

EVACUATION TIME ESTIMATES

From Areas Near

the

Monticello Nuclear Generating Plant

PUBLIC COPY
PERSONAL PRIVACY INFORMATION
DELETED IN ACCORDANCE WITH THE
FREEDOM OF INFORMATION ACT

Prepared by

Northern States Power Company

414 Nicollet Mall

Minneapolis, MN

55401

April, 1980

REVISED AUGUST 1980

8012080 364

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). The lowest VPHC for any road in each exit route was used to provide conservatism to the time estimates (see page 16).
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.

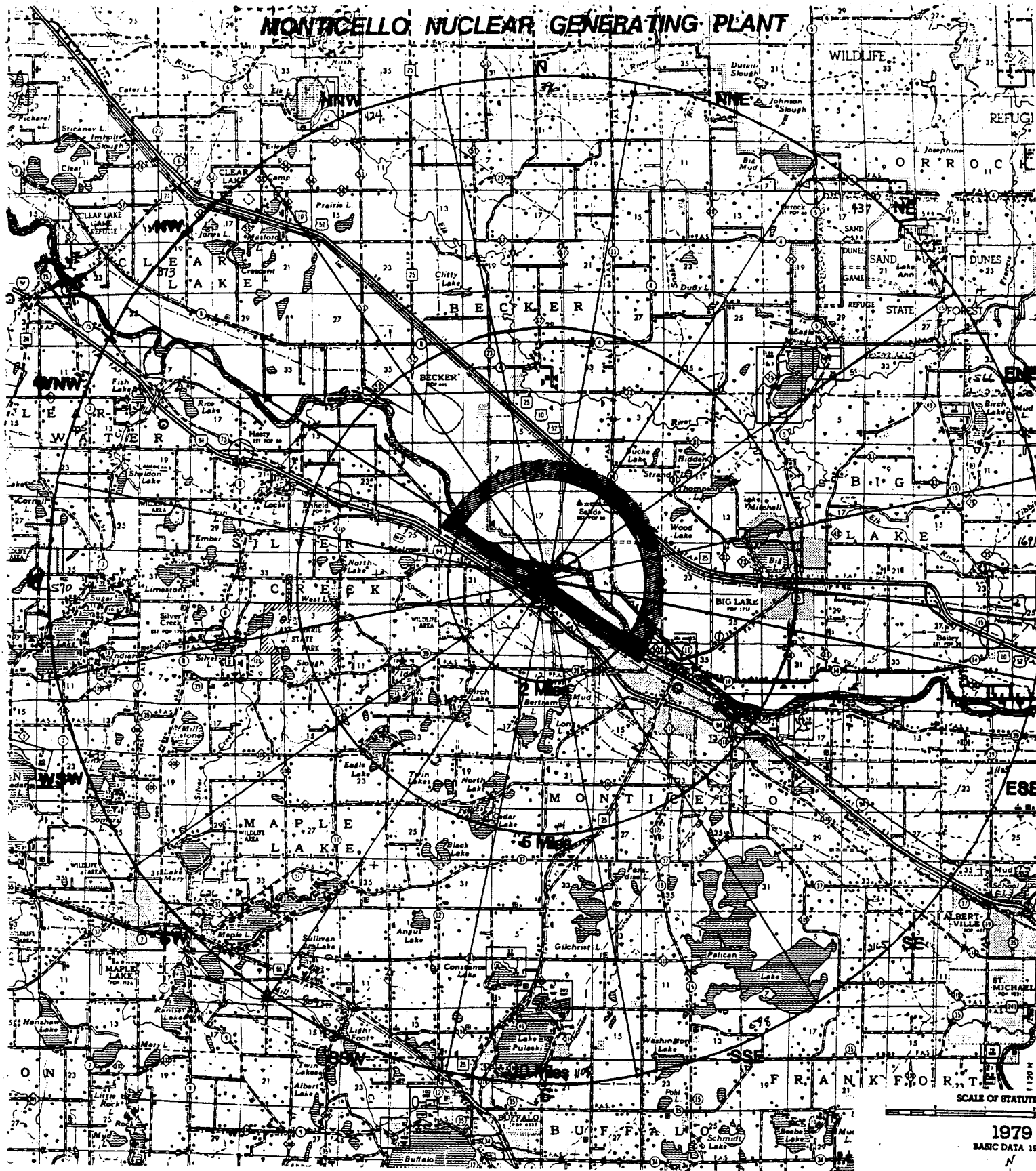
*These notification times were included in this Special Facility Evacuation estimate developed by the Minnesota Department of Health.

Table

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

<u>Evac Zone</u> <u>Map</u>	<u>Sectors</u> <u>Distance</u>	<u>Degree</u>	<u>Sectors</u>	<u>Population</u>	<u>Exist Routes</u>	<u>Evacuation Time</u> <u>(minutes)</u> <u>Best/Adverse/Confirm</u>
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	10/15/30
M - 3	0 - 5 miles	90	NW-NNE	1099	Co Rd 11, Co Rd 23 T.H.-10	20/30/60
M - 4	0 - 5 miles	90	NE-ESE	1766	Co Rd 11, 14, 73 T.H.-10 T.H.-25	30/40/80
M - 5	0 - 5 miles	90	SE-SSW	4573	Co Rd 75, Co Rd 106 T.H.-94 T.H.-25	50/65/130
M - 6	0 - 5 miles	90	SW-WNW	1133	Co Rd 75, 39, 111 T.H.-94	20/30/60
M - 7	0 - 10 miles	90	NW-NNE	2855	Co Rd 8, 53, 23, 11, 4 T.H.-10	100/130/260
M - 8	0 - 10 miles	90	NE-ESE	6609	Co Rd 5, 43, 14, 39 T.H.-10	200/260/520
M - 9	0 - 10 miles	90	SE-SSW	8890	Co Rd 12, 15, 37, 119 T.H.-94, T.H.-25	200/260/520
M - 10	0 - 10 miles	90	SW-WNW	3620	Co Rd 11, 37, 106, 8, 39 T.H.-94	80/100/200

