NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

DOCKET NUMBER: 50-289

FILE NUMBER:

TO:
Mr. Robert W. Reid

FROM:
Metropolitan Edison Company
Reading, Pa.
R. C. Arnold

DATE OF DOCUMENT: 7/21/76

DATE RECEIVED: 7/24/76

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DESCRIPTION

Ltr. re our 2/18/76 ltr..trans the following:

APPENDIX I DISTRIBUTION AFTER ISSUANCE OF A LICENSE

(1-P)

Plant Name:

Three Mile Island #1

ENCLOSURE

Furnishing responses to questions raised in enclosure 2 of the N.R.C.'s 2/18/76 ltr. to TMI-1 concerning Appendix I.

(27-P)

FOR ACTION/INFORMATION 7/26/76 RJL

	ASSIGNED AD:			ASSIGNED AD:	
✓	BRANCH CHIEF: (3)	Reid		BRANCH CHIEF:	
✓	PROJECT MANAGER:	Bridges		PROJECT MANAGER:	
✓	LIC. ASST.:	Ingram		LIC. ASST.:	

INTERNAL DISTRIBUTION

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✓	NRC PDR		HEINEMAN		TEDESCO		ERNST
✓	I & E (2)		SCHROEDER		BENAROYA	✓	BALLARD
✓	OELD				LAINAS		SPANGLER
✓	GOSSICK & STAFF		ENGINEERING		IPPOLITO		
	MIPC		MCCARY				SITE TECH
	CASE		KNIGHT		OPERATING REACTORS	✓	CAMPBELL
	HANAUER		SIHWEIL		STELLO		STEPP
	HARLESS		PAWLICKI			✓	HUTMAN
					OPERATING TECH	✓	MARKEE
	PROJECT MANAGEMENT		REACTOR SAFETY		EISENHUT		SITE ANALYSIS
	BOYD		ROSS		SHAO		VOLLMER
	P COLLINS		NOVAK		BAER		BUNCH
	HOUSTON		ROSZTOCZY		BUTLER	✓	J. COLLINS (2)
	PETERSON		CHECK	✓	GRIMES	✓	KREGER
	MELTZ					✓	VERDERY
	HELTEMES		AT & I		SITE SAFETY & ENVIRO		
	SKOVHOLT		SALTZMAN		ANALYSIS		
			RUTBERG	✓	DENTON & MULLER - 4P		

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CONTROL NUMBER

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NRC FORM 195 (2-76)

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METROPOLITAN EDISON COMPANY

POST OFFICE BOX 542 READING, PENNSYLVANIA 19603 TELEPHONE 215 – 929-3601

July 21, 1976
GQL 0998

Director of Nuclear Reactor Regulation
Attn: Robert W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Reid:

Three Mile Island Nuclear Station Unit No. 1
Docket Number 50-289

Enclosed please find forty (40) copies of our response to Enclosure 2 of your letter of February 18, 1976 concerning Appendix I to 10 CFR Part 50. We have sent under separate cover six (6) copies of a document entitled, "Meterological Information and Diffusion Estimates to Conform with Appendix I Requirements". This data was used to perform the Appendix I Analyses for both Three Mile Island Units 1 and 2.

It is our opinion that these submittals answer all outstanding questions with respect to Appendix I for Three Mile Island Unit 1.

Sincerely,

R. C. Arnold
Vice President

RCA:JJM:tas

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Errata Sheet to responses to questions raised in Enclosure 2 of the NRC's 2-18-76 letter to TMI-1 concerning Appendix I

The following changes should be made to the above referenced document. These errors were inadvertently over looked in the initial printing.

Question 2a - typo change "nearest mile cow...." to "nearest milk cow...."

Responses to questions 3, 4, 5 and 7 indicate that meteorological information is attached. This information was sent under separate cover, GQL 0998.

RESPONSES TO QUESTIONS RAISED IN ENCLOSURE 2 OF THE NRC'S 2-18-76 LETTER TO TMI-1 CONCERNING APPENDIX I

QUESTION 1

Provide the information requested in Appendix D of Draft Regulatory Guide 1.BB or 1.CC, as appropriate.

RESPONSE

The analysis submitted on 6/4/76 contains the necessary information required by Draft Regulatory Guide 1.BB.

QUESTION 2

Provide, in tabular form, the distances from the centerline of the first nuclear unit to the following for each of the 22-1/2 degree radial sectors centered on the 16 cardinal compass directions.

a. Nearest mile cow (to a distance of 5 miles)
b. Nearest meat animal (to a distance of 5 miles)
c. Nearest milk goat (to a distance of 5 miles)
d. Nearest residence (to a distance of 5 miles)
e. Nearest vegetable garden greater than 500 ft^2 (to a distance of 5 miles)
f. Nearest site boundary.

For radioactivity releases from stacks which qualify as elevated releases as defined in Draft Regulatory Guide 1.DD, identify the locations of all milk cows, milk goats, meat animals, residences, and vegetable gardens, in a similar manner, out to a distance of 3 miles for each radial sector.

RESPONSE

See attached Table 2-1.

QUESTION 3

Based on considerations in Draft Regulatory Guide 1.DD, provide estimates of relative concentration (X/Q) and deposition (D/Q) at locations specified in response to item 2 above for each release point specified in response to item 1 above.

RESPONSE

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See Tables 1.3-11A to 1.3-14B of attached Meteorological Information for Three Mile Island Units 1 & 2.

QUESTION 4

Provide a detailed description of the meteorological data, models and parameters used to determine the X/Q and D/Q values. Include information concerning the validity and accuracy of the models and assumptions for your site and the representativeness of the meteorological data used.

RESPONSE

See Sections 1.1, 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.2.1, 1.2.2, 1.2.3, 1.3, 1.32 & 1.3.3 and Tables 1.1-1, 1.1-4, 1.3-2, 1.3-3, 1.3-4 and 1.3-5 of attached Meteorological Information for Three Mile Island Units 1 & 2.

QUESTION 5

If an onsite program commensurate with the recommendations and intent of Regulatory Guide 1.23 exists:

a. Provide representative annual and monthly, if available, joint frequency distributions of wind speed and direction by atmospheric stability class covering at least the most recent one year period of record, preferably two or more years of record. Wind speed and direction should be measured at levels applicable to release point elevations and stability should be determined from the vertical temperature gradient between measurement levels that represent conditions into which the effluent is released.

b. Describe the representativeness of the available data with respect to expected long-term conditions at the site.

RESPONSE

a. See Tables 1.1-2 and 1.1-3 of attached Meteorological Information for Three Mile Island Units 1 & 2.

b. See Section 1.1-4 of attached Meteorological Information for Three Mile Island Units 1 & 2.

QUESTION 6

If recent onsite meteorological data are not available, or if the meteorological measurements program does not meet the recommendations and intent of Regulatory Guide 1.23:

a. Provide the best available meteorological data in the format described in item 5.a above.

b. Describe the representativeness of the available data with respect to onsite and near site atmospheric transport and diffusion conditions, and with respect to expected long term conditions at and near the site.

QUESTION 6 (Cont'd.)

c. Provide a description of the meteorological measurements used for collection of the data presented. This description should include the location of the sensors with respect to the power plant(s) and other prominent topographic features (including buildings) and accuracy of the instrumentation.

d. Provide a commitment to establish a program to meet the recommendations and intent of Regulatory Guide 1.23, or provide sufficient justification to allow the present program to remain unchanged.

RESPONSE

Since acceptable onsite meteorological data is available for Three Mile Island Unit 1,tthe Applicant will not respond to this question.

QUESTION 7

Describe airflow trajectory regimes of importance in transporting effluents to the locations for which dose calculations are made.

RESPONSE

See Sections 1.1.5, 1.2.2 and 1.2.3 of attached Meteorological Information for Three Mile Island Units 1 & 2.

QUESTION 8

Provide a map showing the detailed topographical features (as modified by the plant) on a large scale, within a 10-mile radius of the plant and a plot of the maximum topographic elevation versus distance from the center of the plant in each of the sixteen 22-1/2 degree cardinal compass point sectors (centered on true north), radiating from the center of the plant, to a distance of 10 miles.

RESPONSE

See attached Table 8-1 and Figures 8-1 through 8-16.

QUESTION 9

Provide the dates and times of radioactivity releases from intermittant sources by source location based on actual plant operation and, if available, appropriate hourly meteorological data (i.e., wind direction and speed, and atmospheric stability) during each period of release.

RESPONSE

Since it is our understanding that the first full year of effluent release data is not considered representative, we are enclosing copies of the effluent release data contained in the Semi-Annual Reports for 1975 at Three Mile Island Unit 1.

TABLE 2-1

THREE MILE ISLAND NUCLEAR GENERATING STATION

Sector	Milk		Meat Animal	Residence	Vegetable Garden	Site Boundary
	Cow	Goat				
1. N	2.00	1.02	1.02	.94	1.0	1,248
2. NNE	2.34	2.34	1.8	.73	.73	1,690
3. NE	2.28	3.20	1.5	.53	.53	1,300
4. ENE	1.05	-	1.05	.45	.45	1,105
5. E	1.0	-	.81	.43	.81	1,072
6. ESE	2.33	-	2.2	1.32	1.32	1,105
7. SE	1.2	4.62	1.0	.79	.79	1,241
8. SSE	-	-	1.8	.79	.79	1,690
9. S	-	-	3.2	2.26	2.26	1,690
10. SSW	4.86	4.91	2.7	.58	.58	1,040
11. SW	-	-	2.5	.54	.54	715
12. WSW	4.03	4.40	3.3	.45	.45	585
13. W	-	-	2.8	.37	.37	585
14. WNW	2.68	3.23	2.0	.37	.37	585
15. NW	-	-	2.5	.42	.42	650
16. NNW	-	-	4.2	.41	.41	715

NOTE: All the above figures are in miles, except for site boundary, which is in feet.

