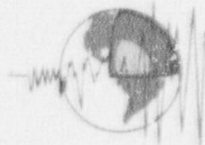


ELEVENTH QUARTERLY REPORT
CEI SEISMIC MONITORING NETWORK
APRIL 1 THROUGH JUNE 30, 1989

Prepared for
CLEVELAND ELECTRIC ILLUMINATING COMPANY

AUGUST 1989



Weston Geophysical
CORPORATION

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TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	i
LIST OF FIGURES	ii
1.0 INTRODUCTION	1
2.0 SEISMIC NETWORK	1
3.0 OBSERVED SEISMICITY	2
3.1 Epicentral Area of January 31, 1986	2
3.2 The Corridor between the January 31, 1986 Epicenter and the Injection Well	2
3.3 Other Events Recorded by AUTOSTAR	2
4.0 DISCUSSION	2
5.0 CONCLUSION	3
6.0 ACKNOWLEDGEMENT	3
FIGURES	
APPENDIX A: CALHIO VOLUMETRIC INJECTION DATA	

LIST OF TABLES

TABLE 1	Microearthquakes Within the CEI Micronet Aperture and its Immediate Vicinity
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LIST OF FIGURES

- FIGURE 1 Seismicity; April - May-June 1989
- FIGURE 2 Cumulative Seismicity 1/31/1986 - 6/30/89

1.0 INTRODUCTION

In accordance with its agreement with the U.S. Nuclear Regulatory Commission, Cleveland Electric Illuminating (CEI) continues to monitor the seismic activity in a restricted region of Northeastern Ohio, encompassing the locale of the Perry Nuclear Power Plant, two deep injection wells operated by CALHIO, and the epicentral area of the January 31, 1986 earthquake. This eleventh Quarterly Report covers the period from April 1 to June 30, 1989. An update of the CALHIO volumetric injection data is also provided in Appendix A.

2.0 SEISMIC NETWORK

During the second quarter of 1989, the Automated Seismic Telemetering and Recording System (AUTOSTAR) performed quite reliably, achieving an uptime for network operation of 87%. Most of the downtime, calculated in station-hour units, was due to the failure of one remote site REF TEK #97 unit and the month long repair time. By moving the unit from station ANT to station SCH, where the failure occurred, the detection capability over the Calhio Wells - Leroy epicentral area corridor was maintained relatively unchanged.

By the end of June, CEI and Weston Geophysical completed the installation of a new seismic station in Ashtabula County. The coordinates are 41.8463°N and 80.9902°W ; the elevation is 181 meters. The station, with code name GEN, is located between Madison-on-the-Lake and Geneva-on-the-Lake. It is equipped with a 2Hz vertical L4 seismometer. The analog signal is telemetered via telephone line to the PNPP seismic laboratory, where it is recorded on a Geotech RV-301 Helicorder. With this additional station, the original aperture of the CEI net has been expanded to include the epicentral area of the December 25, 1988 ($M_c=2.4$) tremor south of Madison-on-the-Lake.

3.0 OBSERVED SEISMICITY

3.1 Epicentral Area of the January 31, 1986 Earthquake

There was no microearthquake activity detected during the quarter. The last event reported occurred on December 28, 1988.

3.2 The Corridor between the January 31, 1986 Epicenter and the Injection Wells

During this quarter, AUTOSTAR detected on May 30, one microearthquake, with $M_c = -0.4$ within the network aperture. The standard location parameters of this event are listed on Table 1 and the epicentral location is plotted on Figure 1. Station and injection well locations are also included on the same figure. Figure 2 presents the cumulative seismicity since January 31, 1986.

3.3 Other Events Recorded by AUTOSTAR

One other microearthquake, with $M_c = -0.4$, was detected by AUTOSTAR on June 15. The calculated epicenter, well outside CEI network aperture, is located in the vicinity of injection wells in Fairport Harbor. Location parameters are listed on Table 1; the epicenter is shown on Figure 1.

4.0 DISCUSSION

The microseismicity observed during this second quarter is notably low. Almost nothing has been contributed to the data base, and thus no advance was made towards a better understanding of the previous observations.

5.0 CONCLUSION

Two small microearthquakes were located by AUTOSTAR during the second quarter of 1989. One was located within the network aperture; the other occurred outside the aperture in the general area of Fairport Harbor. Such low seismic activity does not improve the current interpretation of either the local or regional seismotectonics.

6.0 ACKNOWLEDGEMENT

CEI and Weston Geophysical are grateful to Rev. W.R. Ott, S.J., of the John Carroll University Seismological Observatory, for contributing additional phase arrival times for several seismic events detected by the CEI network.