MONTICELLO NUCLEAR GENERATING PLANT



MINUTES
 10, 15, 30
 BEST/ADVERSE/CONFIRM

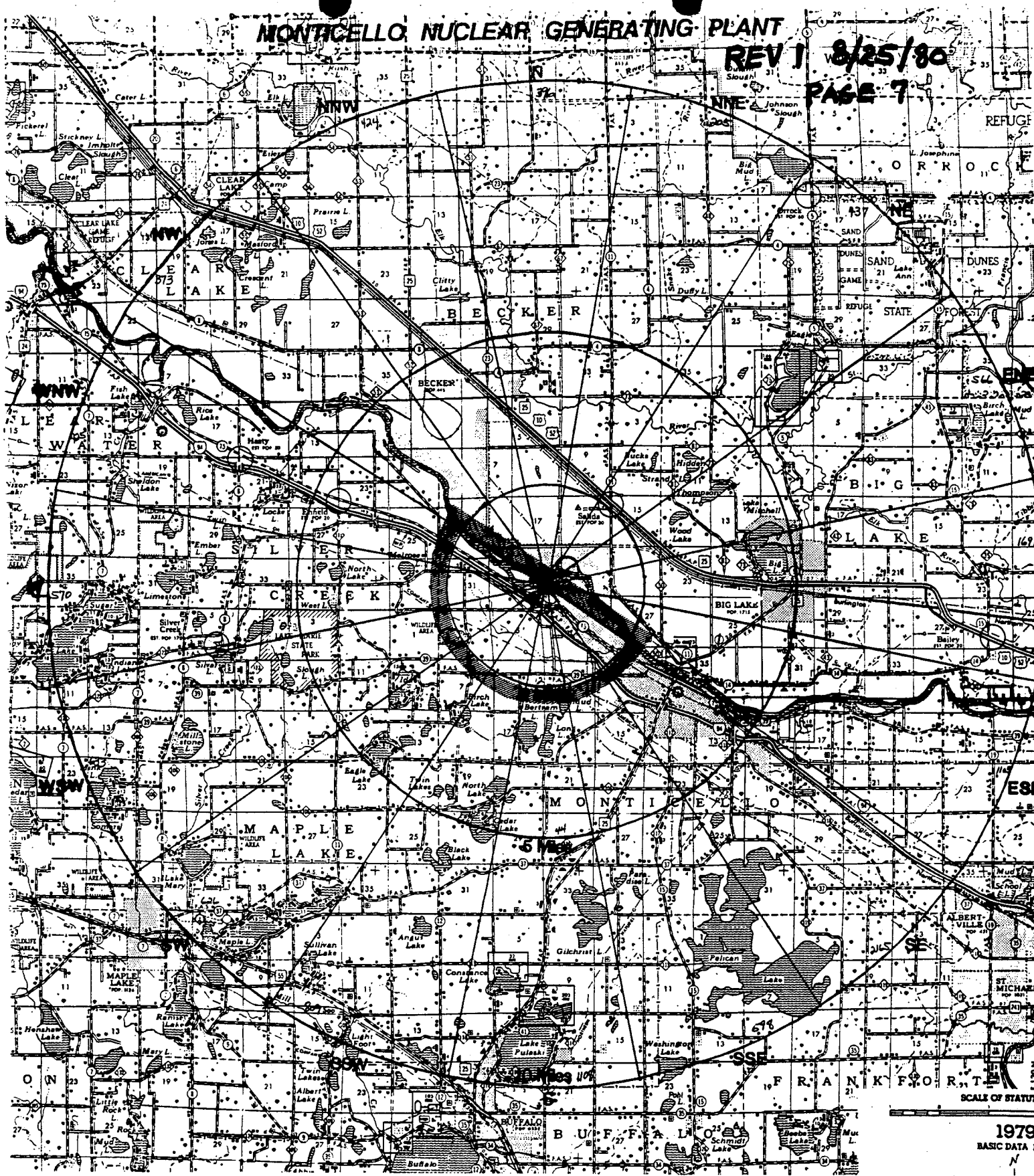
266
 POPULATION

EVAC AREA
 M-1
 (See Table)

