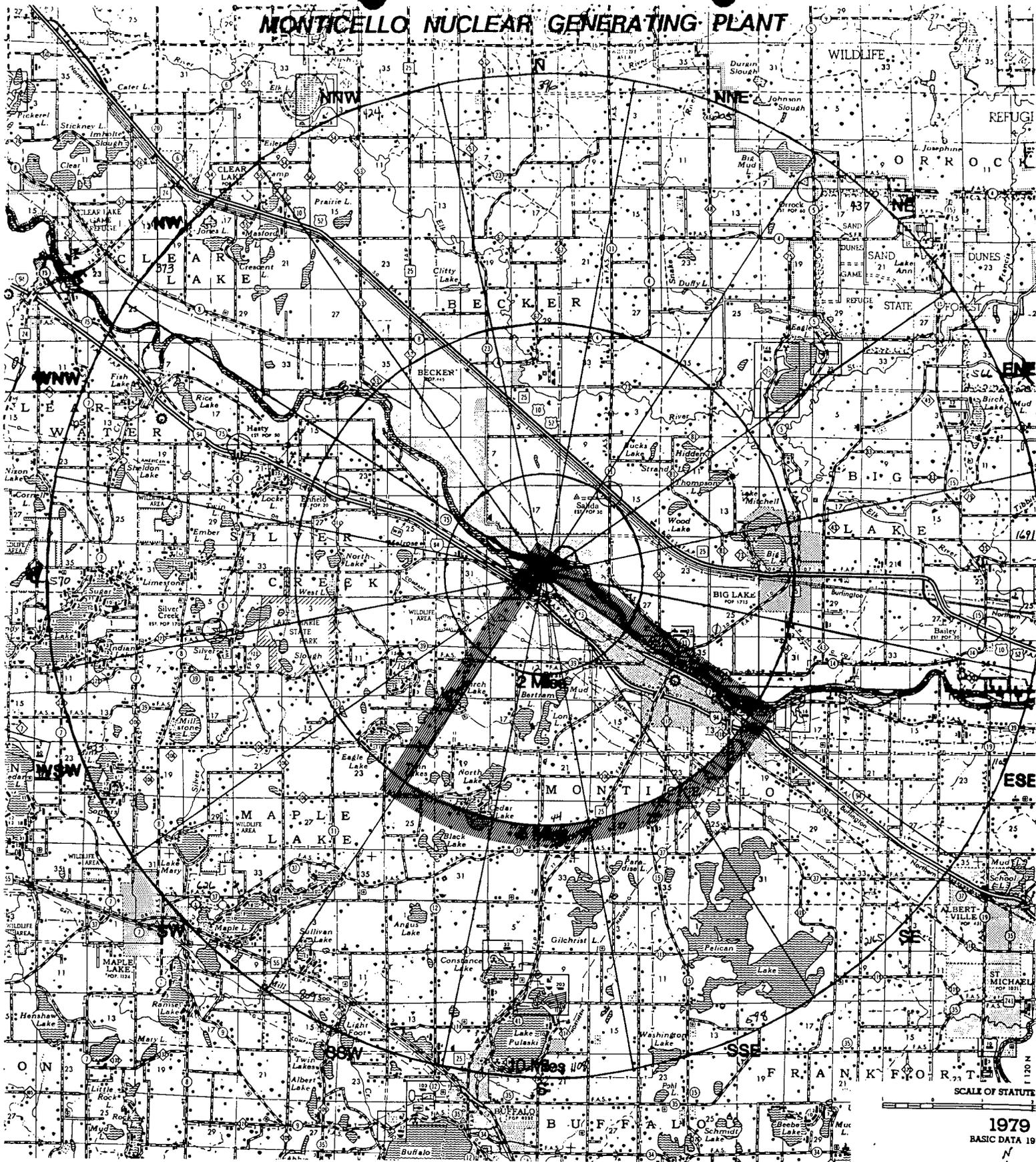
POPULATION

EVAC AREA

M-4

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

45 154 110

BEST/ADVERSE/CONFIRM