TABLE

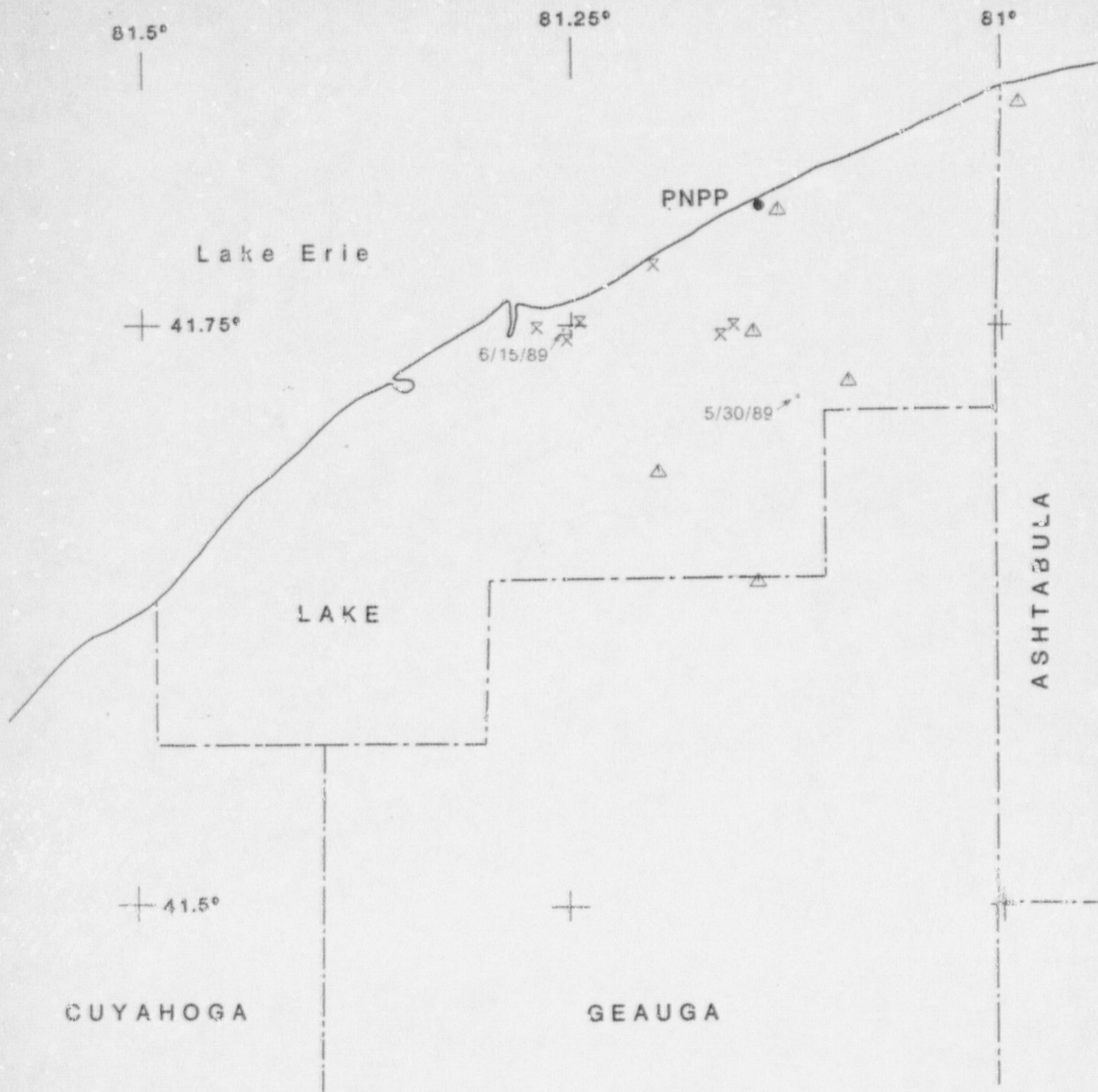
TABLE 1

MICROEARTHQUAKES INSIDE OR NEAR THE CEI MICRONET APERTURE

YEAR	MO	DAY	HR	MIN	SEC	LAT. N	LCNG. N	D	RMS	EH	EZ	NP	NS	GAP	MC	SJ	TRIG. NO
1989	01	03	12	02	44.5	41.7287	81.1328	2.1	0.06	0.2	11.0	8	5	236	-.1	WG	3623
1989	01	30	03	25	27.0	41.7018	81.1846	2.0	0.04	0.4	18.2	10	6	182	-.2	WG	3661
1989	01	30	18	50	20.8	41.7334	81.0983	2.0	0.04	0.2	0.4	11	5	155	-.2	WG	3563
1989	03	09	03	30	45.8	41.7185	81.0581	2.0	0.04	0.2	15.1	13	8	187	0.6	WG	3719
1989	03	10	16	57	22.4	41.7107	81.0585	1.9	0.04	0.2	0.1	10	6	186	-.2	WG	3725
1989	03	12	19	23	49.6	41.7113	81.0596	2.0	0.04	0.2	13.2	13	8	185	0.1	WG	3729
1989	03	22	20	13	35.9	41.7269	81.1545	2.1	0.03	0.1	1.4	16	9	119	1.9	WG	3770
1989	03	25	23	35	07.9	41.7468	81.2633	2.2	0.06	0.3	15.3	14	9	184	0.3	WG	3786
1989	05	20	14	20	39.6	41.7188	81.1223	2.1	0.04	0.1	3.0	7	4	115	-.4	WG	3953
1989	06	15	16	47	51.6	41.7475	81.2570	2.0	0.04	0.3	17.2	11	6	278	-.4	WG	4023