MONTICELLO NUCLEAR GENERATING PLANT

REV 1 8/25/80

PAGE 7



MINUTES

10 / 15 / 30

BEST/ADVERSE/CONFIRM

509

POPULATION

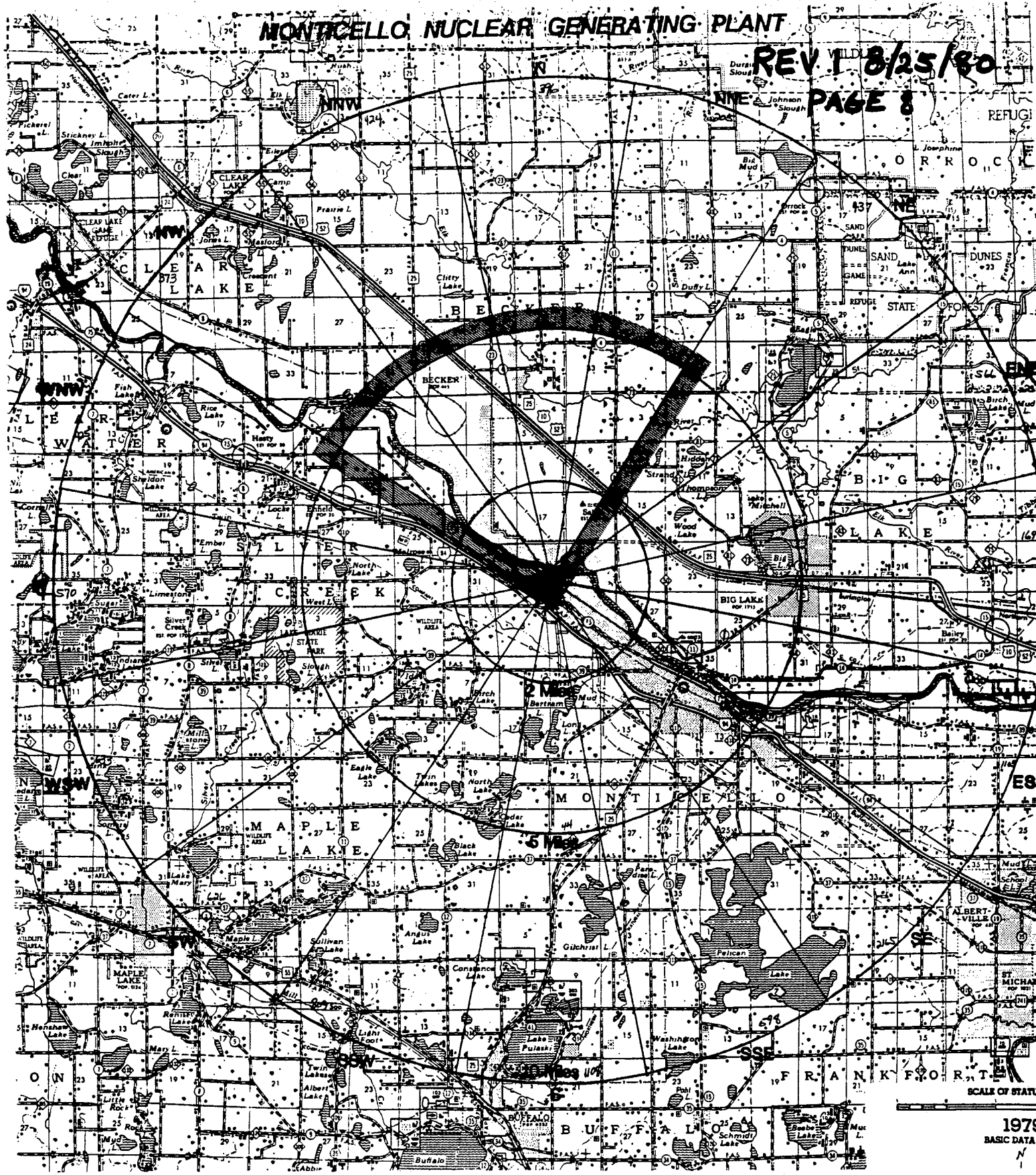
EVAC AREA

M-2

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT

REV 1 8/25/80
PAGE 8



MINUTES

20 1 30 1 60

BEST/ADVERSE/CONFIRM