4573

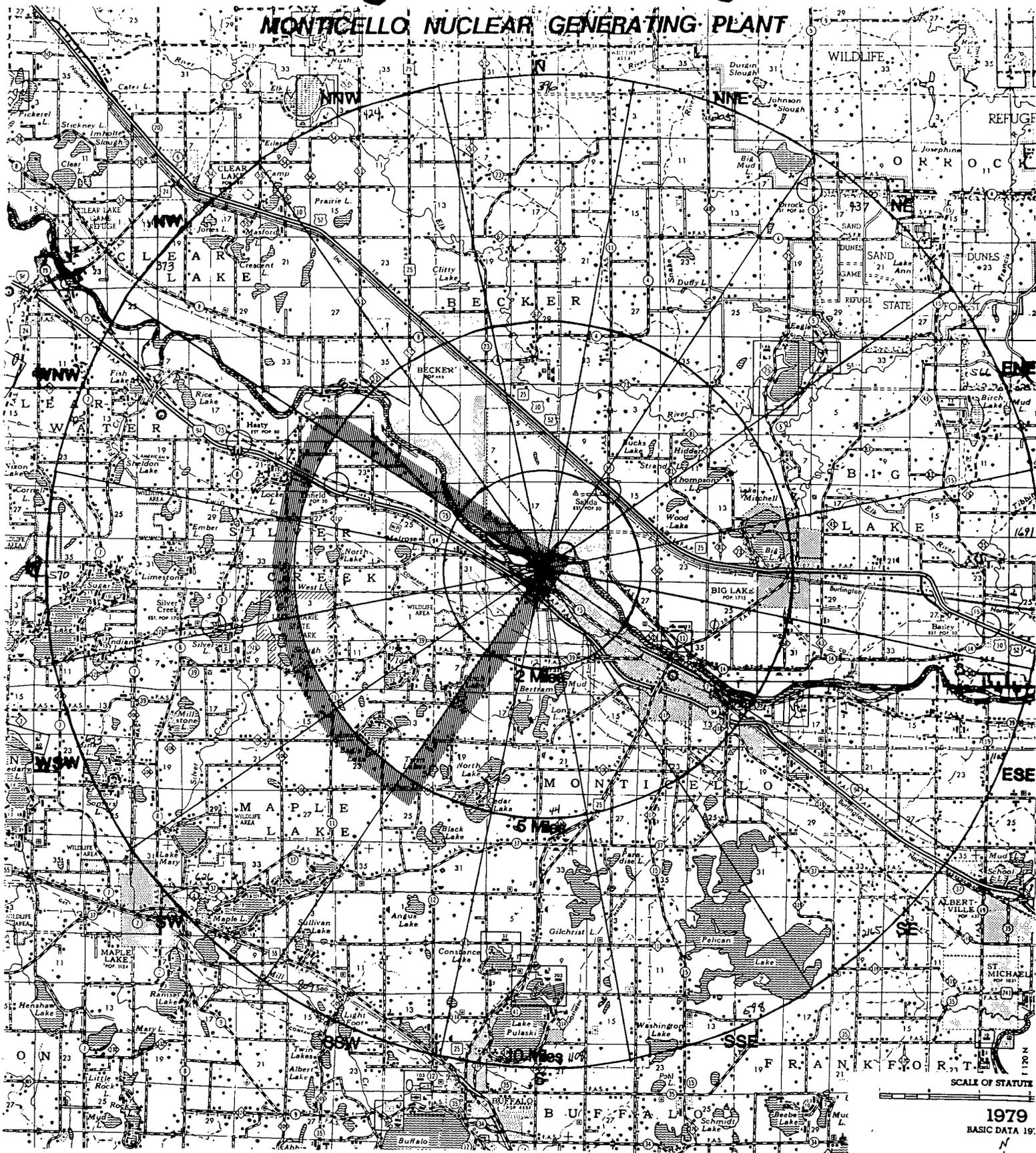
POPULATION

EVAC AREA

M-5

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

30 / 40 / 80