MAXIMUM TOPOGRAPHIC ELEVATIONS FOR

THREE MILE ISLAND UNITS 1 & 2

TABLE 8-1

	DISTANCE IN MILES									
Sector	1	2	3	4	5	6	7	8	9	10
N	330	520	420	420	500	540	500	540	500	540
NNE	340	520	520	520	900	900	760	820	700	420
NE	360	500	540	560	760	760	820	760	540	660
ENE	360	420	480	440	440	560	520	500	560	550
E	360	400	440	560	640	640	600	580	620	620
ESE	380	460	540	560	640	640	640	540	460	450
SE	400	480	520	500	500	480	420	480	680	940
SSE	380	500	480	380	440	540	580	660	700	1020
S	300	280	515	580	440	480	500	715	725	560
SSW	300	300	500	535	460	680	760	760	560	540
SW	300	460	545	760	645	740	1040	920	1040	1100
WSW	300	520	560	720	790	660	785	785	1000	1100
W	300	520	500	500	760	850	980	1050	840	940
WNW	300	480	615	830	965	880	825	1040	940	600
NW	300	480	600	700	680	590	550	510	515	490
NNW	300	505	320	360	540	580	590	620	520	520

FIGURE 8-1

THREE MILE ISLAND UNITS 1 & 2

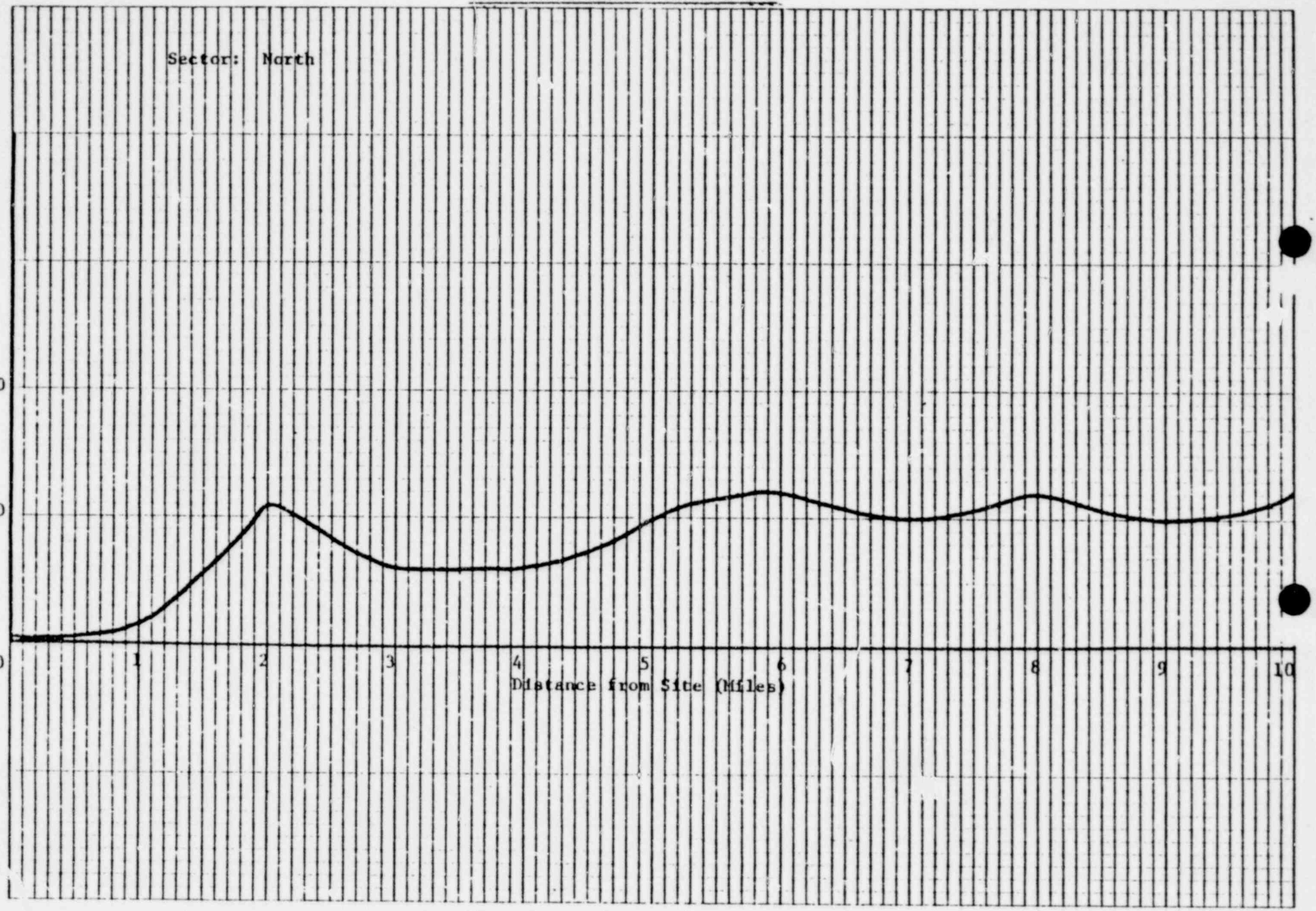

FIGURE 8-2

THREE MILE ISLAND UNITS 1 & 2

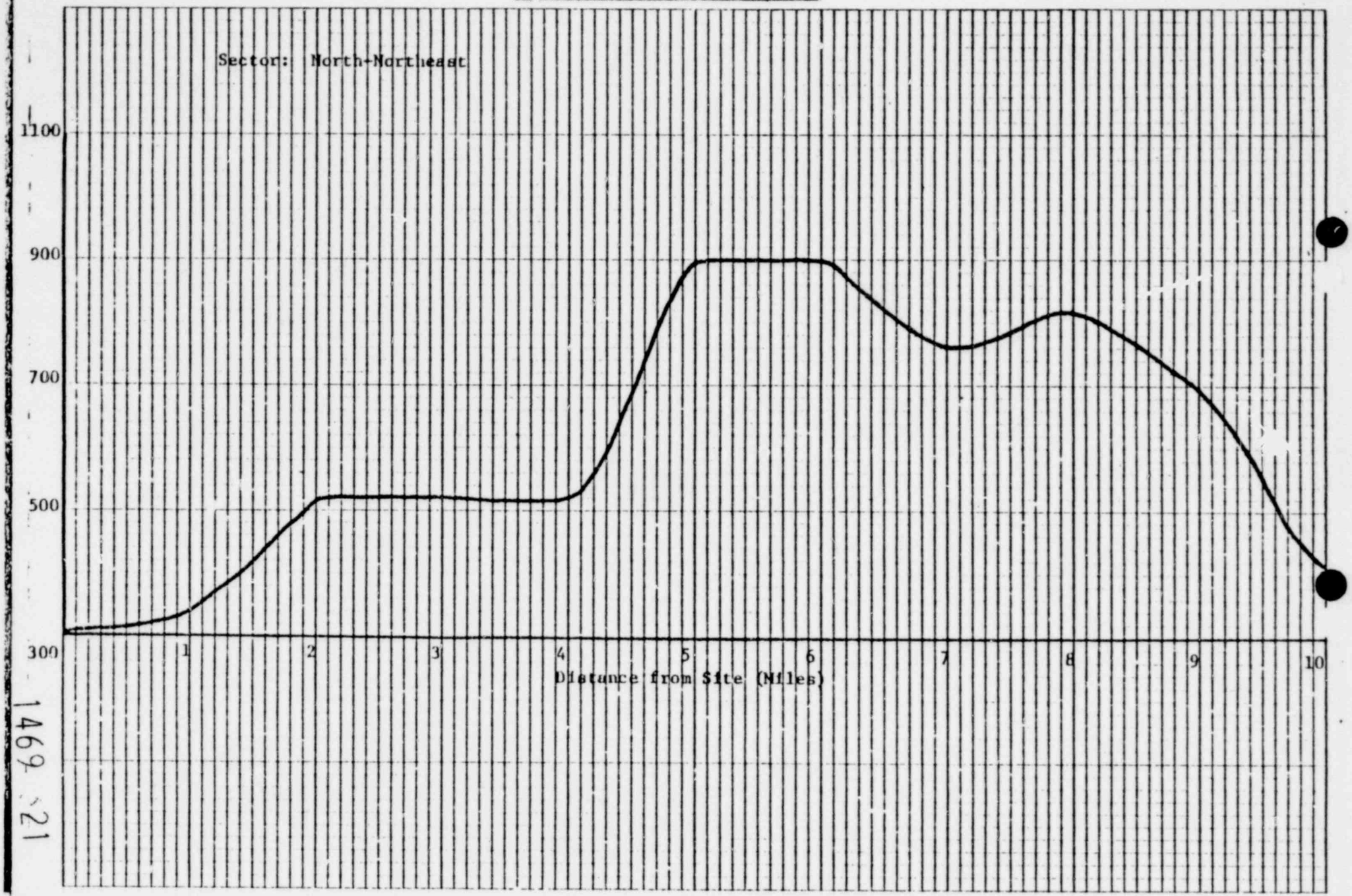

FIGURE 8-3

THREE MILE ISLAND UNITS 1 & 2

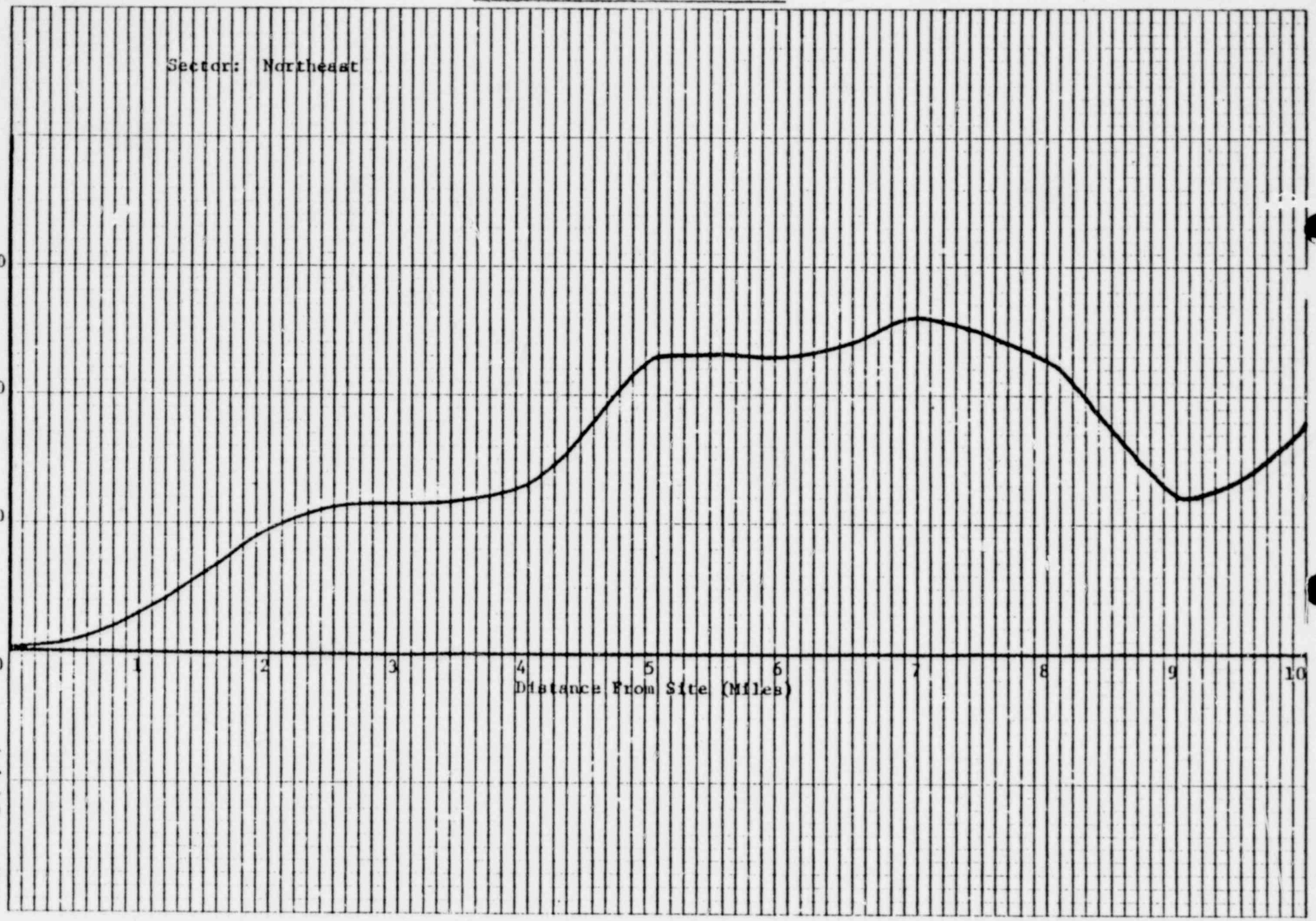

FIGURE 8-4

THREE MILE ISLAND UNITS 1 & 2

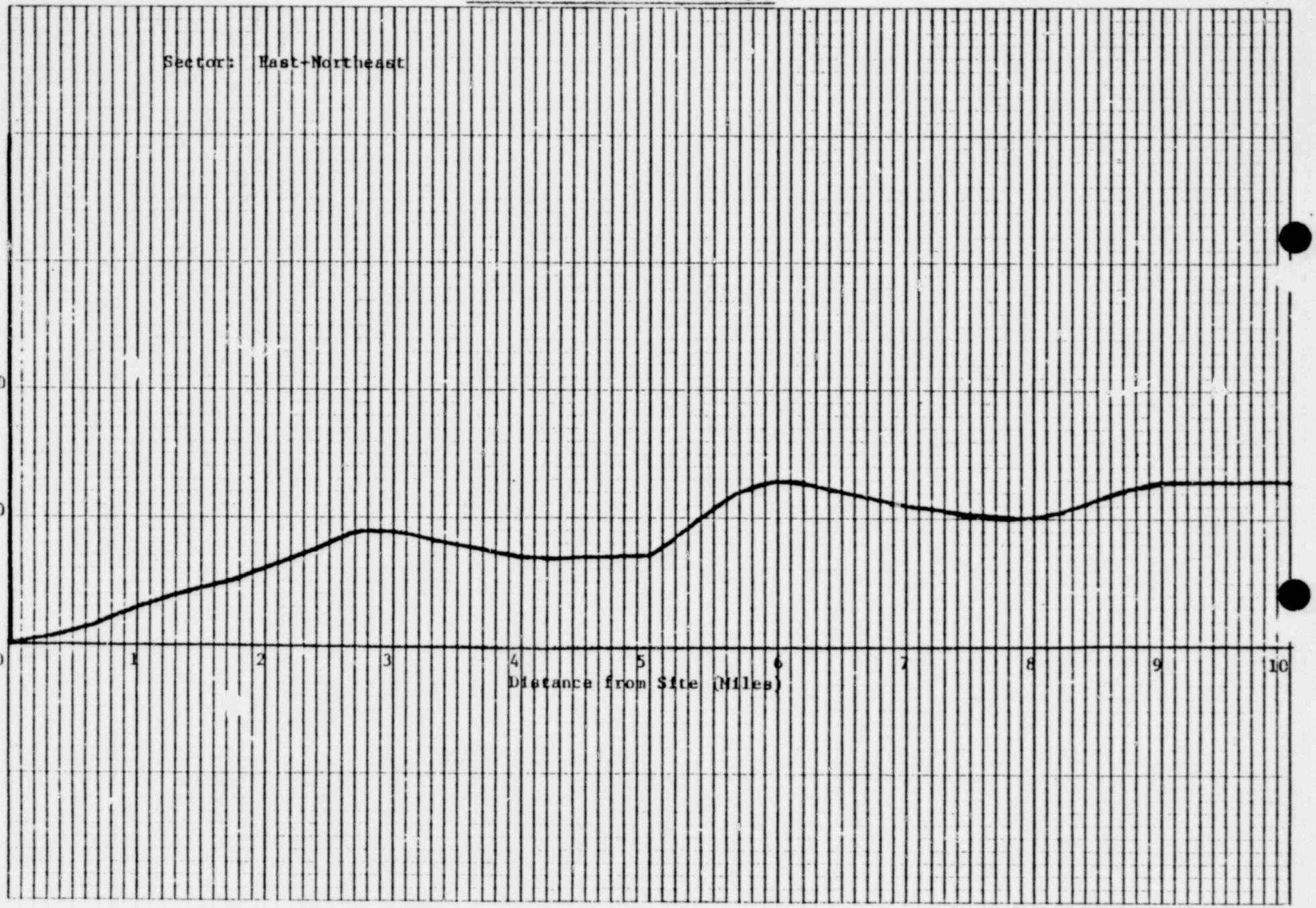

FIGURE 8-5