1099

POPULATION

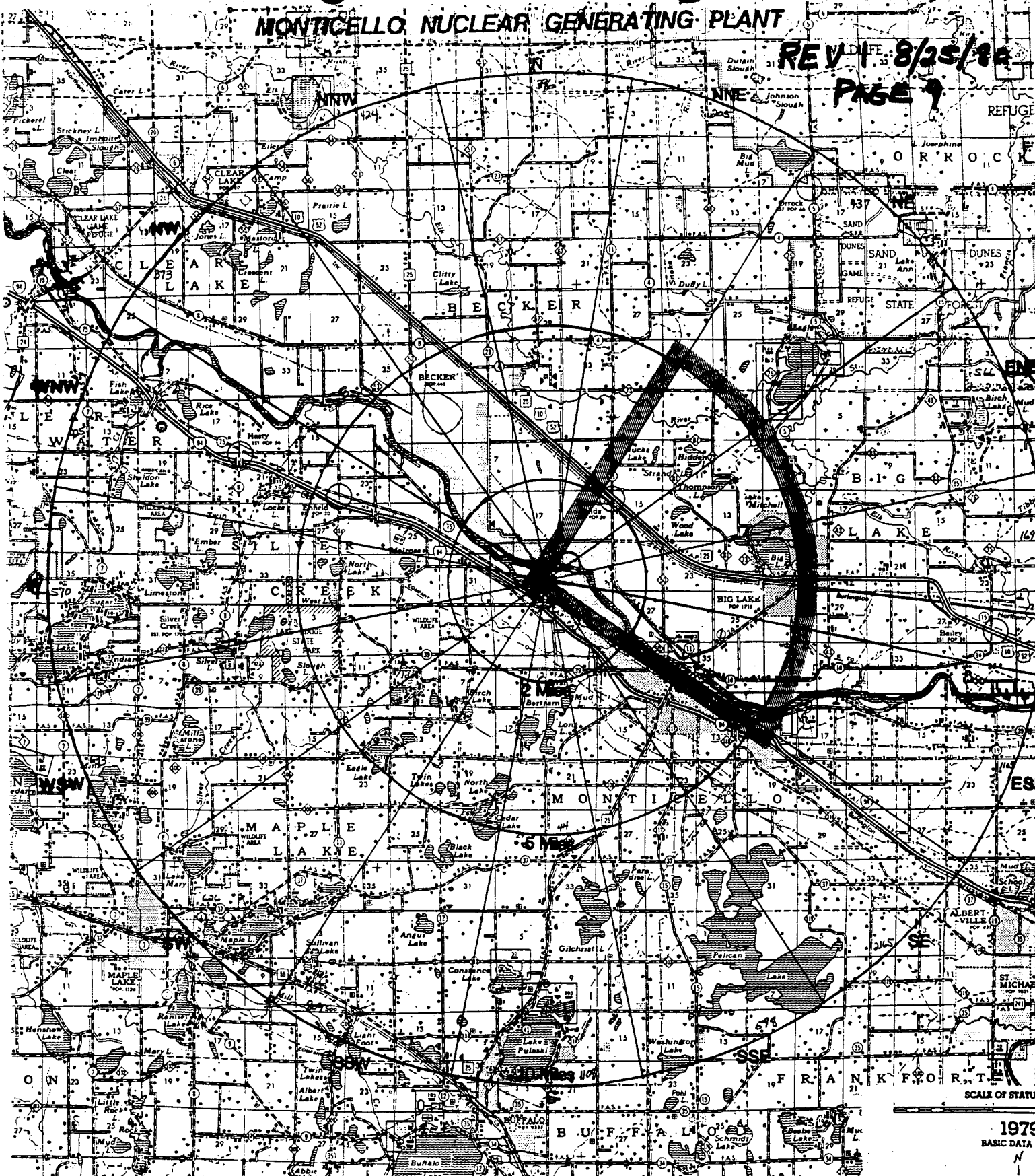
EVAC AREA

M-3

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT

REV. DATE: 8/25/79
PAGE 9



MINUTES

30 / 40 / 80

BEST/ADVERSE/CONFIRM

1766

POPULATION

EVAC AREA

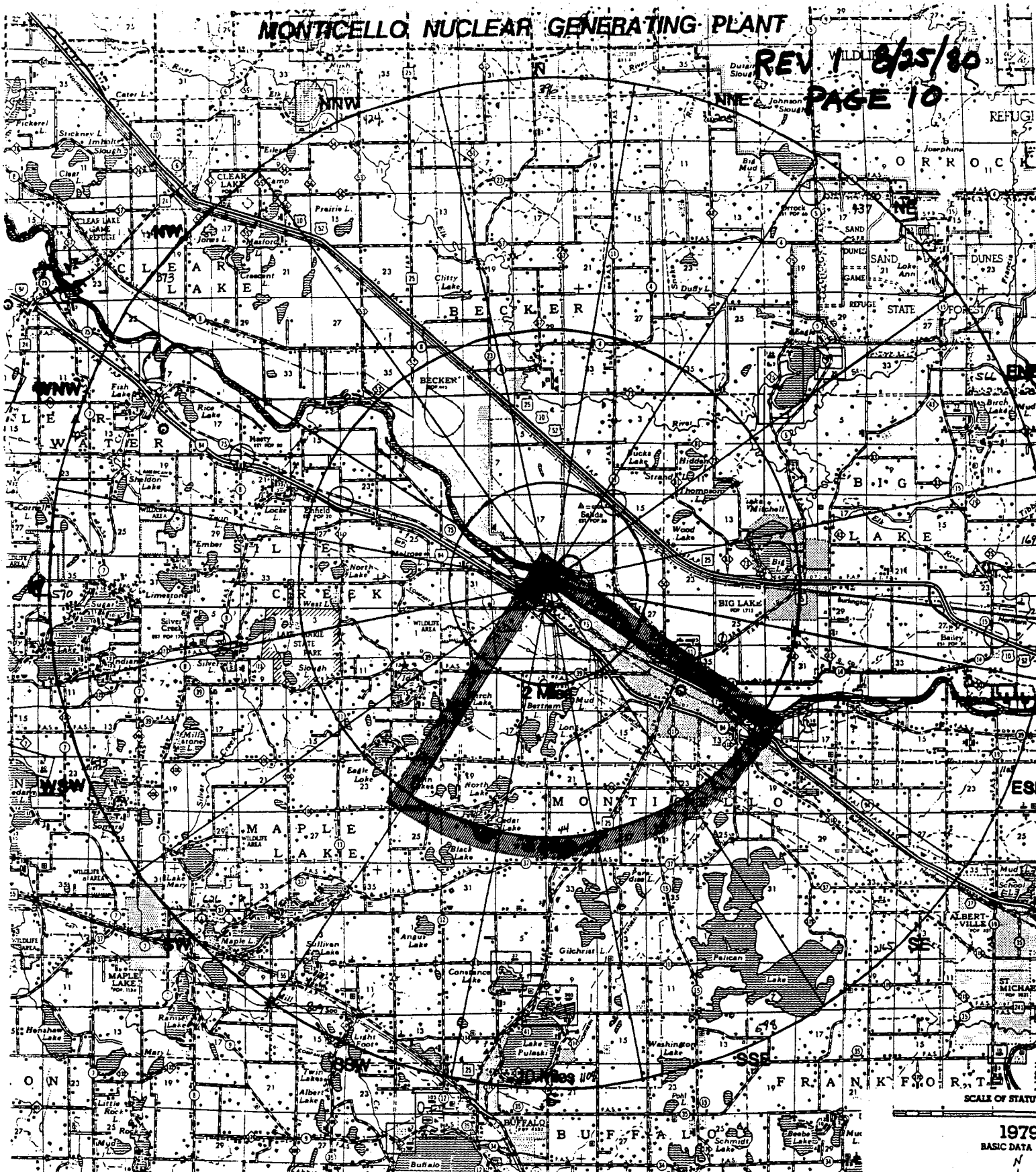
M-4