BEST/ADVERSE/CONFIRM

1133

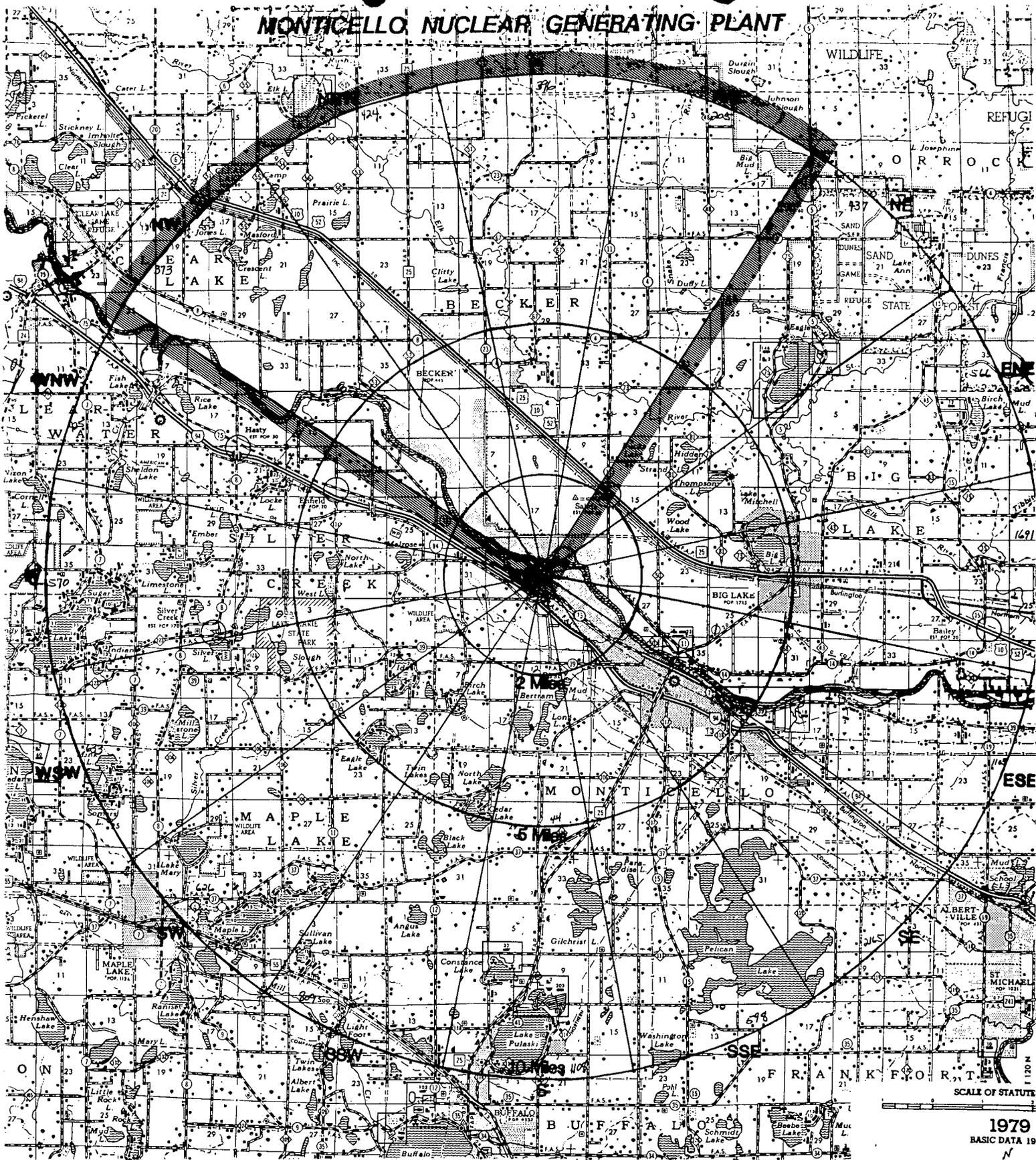
POPULATION

EVAC AREA

M-6

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