THREE MILE ISLAND UNITS 1 & 2

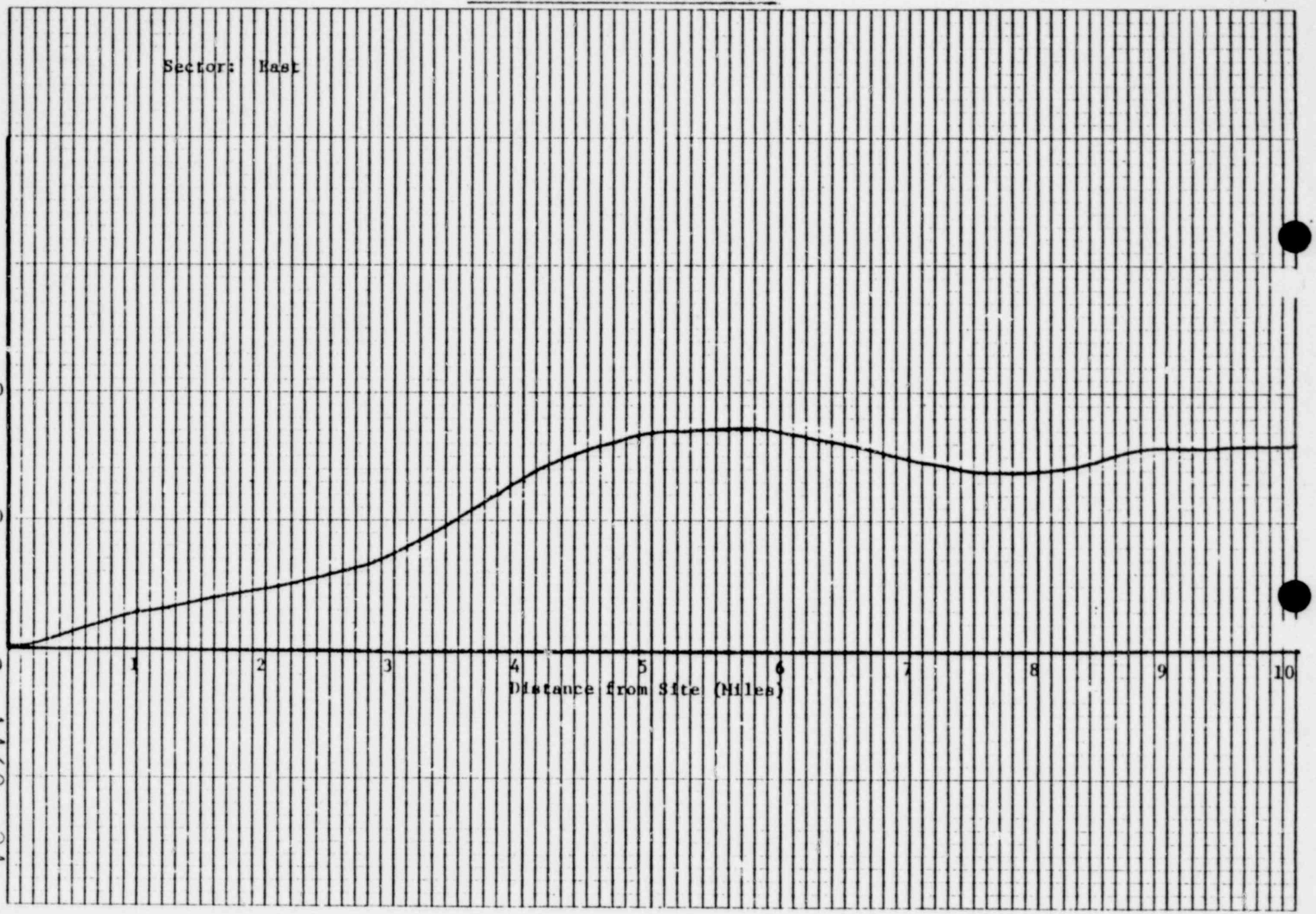

FIGURE 8-6

THREE MILE ISLAND UNITS 1 & 2

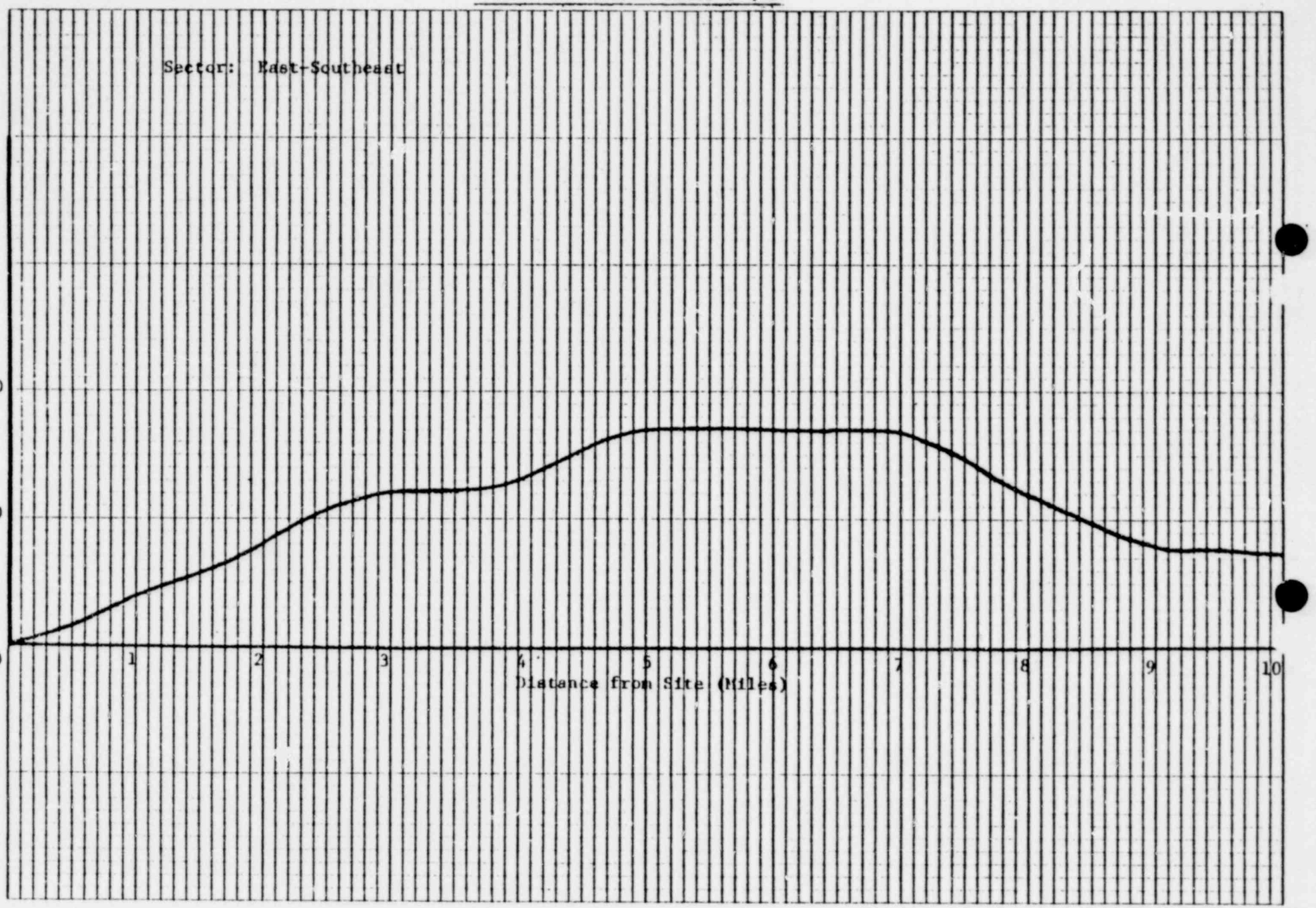

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FIGURE 8-7

THREE MILE ISLAND UNITS 1 & 2

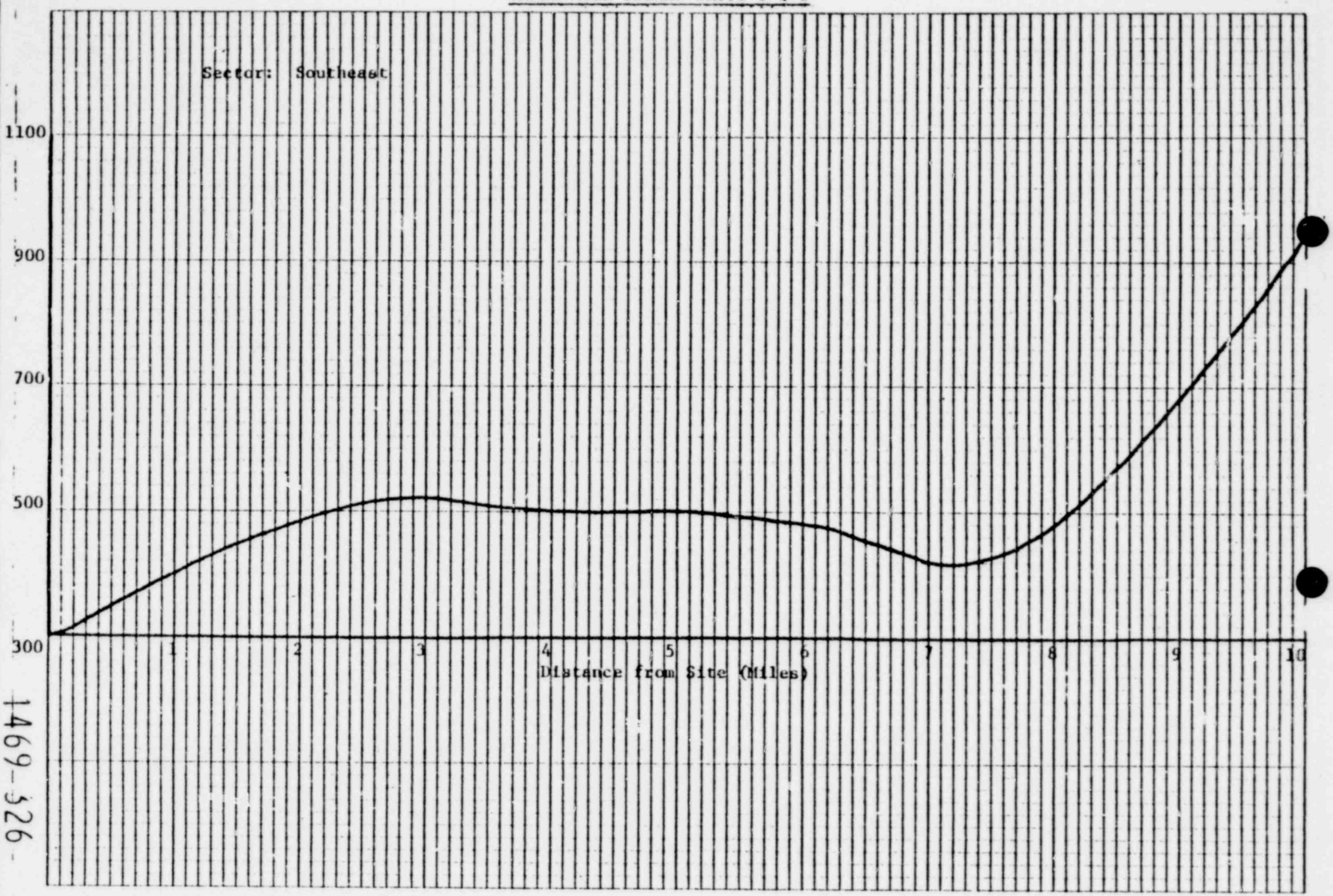

FIGURE 8-8

THREE MILE ISLAND UNITS 1 & 2

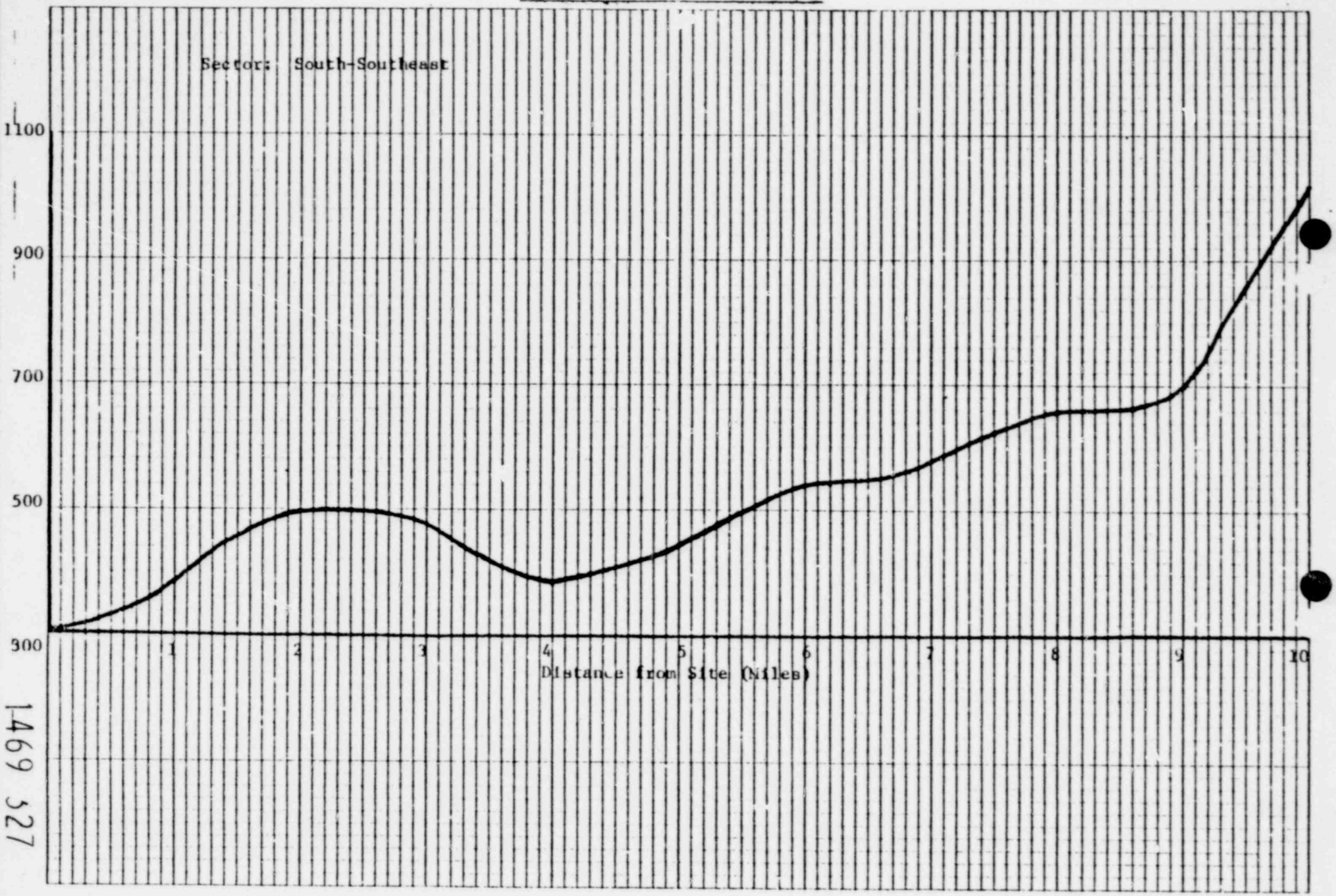

FIGURE 8-9