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT

REV 1 8/25/80

PAGE 10



MINUTES

50 | 65 | 130

BEST/ADVERSE/CONFIRM

4573

POPULATION

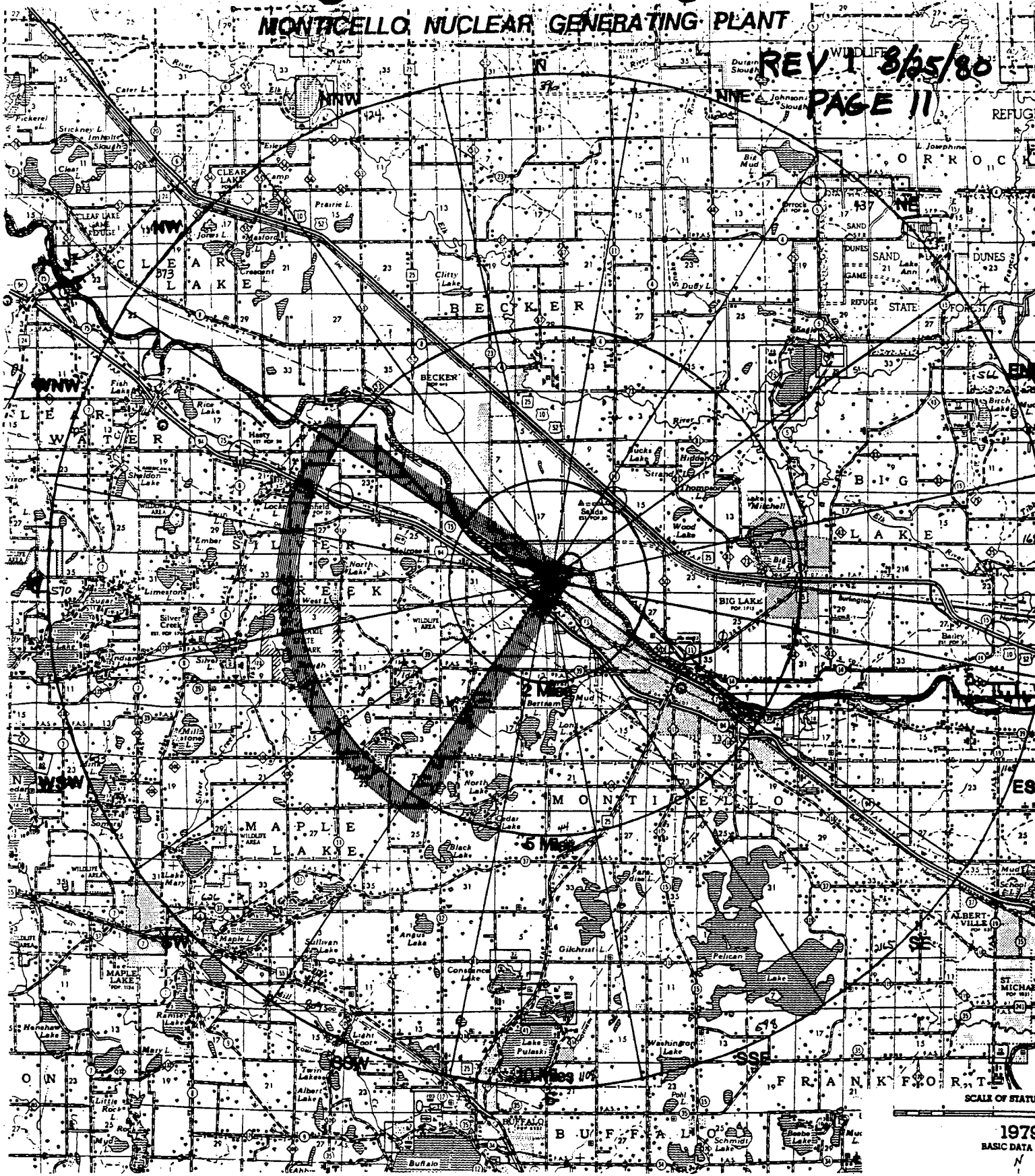
EVAC AREA

M-5

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT

REV 1 8/25/80
PAGE 11



MINUTES

20 1 30 1 60

BEST/ADVERSE/CONFIRM