60 1 80 1 160

BEST/ADVERSE/CONFIRM

2855

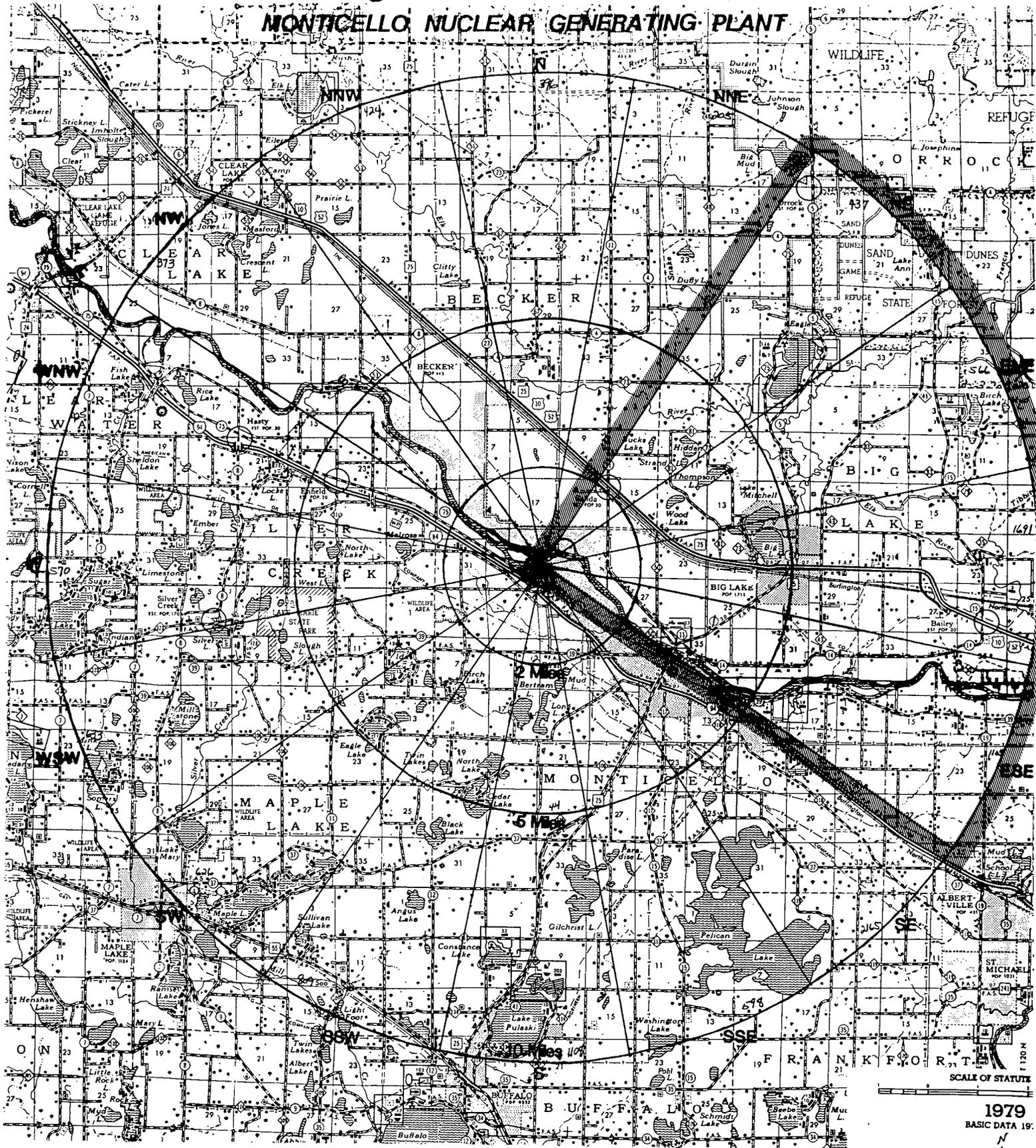
POPULATION

EVAC AREA

M-7

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