THREE MILE ISLAND UNITS 1 & 2

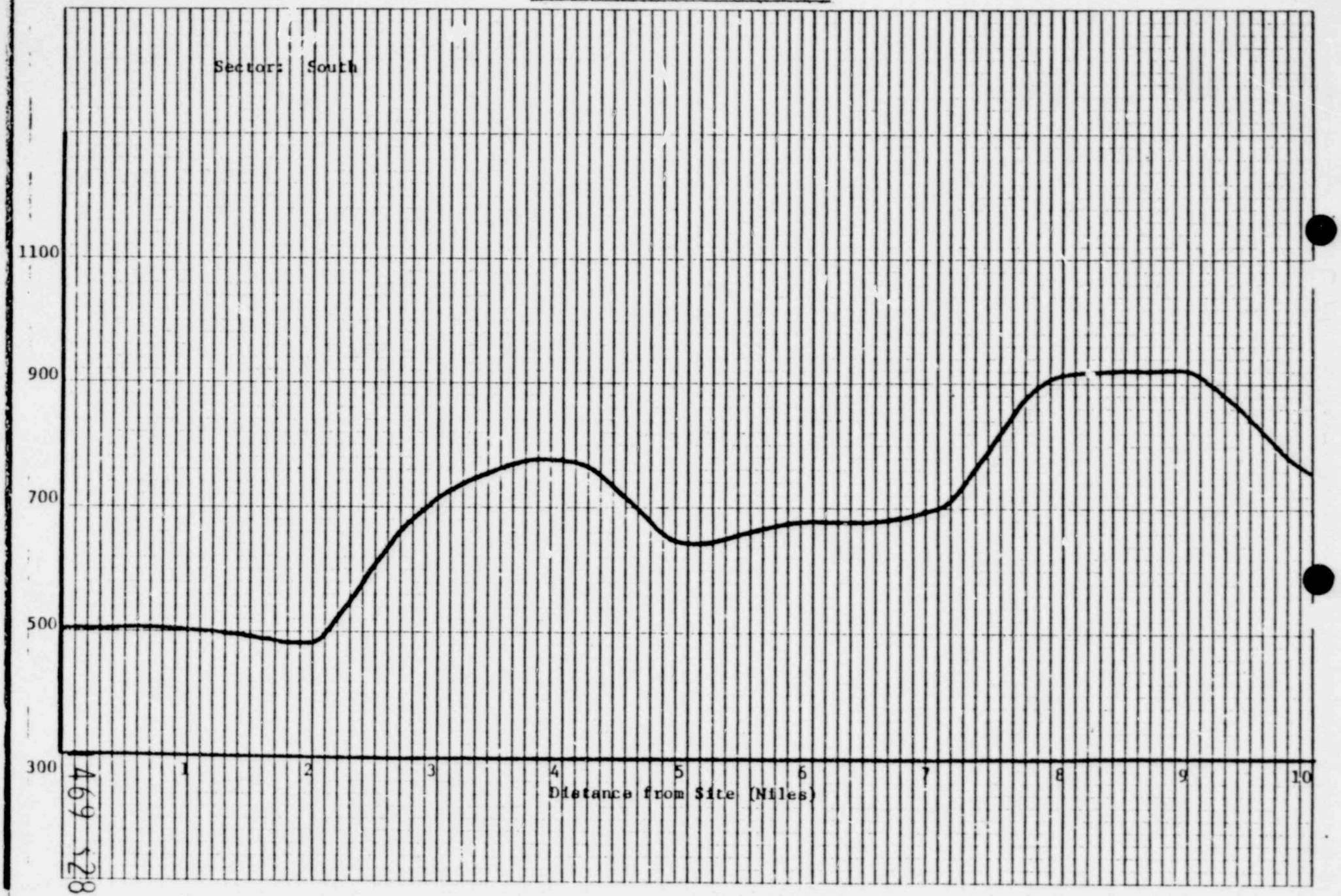

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FIGURE 8-10

THREE MILE ISLAND UNITS 1 & 2

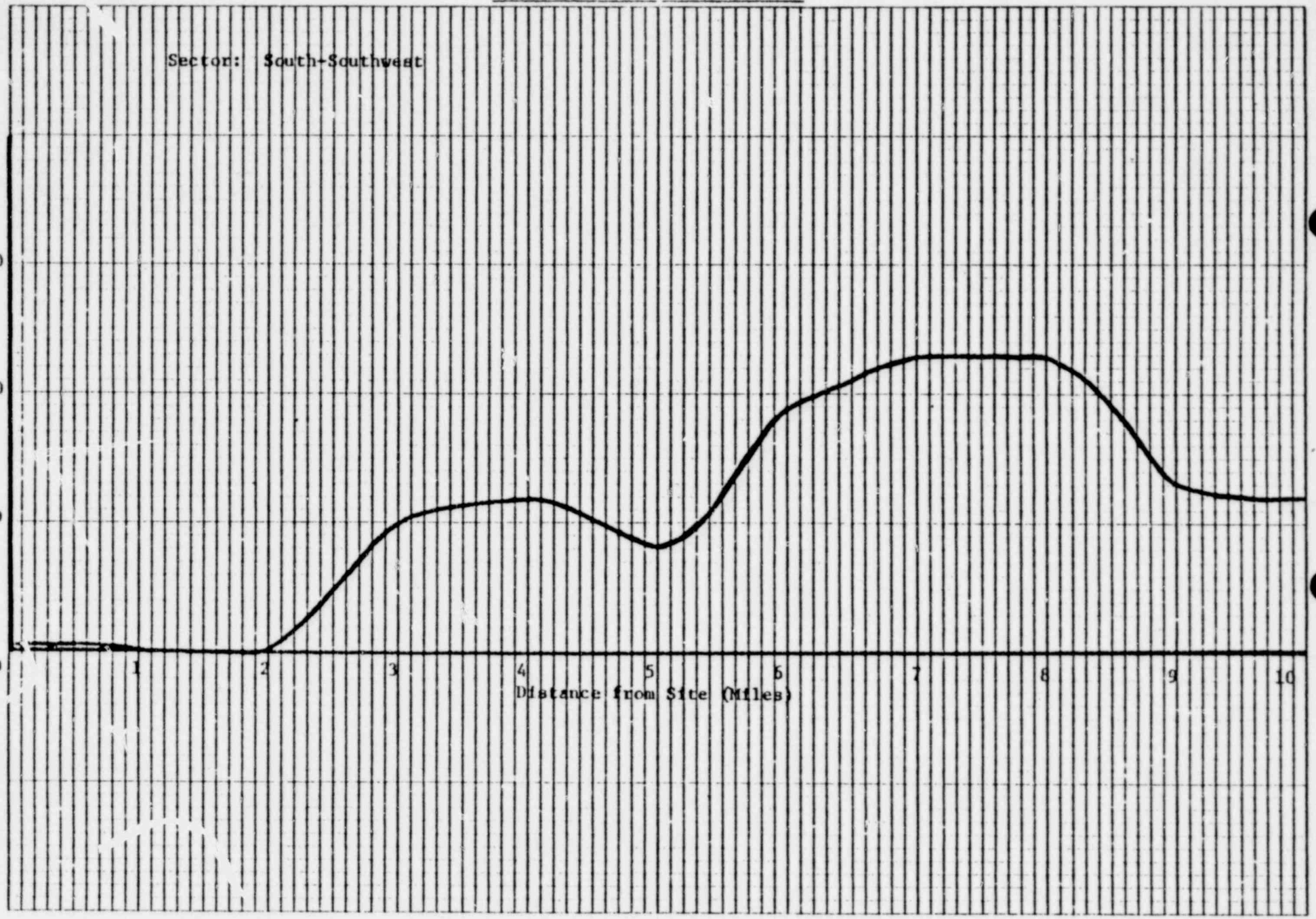

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FIGURE 8-11

THREE MILE ISLAND UNITS 1 & 2

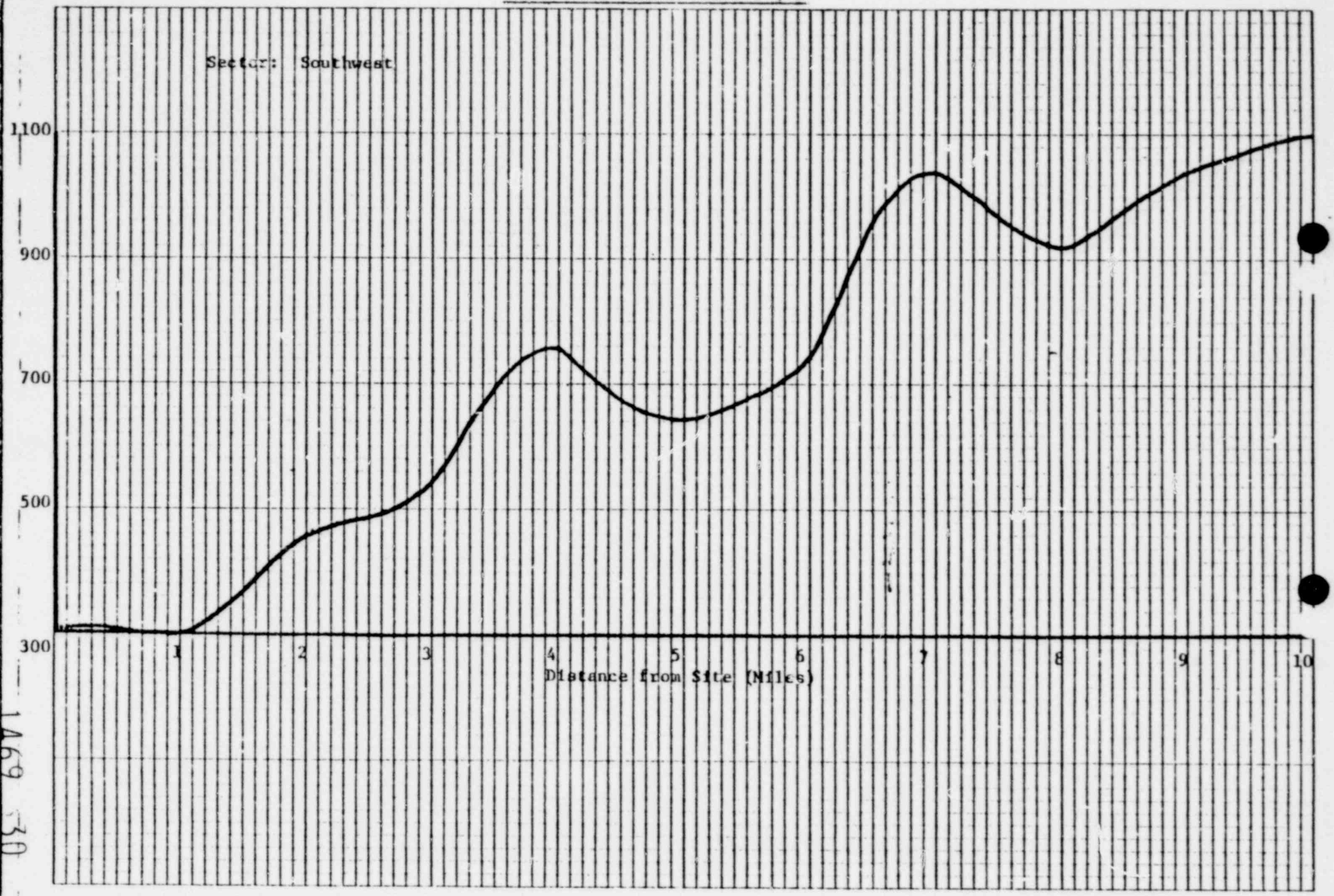

FIGURE 8-12

THREE MILE ISLAND UNITS 1 & 2