1133

POPULATION

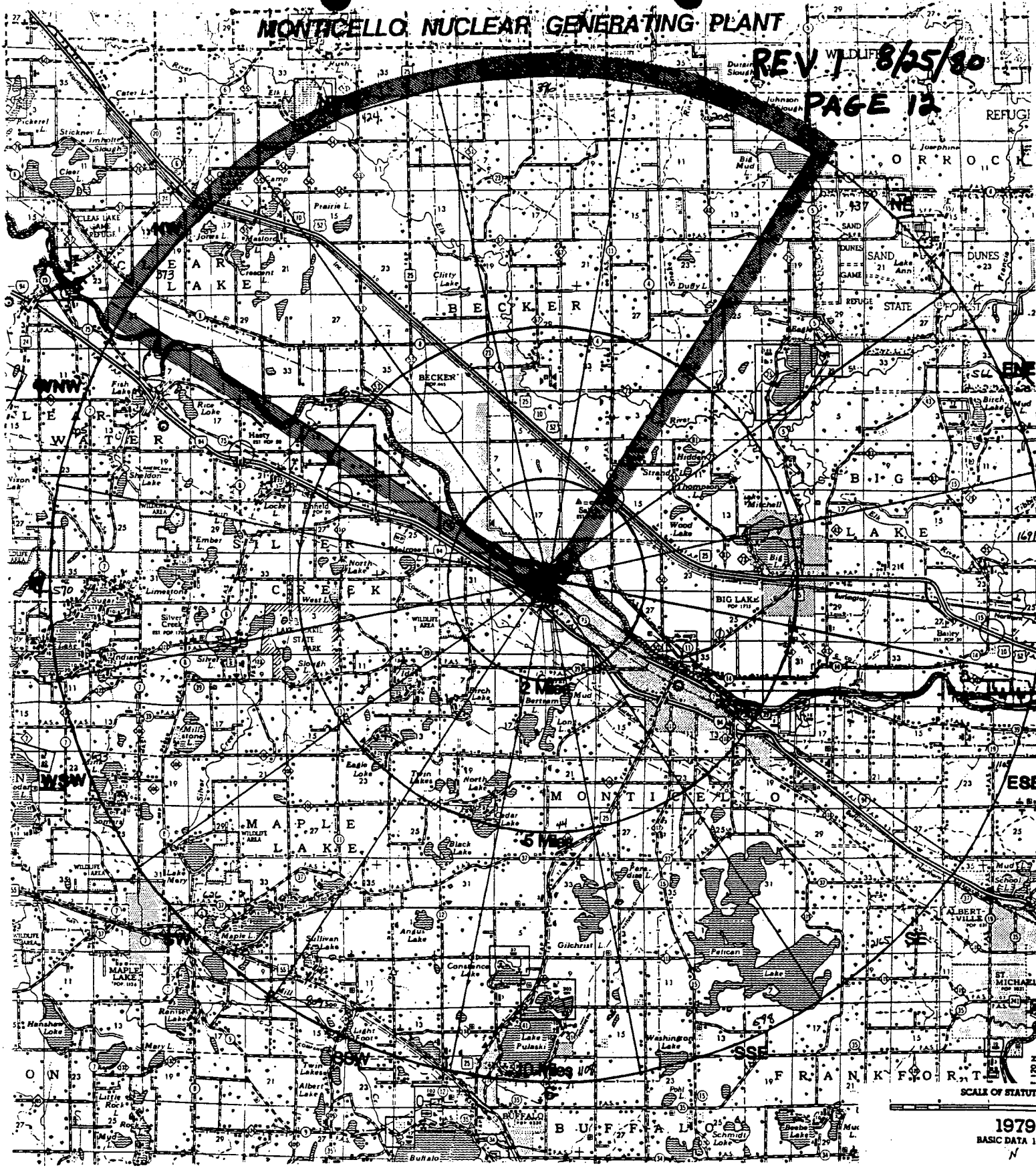
EVAC AREA

M-6

(See Table)

MONTICELLO NUCLEAR GENERATING PLANT

REV. 1 8/25/80
PAGE 12



MINUTES

100 / 130 / 260

BEST/ADVERSE/CONFIRM

2855
POPULATION

- 12 -

EVAC AREA

M-7

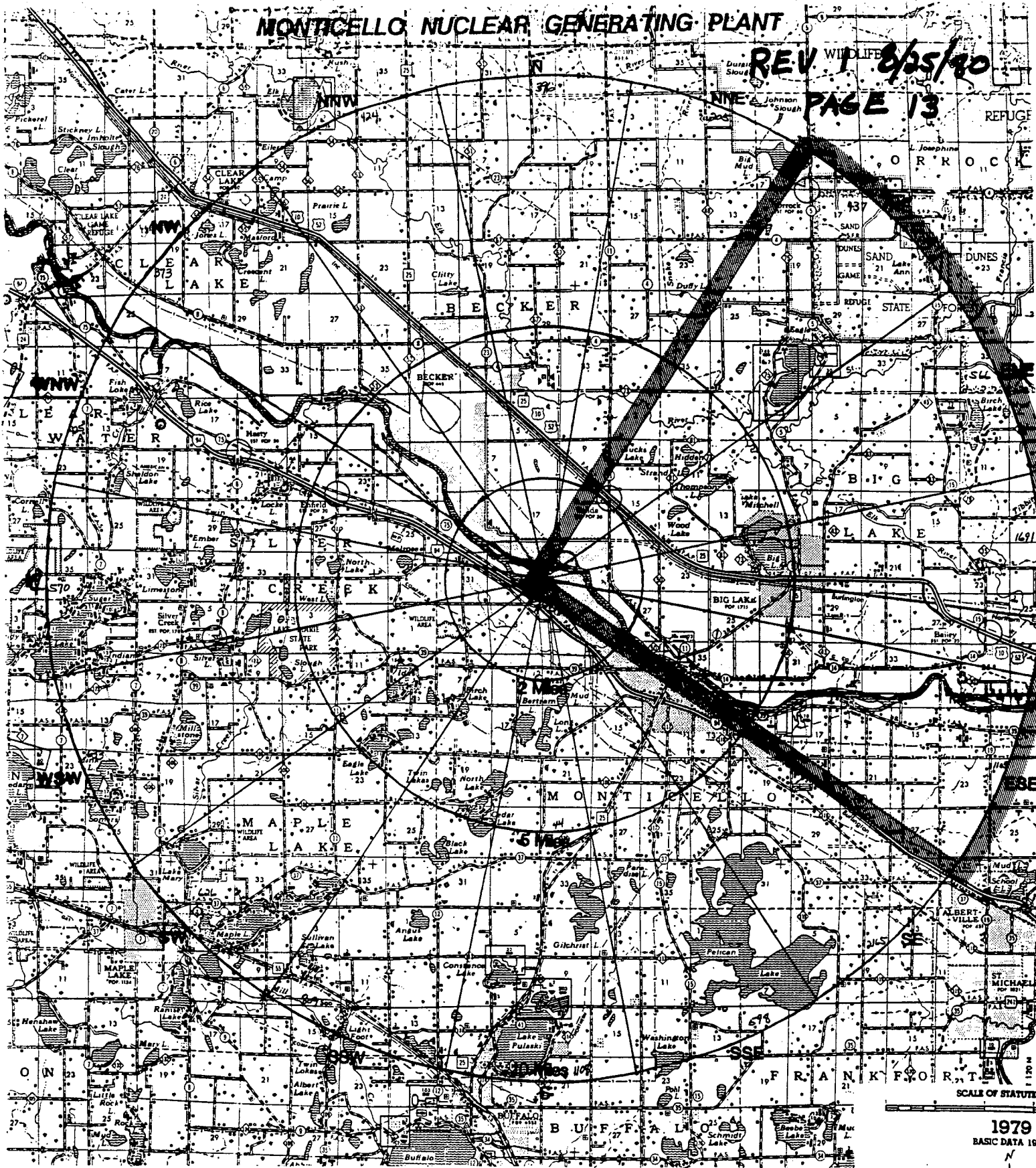
(See Table)