45 / 100 / 200

EVAC AREA

M-8

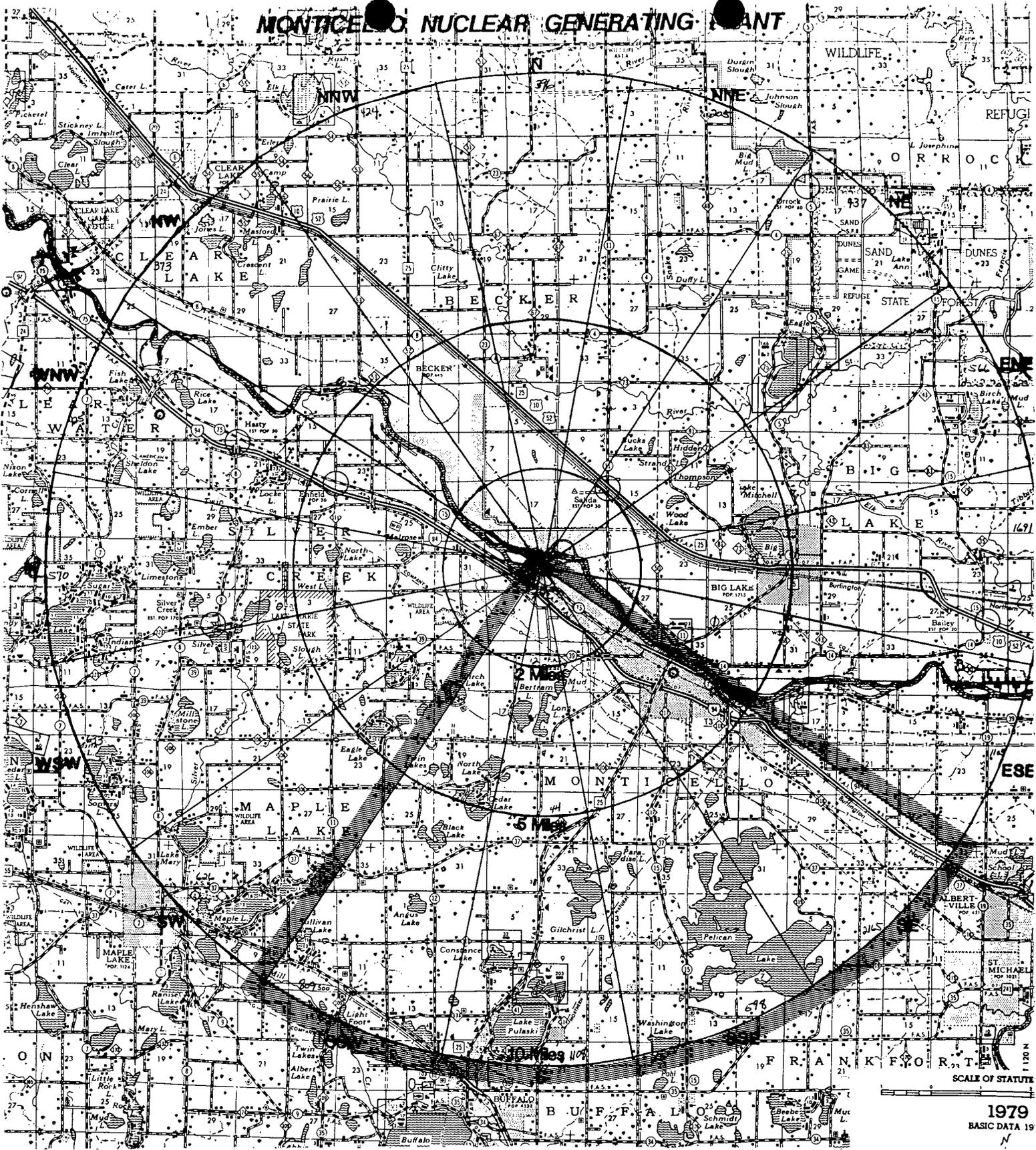
BEST/ADVERSE/CONFIRM

POPULATION

(See Table)