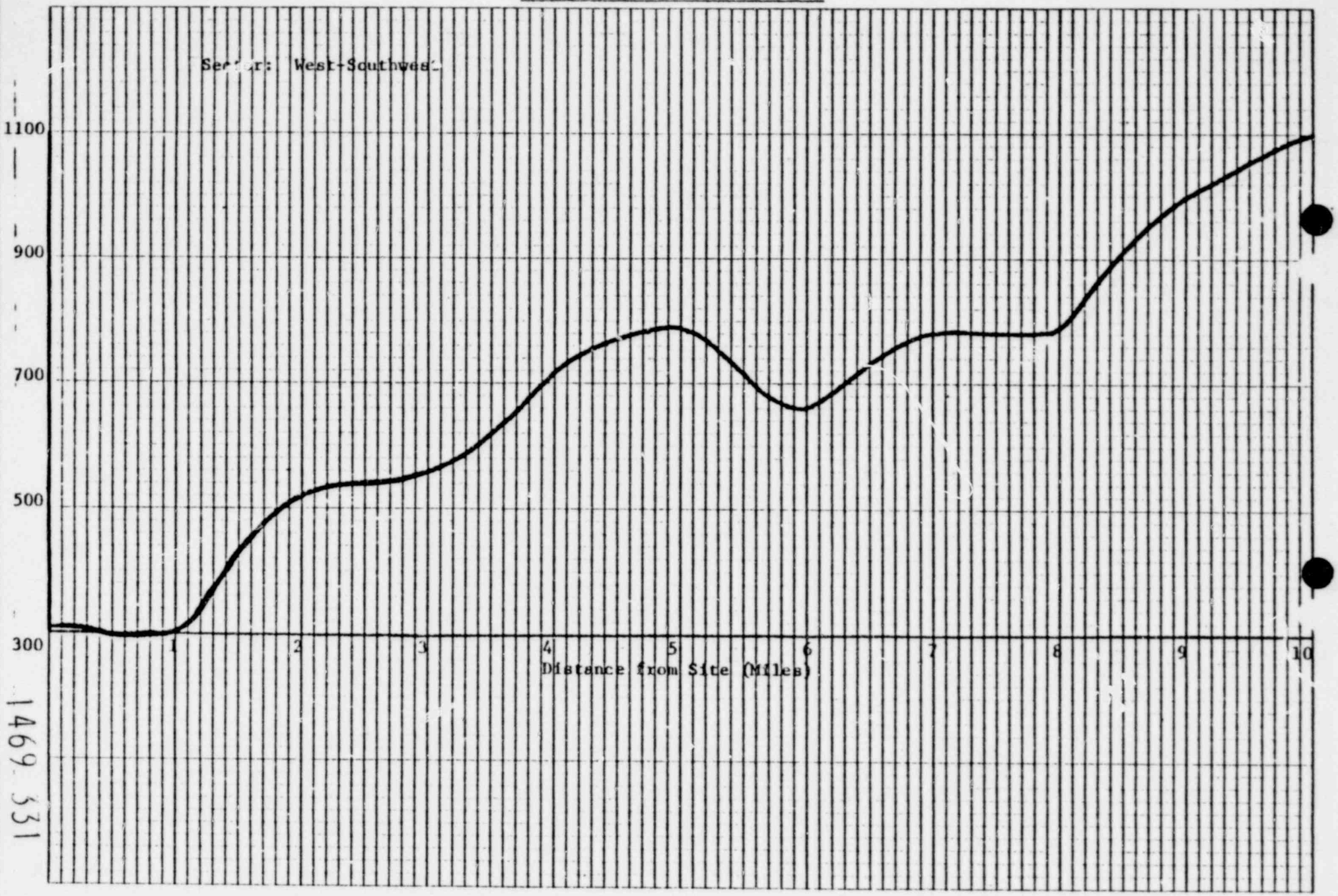

FIGURE 8-13

THREE MILE ISLAND UNITS 1 & 2

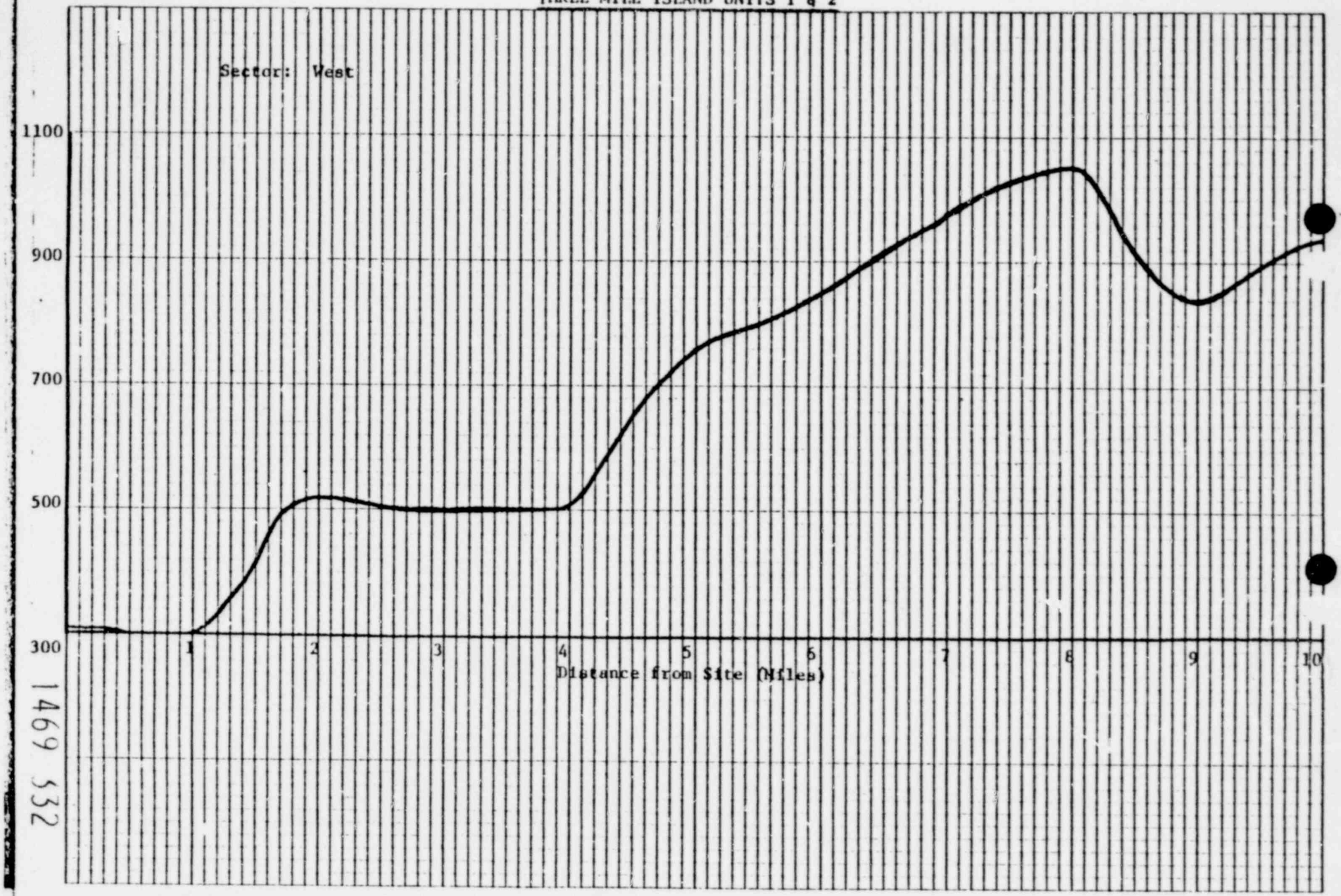

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FIGURE 8-14

THREE MILE ISLAND UNITS 1 & 2

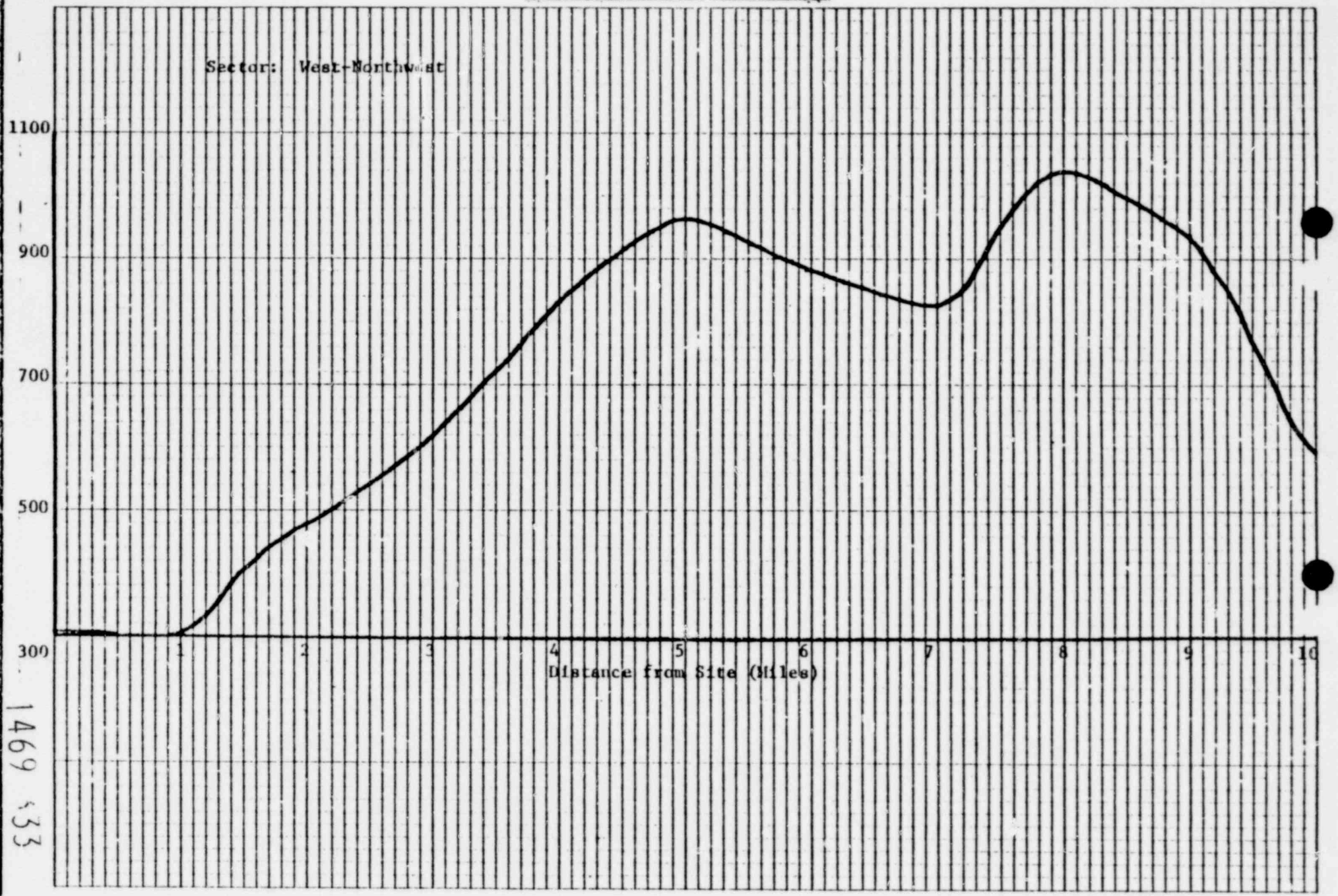


FIGURE 8-15

THREE MILE ISLAND UNITS 1 & 2

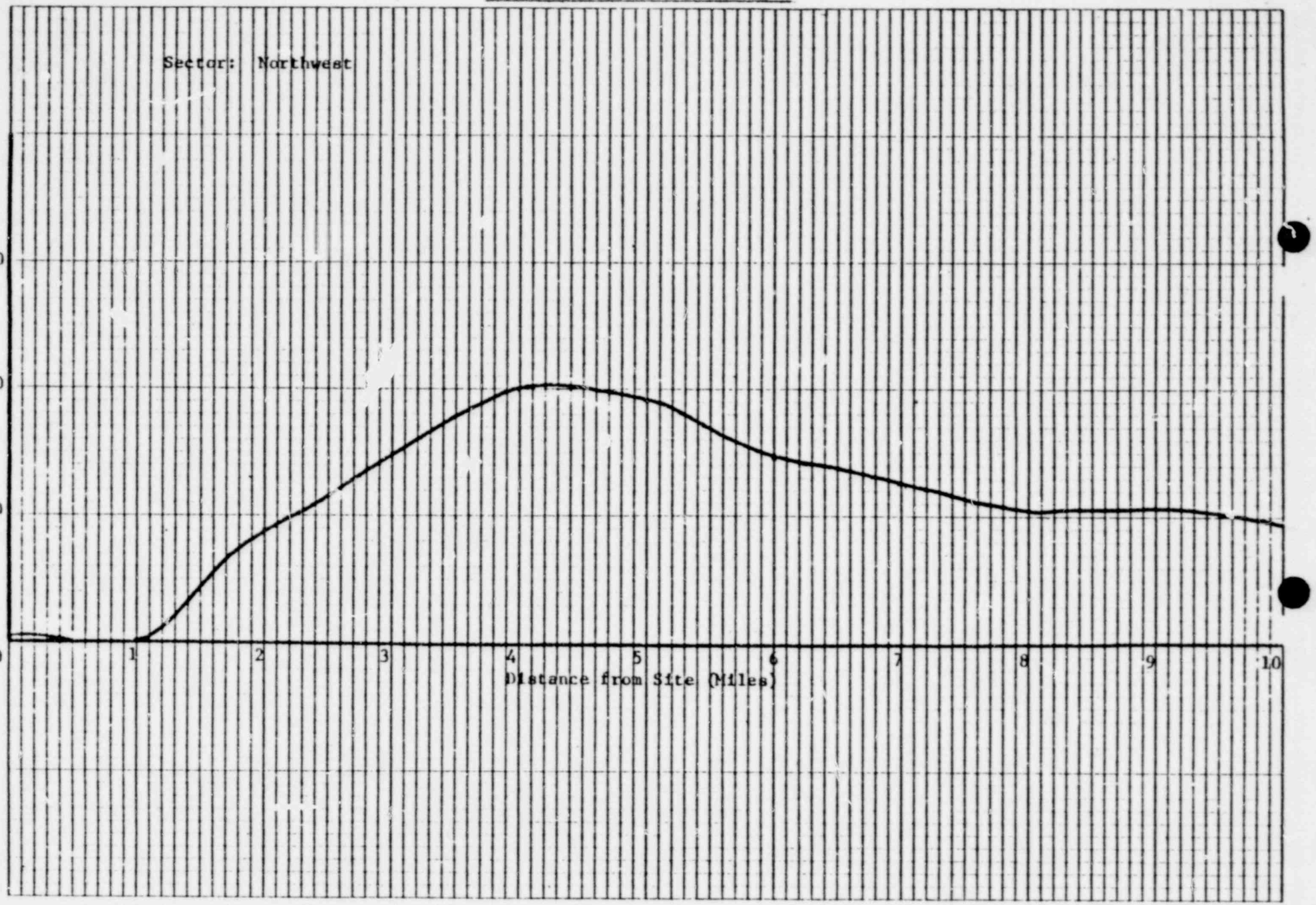
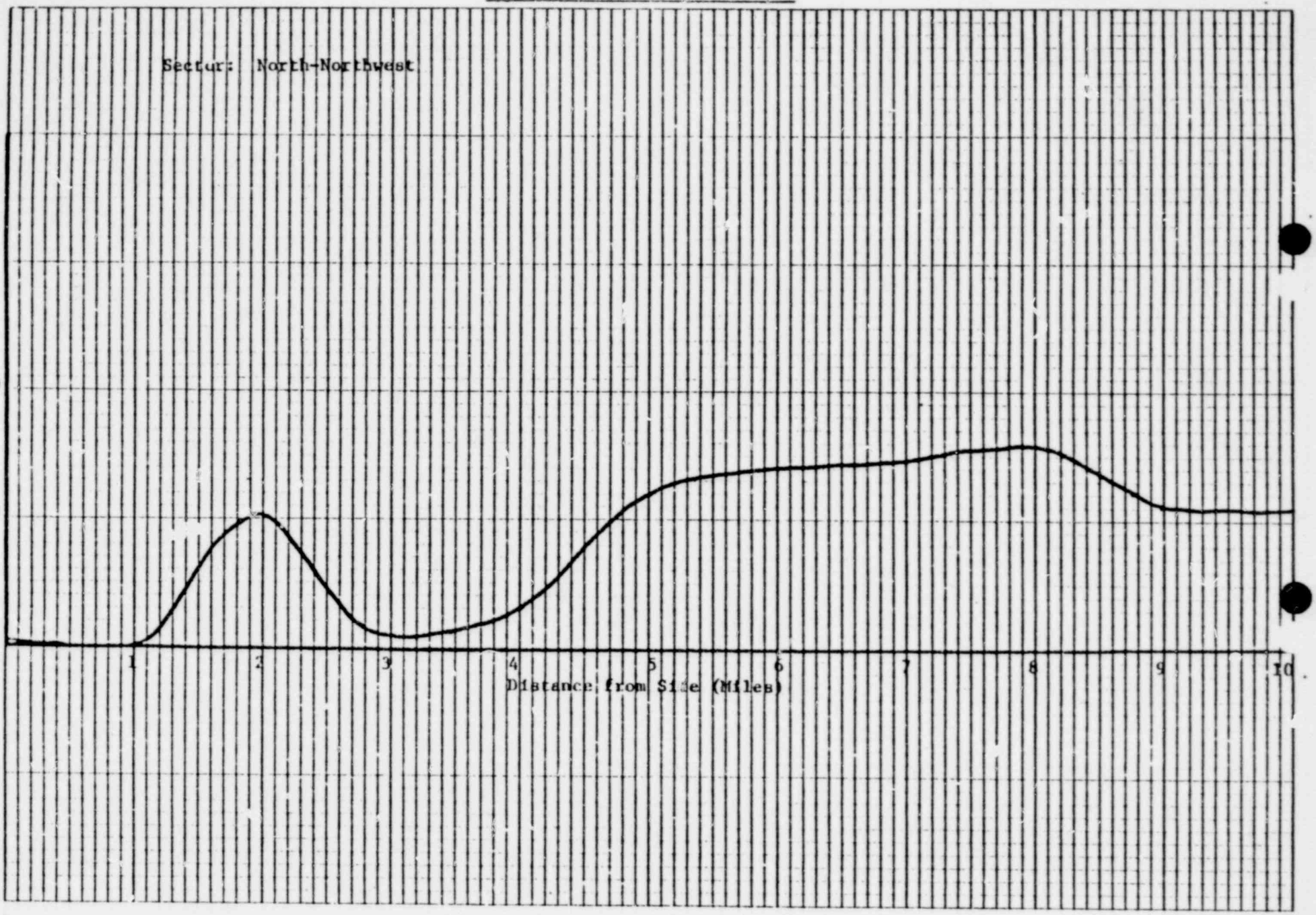