1979
BASIC DATA 19

MONTICELLO NUCLEAR GENERATING PLANT

REV. 1 LIFE 8/25/80

PAGE 13



MINUTES

200 / 260 / 520

BEST/ADVERSE/CONFIRM

6609

POPULATION

- 13 -

EVAC AREA

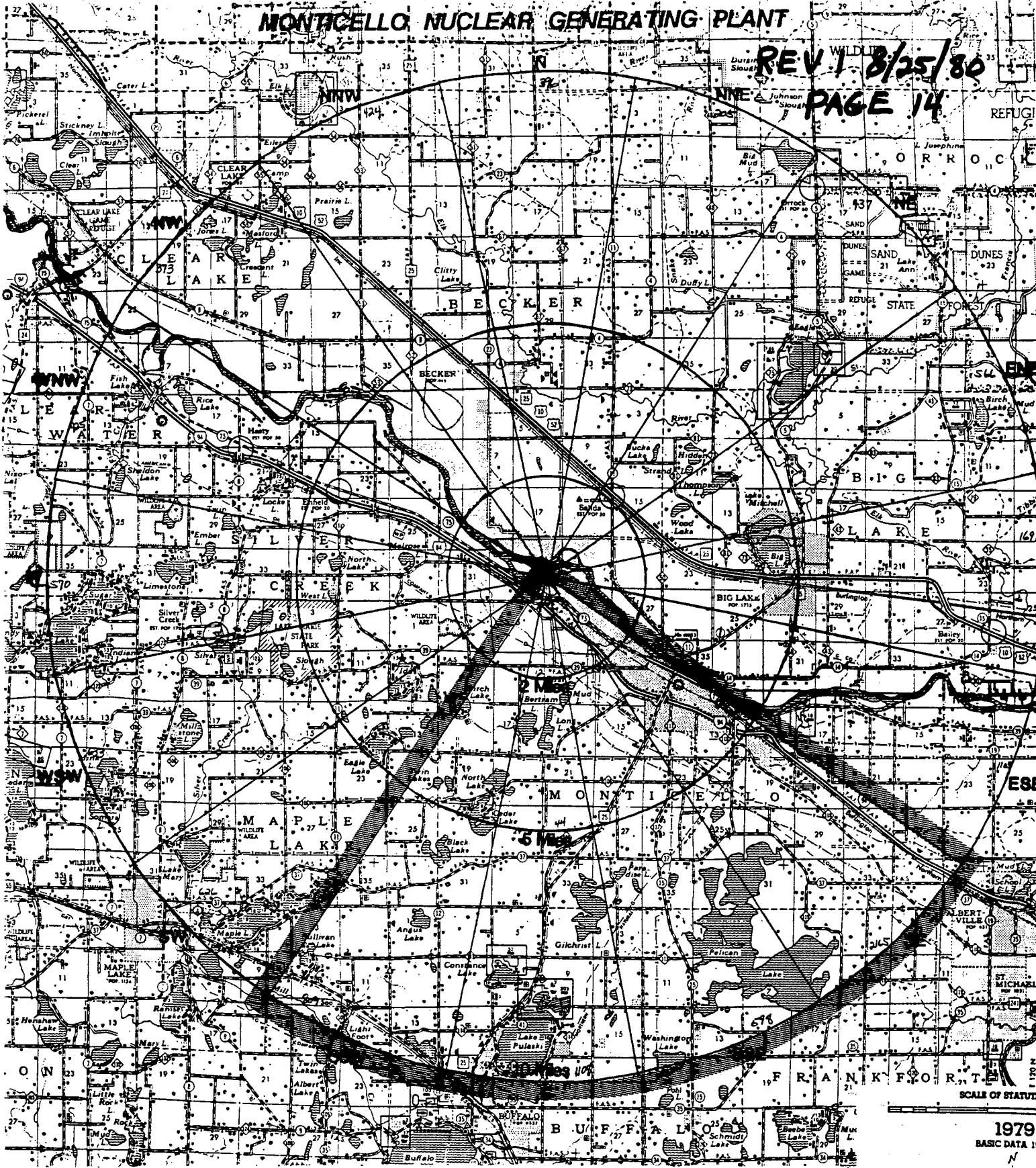
M-8

(See Table)