AUG. 07 1989

FIGURES



Magnitude*

□ 2

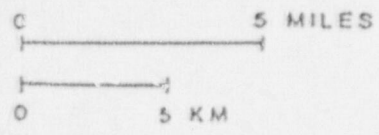
□ 3


□ 4

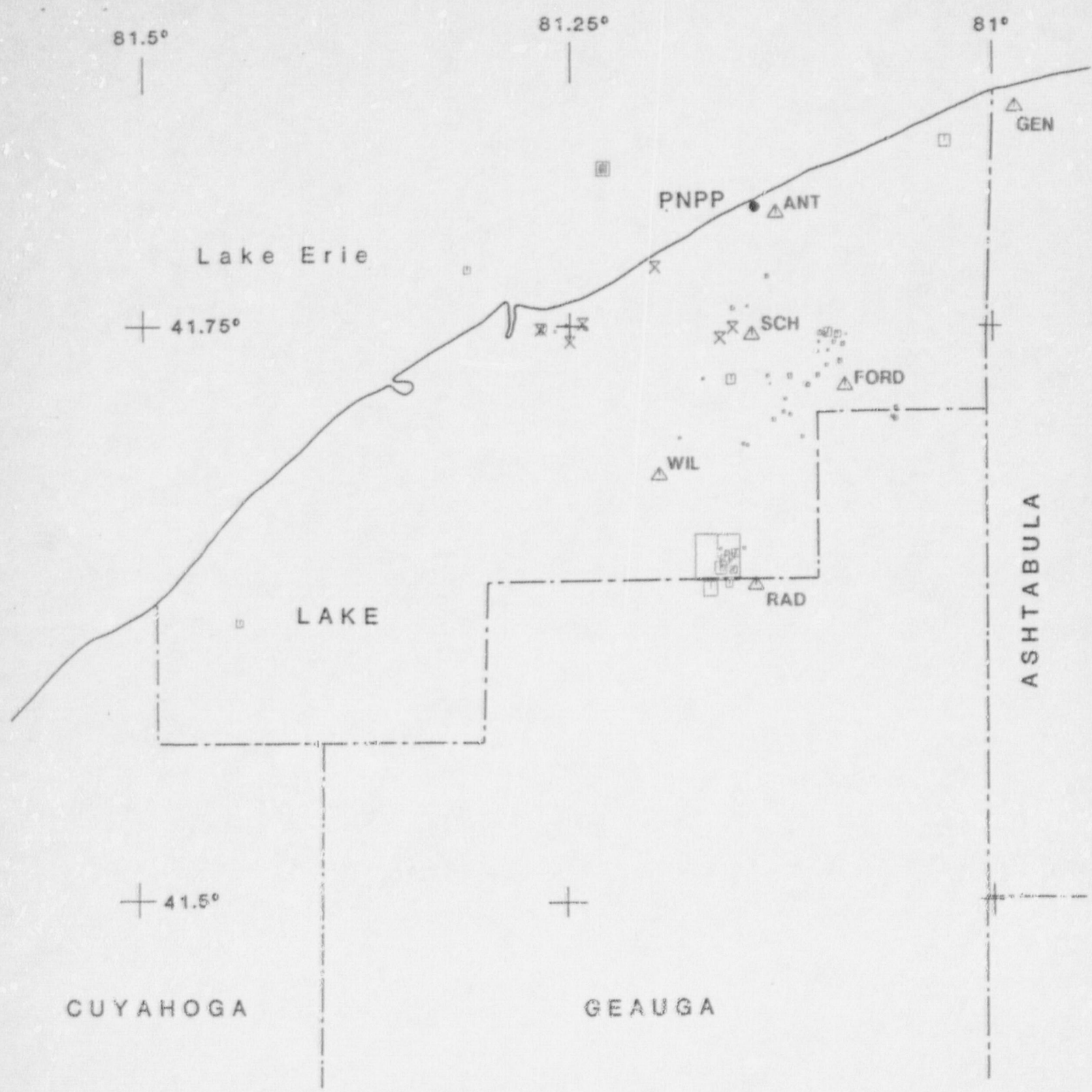
* Size proportionate to magnitude.