FIGURE 8-16

THREE MILE ISLAND UNITS 1 & 2



TMI Nuclear Station Unit #1
Year 1975

REPORTS OF RADIOACTIVE EFFLUENTS
(Table 6.1)

I. LIQUID RELEASES	UNIT	MONTH JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
1. GROSS RADIOACTIVITY - (β,γ) (Includes Dissolved Noble Gases)								
a. Total Release	Curies	5.89E-02	1.90E-01	2.29E-01	1.49E-01	1.83E-01	2.03E-01	1.01E+00
b. Average Concentration Released	µCi/ml	2.31E-08	1.06E-07	5.47E-08	3.50E-08	4.29E-08	1.99E-07	5.58E-08
c. Maximum Concentration Released	µCi/ml	6.65E-07	2.27E-07	3.27E-07	2.12E-07	1.21E-06	2.44E-07	1.21E-06
2. TRITIUM - (Determined from measurement of each batch)								
a. Total Release	Curies	2.25E+01	6.70E+01	4.28E+01	4.56E+01	1.54E+01	2.03E+01	2.14E+02
b. Average Concentration Released	µCi/ml	8.82E-06	3.76E-05	1.02E-05	1.07E-05	3.61E-06	1.99E-05	1.18E-05
3. DISSOLVED NOBLE GASES - (Determined from measurement of each batch)								
a. Total Release	Curies	4.18E-02	1.85E-01	2.25E-01	1.41E-01	1.75E-01	1.94E-01	9.62E-01
b. Average Concentration Released	µCi/ml	1.64E-08	1.04E-07	5.37E-08	3.32E-08	4.09E-08	1.90E-07	5.31E-08
4. GROSS ALPHA RADIOACTIVITY - (Determined from measurement of monthly composite of all tanks)								
a. Total Release	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
b. Average Concentration Released	µCi/ml	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
5. VOLUME OF LIQUID WASTE TO DISCHARGE CANAL	Liters	2.24E+05	6.31E+05	4.37E+05	8.08E+05	5.16E+05	6.68E+05	3.28E+06
6. VOLUME OF DILUTION WATER	Liters	2.55E+09	1.78E+09	4.19E+09	4.25E+09	4.27E+09	1.02E+09	1.81E+10

TMI Nuclear Station Unit #1
Year 1975

REPORTS OF RADIOACTIVE EFFLUENTS
(Table 6.1)

I. LIQUID RELEASES	UNIT	MONTH JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
7. ISOTOPES RELEASED - (Determined from measurement of each batch released except Sr-89 & Sr-90 which are determined from measurement of monthly composite of all tanks)								
Ba-La-140	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Sr-89	Curies	< MDA	2.09E-05	2.89E-06	6.35E-06	< MDA	3.66E-04	3.96E-0
Na-24	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Sr-90	Curies	< MDA	3.90E-06	< MDA	< MDA	< MDA	1.09E-04	1.13E-04
I-131	Curies	2.49E-04	1.33E-04	3.58E-04	1.04E-03	8.43E-04	1.00E-03	3.62E-03
Xe-133	Curies	3.97E-02	1.80E-01	2.10E-01	1.38E-01	1.73E-01	1.87E-01	9.28E-01
Xe-135	Curies	4.72E-04	3.48E-03	1.25E-02	1.45E-03	1.03E-03	4.81E-03	2.37E-02
Cs-137	Curies	2.51E-05	1.23E-04	2.99E-04	1.03E-03	6.11E-04	8.24E-04	2.91E-03
Cs-134	Curies	< MDA	< MDA	< MDA	1.84E-04	< MDA	1.10E-04	2.94E-04
Mo-99	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Co-60	Curies	2.37E-04	7.96E-05	1.00E-04	2.77E-04	2.43E-03	4.85E-04	3.61E-03
Co-58	Curies	1.63E-02	3.38E-03	3.49E-03	5.01E-03	4.24E-03	6.14E-03	3.86E-02
Zr-97	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Cr-51	Curies	< MDA	6.67E-04	< MDA	1.93E-04	1.06E-04	1.02E-04	1.07E-03
Mn-54	Curies	1.25E-04	8.67E-05	1.30E-04	2.25E-04	1.53E-04	3.47E-04	1.07E-03
Zn-65	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Cs-136	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Fe-59	Curies	1.91E-04	1.07E-04	3.84E-05	2.93E-05	< MDA	6.37E-05	4.29E-0
Zr-95	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	1.52E-04	1.52E-04
Nb-95	Curies	< MDA	2.49E-06	< MDA	2.44E-05	4.74E-05	3.09E-04	3.83E-04
Xe-133m	Curies	3.70E-04	1.77E-03	2.58E-03	1.15E-03	7.82E-04	1.85E-03	8.50E-03
Kr-85	Curies	1.22E-03	< MDA	< MDA	< MDA	< MDA	< MDA	1.22E-03
8. PERCENT OF TECHNICAL SPECIFICATION LIMIT FOR TOTAL ACTIVITY RELEASED - (Exclude H-3 & Dissolved Noble Gases: Limit 10 Ci/QTR)	%	1.7E-01	5.0E-02	4.0E-02	8.0E-02	8.0E-02	9.0E-02	5.8E-01

TMI Nuclear Station Unit #1
Year 1975

REPORTS OF RADIOACTIVE EFFLUENTS
(Table 6.1)

II. AIRBORNE RELEASES	UNIT	MONTH JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
1. TOTAL NOBLE GASES	Curies	2.10E+02	2.60E+02	3.77E+02	2.50E+02	5.88E+02	8.27E+02	2.51E+03
2. TOTAL HALOGENS	Curies	2.14E-05	2.39E-10	< MDA	4.34E-05	9.97E-05	2.02E-04	3.67E-04
3. TOTAL PARTICULATE, GROSS RADIOACTIVITY (β,γ)	Curies	1.71E-10	4.01E-09	1.61E-07	8.03E-05	1.19E-05	< MDA	9.22E-05
4. TOTAL TRITIUM	Curies	3.98E+00	5.53E+00	8.34E+00	1.13E+00	1.63E+00	1.12E+00	2.17E+01
5. TOTAL PARTICULATE GROSS ALPHA RADIOACTIVITY	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
6. MAXIMUM NOBLE GAS RELEASE RATE	µCi/sec	7.92E+03	1.60E+04	1.50E+04	7.85E+03	1.24E+04	4.68E+05	4.68E+05
7a. PERCENT OF APPLICABLE LIMIT FOR: Noble Gases (Limit: $\Sigma Q_i / MPC_i$ - 4.8×10^3 m^3/sec avg over QTR)	%	2.10E+00	2.67E+00	4.74E+00	4.29E+00	5.45E+00	9.46E+00	N/A
7b. PERCENT OF APPLICABLE LIMIT FOR: Halogens & Particulates (Limit: 0.024 µCi/sec avg. over QTR)	%	1.14E-02	2.25E-05	6.62E-02	5.98E-02	1.47E-03	1.06E-01	N/A
8a. ISOTOPE RELEASED: Particulates								
Cs-137	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Ba-La-140	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Sr-90 - (Determined from monthly composite)	Curies	9.78E-12	< MDA	< MDA	< MDA	< MDA	< MDA	9.78E-12
Cs-134	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Sr-89 - (Determined from monthly composite)	Curies	< MDA	< MDA	1.61E-07	< MDA	< MDA	< MDA	1.61E-07

TMI Nuclear Station Unit #1
Year 1975

REPORTS OF RADIOACTIVE EFFLUENTS
(Table 6.1)

II. AIRBORNE RELEASES	UNIT	MONTH JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
Co-60	Curies	< MDA	1.40E-09	< MDA	< MDA	< MDA	< MDA	1.40E-09
Co-58	Curies	1.61E-10	4.99E-10	< MDA	8.03E-05	1.19E-05	< MDA	9.22E-05
Cr-51	Curies	< MDA	1.64E-09	< MDA	< MDA	< MDA	< MDA	1.64E-09
Mn-54	Curies	< MDA	4.67E-10	< MDA	< MDA	< MDA	< MDA	4.67E-10
8b. ISOTOPE RELEASED: Halogens								
I-131	Curies	2.14E-05	2.39E-10	< MDA	4.34E-05	9.97E-05	2.02E-04	3.66E-04
I-132	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
I-133	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
I-135	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
8c. ISOTOPE RELEASED: Gases								
Kr-85	Curies	< MDA	3.64E-02	< MDA	< MDA	1.62E-01	8.75E-02	2.86E-01
Kr-85m	Curies	< MDA	4.54E-01	6.30E-01	3.31E-01	4.29E-01	2.46E-01	2.09E+00
Kr-87	Curies	< MDA	< MDA	2.11E-02	< MDA	2.52E-02	< MDA	4.63E-02
Kr-88	Curies	< MDA	< MDA	2.22E-01	1.25E-01	1.34E-01	2.48E-02	5.06E-01
Xe-131m	Curies	< MDA	1.53E-02	5.39E-02	2.33E-01	5.93E-02	2.81E-01	6.12E-01
Xe-133	Curies	1.99E+02	2.38E+02	3.24E+02	1.95E+02	5.78E+02	7.30E+02	2.26E+03
Xe-133m	Curies	2.92E+00	1.74E+00	< MDA	9.26E-01	1.44E+00	2.18E+00	9.21E+00
Xe-135	Curies	6.49E+00	1.85E+01	4.37E+01	2.59E+01	6.57E+00	8.48E+01	1.86E+
Xe-135m	Curies	< MDA	< MDA	1.75E+00	< MDA	< MDA	< MDA	1.75E+00
Xe-138	Curies	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
Ar-41	Curies	1.38E+00	1.01E+00	6.99E+00	2.71E+01	9.90E-01	9.50E+00	4.70E+01