1979
BASIC DATA 19

MONTICELLO NUCLEAR GENERATING PLANT

REV 1 8/25/80
PAGE 14



MINUTES

200 / 260 / 520

BEST/ADVERSE/CONFIRM

8890

POPULATION

- 14 -

EVAC AREA

M-9

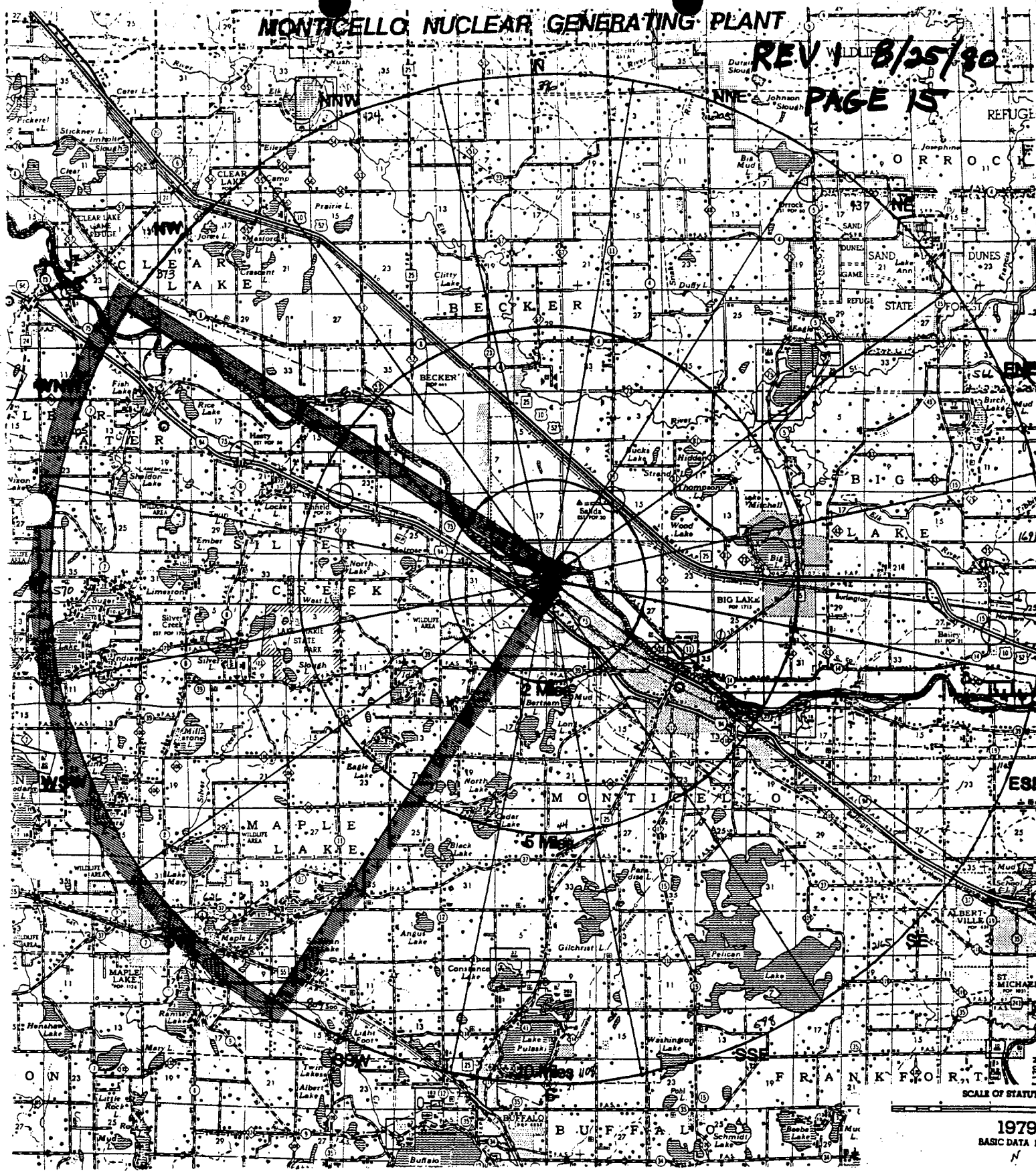
(See Table)

1979
BASIC DATA 15

MONTICELLO NUCLEAR GENERATING PLANT

REV 1 8/25/80

PAGE 15



MINUTES

80 / 100 / 120

BEST/ADVERSE/CONFIRM

3620

POPULATION

- 15 -

EVAC AREA

M-10

(See Table)

1979
BASIC DATA IS

Appendix

EVACUATION TIME ESTIMATES

Monticello Nuclear Generating Plant

<u>Exit Routes</u>	<u>Vehicles/hour Capacity (VPHC)</u>
Trunk Highway 94	1450
Trunk Highway 10	1400
Trunk Highway 25	1150
County Roads 8, 11, 37, 75	1150
County Roads 12, 15, 111	1050
County Roads 106, 117	1000
County Roads 39, 119	900
County Roads 5, 14, 23	800
County Roads 4, 43, 53, 73	600
<u>Vehicle Travel Rate:</u> 10-15 mph	