△ Stations

⊗ Injection Well



	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	SEISMICITY APRIL - MAY - JUNE 1989
Figure 1	

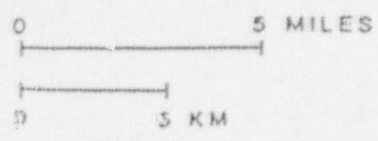


Magnitude*

- 2
- 3
- 4

* Size proportionate to magnitude

- △ Stations
- × Injection Well

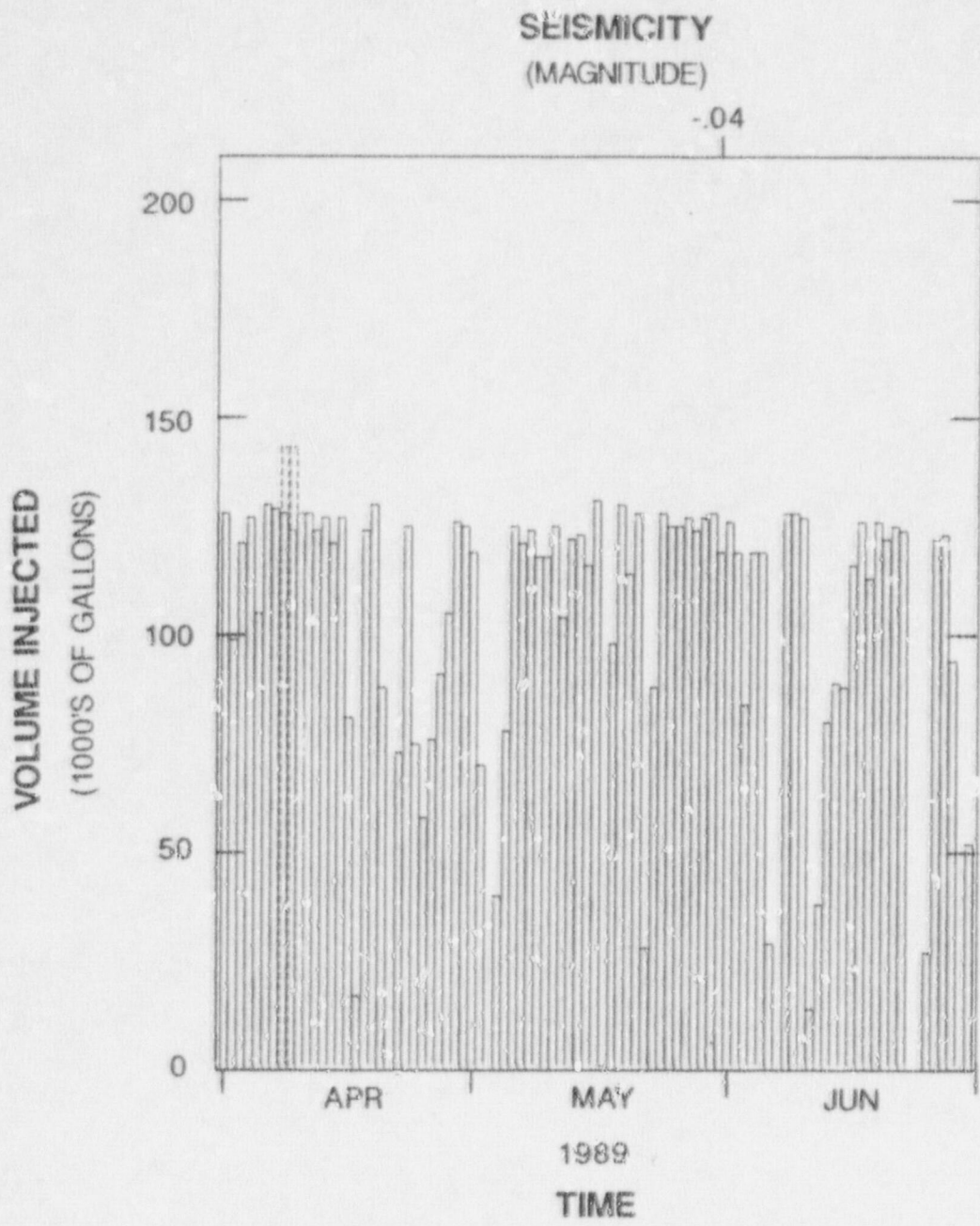


PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC
 ILLUMINATING COMPANY


CUMULATIVE SEISMICITY
 1/30/86 - 6/30/89

Figure 2

APPENDIX A



Data provided by ICI Americas, Perry, Ohio
 Solid lines represent Well #1
 Dashed lines represent Well #2

	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
DAILY INJECTION VOLUME AND OBSERVED SEISMICITY 1989	
Figure A-1	