6609

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

90, 120, 240

BEST/ADVERSE/CONFIRM

EVAC AREA

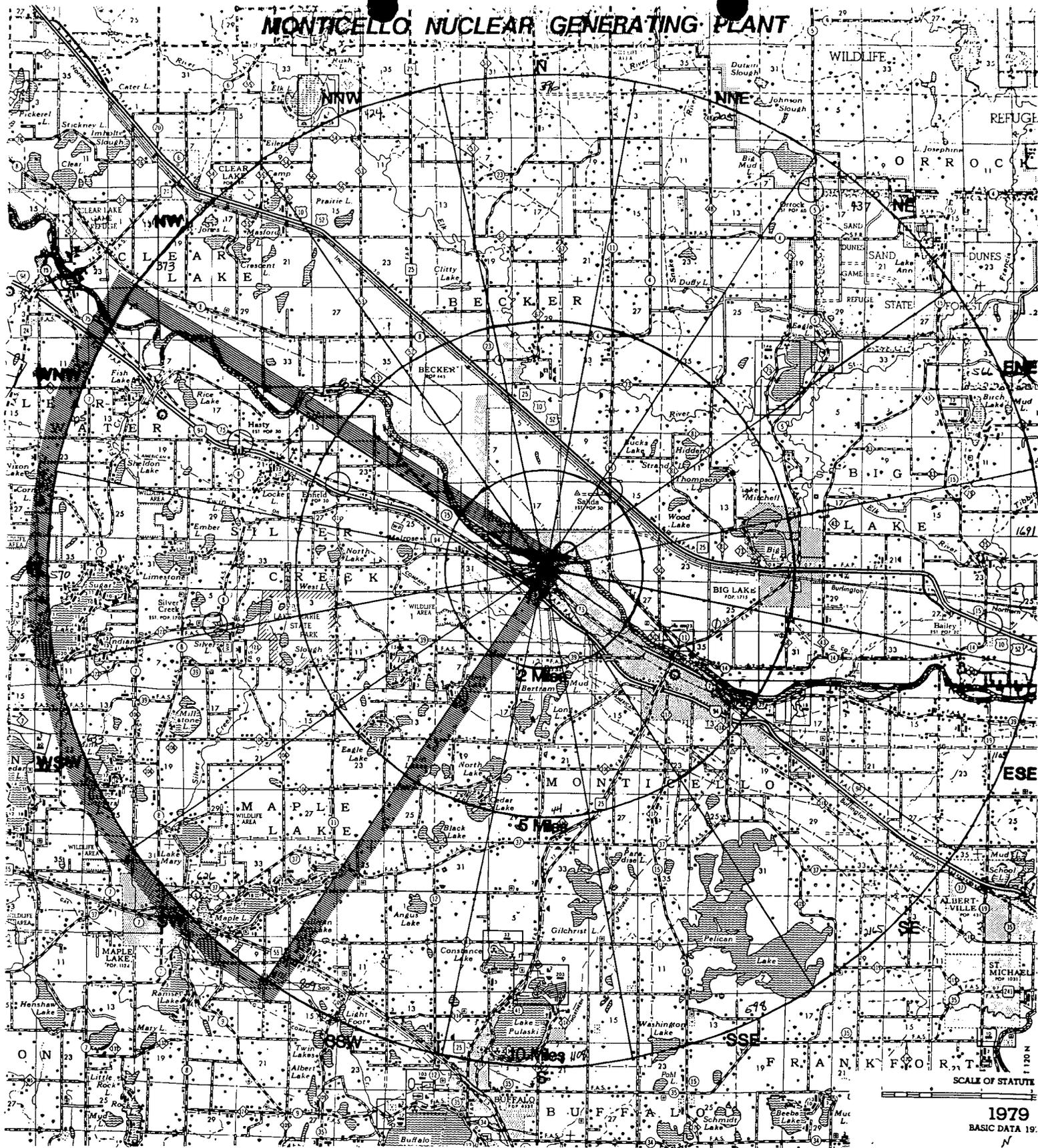
8890

POPULATION

M-9

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES

65, 85, 170

BEST/ADVERSE/CONFIRM

EVAC AREA

M-10

(See Table)

3620

POPULATION

Appendix

EVACUATION TIME ESTIMATES

Monticello Nuclear Generating Plant

<u>Exit Routes</u>	<u>Vehicles/hour Capacity (VPHC)</u>
Trunk Highway 94	15,500
Trunk Highway 10	13,200
Trunk Highway 25	3500
County Roads 4, 5, 8, 11, 12, 14, 15, 23, 37, 39, 43, 53, 73, 75, 106, 111, 119	3000

Vehicle Travel Rate: 10 - 15 mph