EPA Region 5 Records Ctr.
341926

REVIEW OF SITE A/PLOT M PROGRAM

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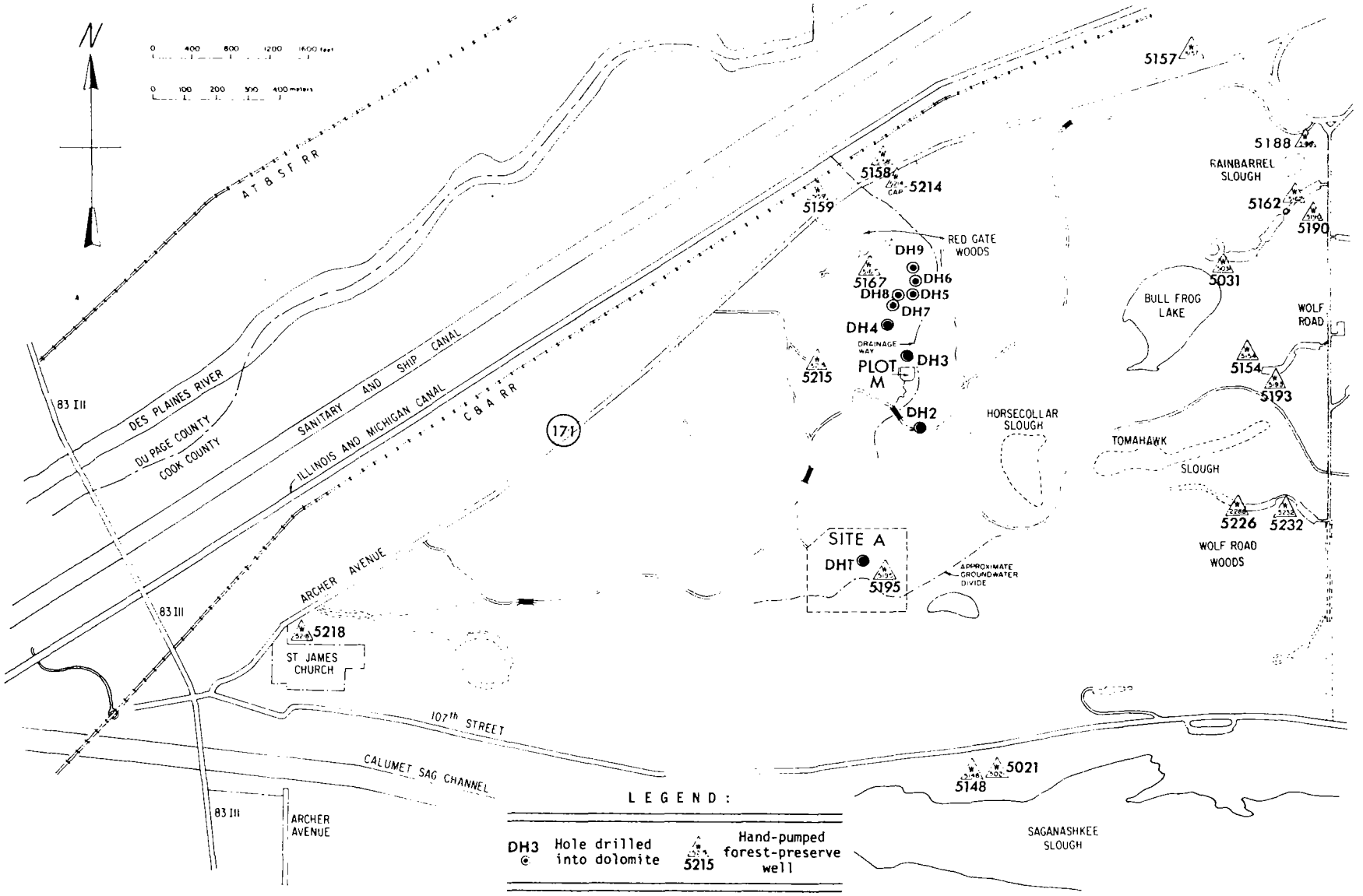
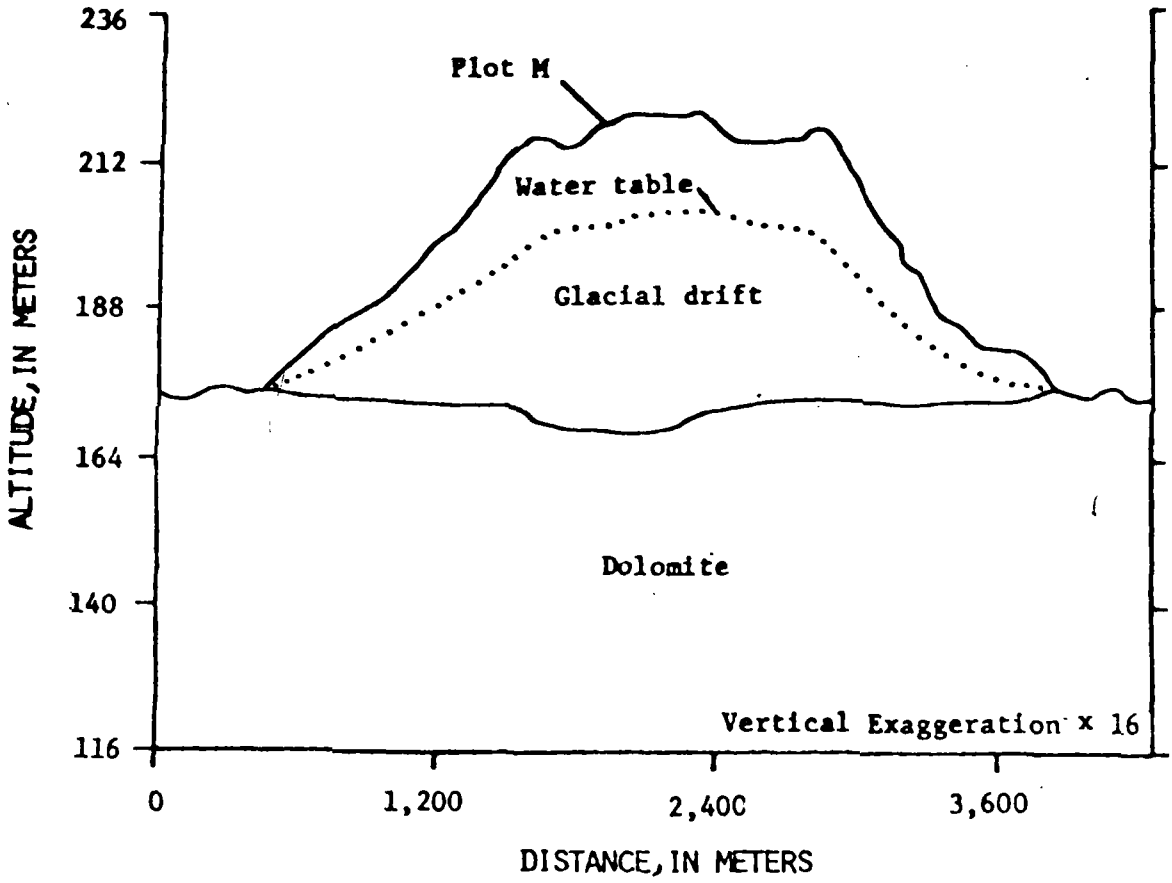
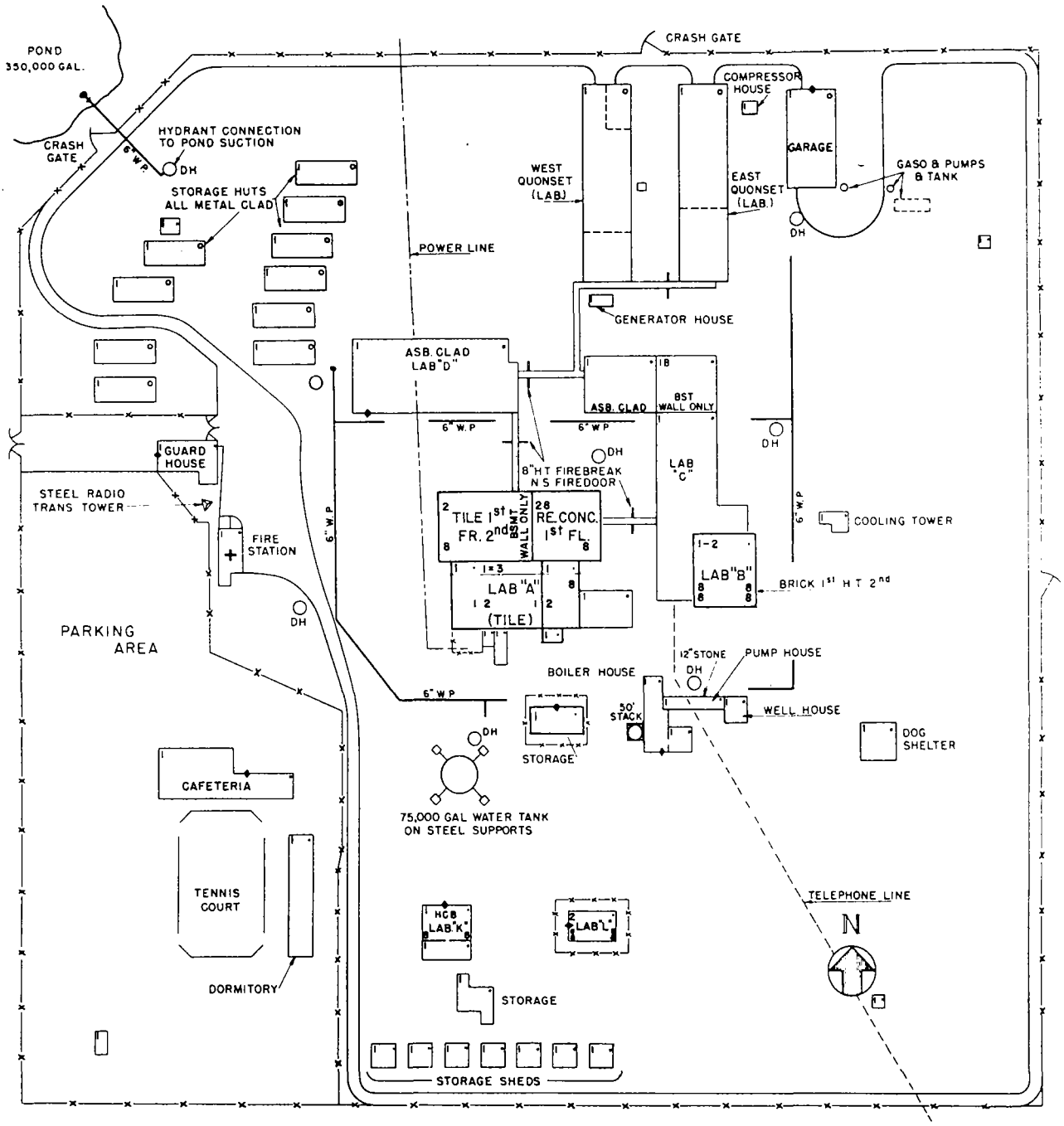
ANL
OCTOBER 15, 1987

SITE A/PLOT M CHRONOLOGY

DECEMBER 1942	CP-1 CRITICAL - WEST STANDS
JANUARY 1943	SITE A CONSTRUCTED
MARCH 1943	CP-2 (CP-1) CRITICAL - SITE A
FEBRUARY 1944	PLOT M ACTIVATED - BURIAL IN TRENCHES
MAY 1944	CP-3 CRITICAL
OCTOBER 1947 - JULY 1948 (?)	BURIAL IN STEEL BINS STARTED
MAY 24, 1949 TO JUNE 10, 1949	PLOT M USE DISCONTINUED, BINS REMOVED - SEARCH FOR BROWN BOTTLE
1950	CP-3 REFUELED - ENRICHED URANIUM
1955	CP-2, CP-3 BURIAL
1956	PLOT M COVERED WITH CONCRETE

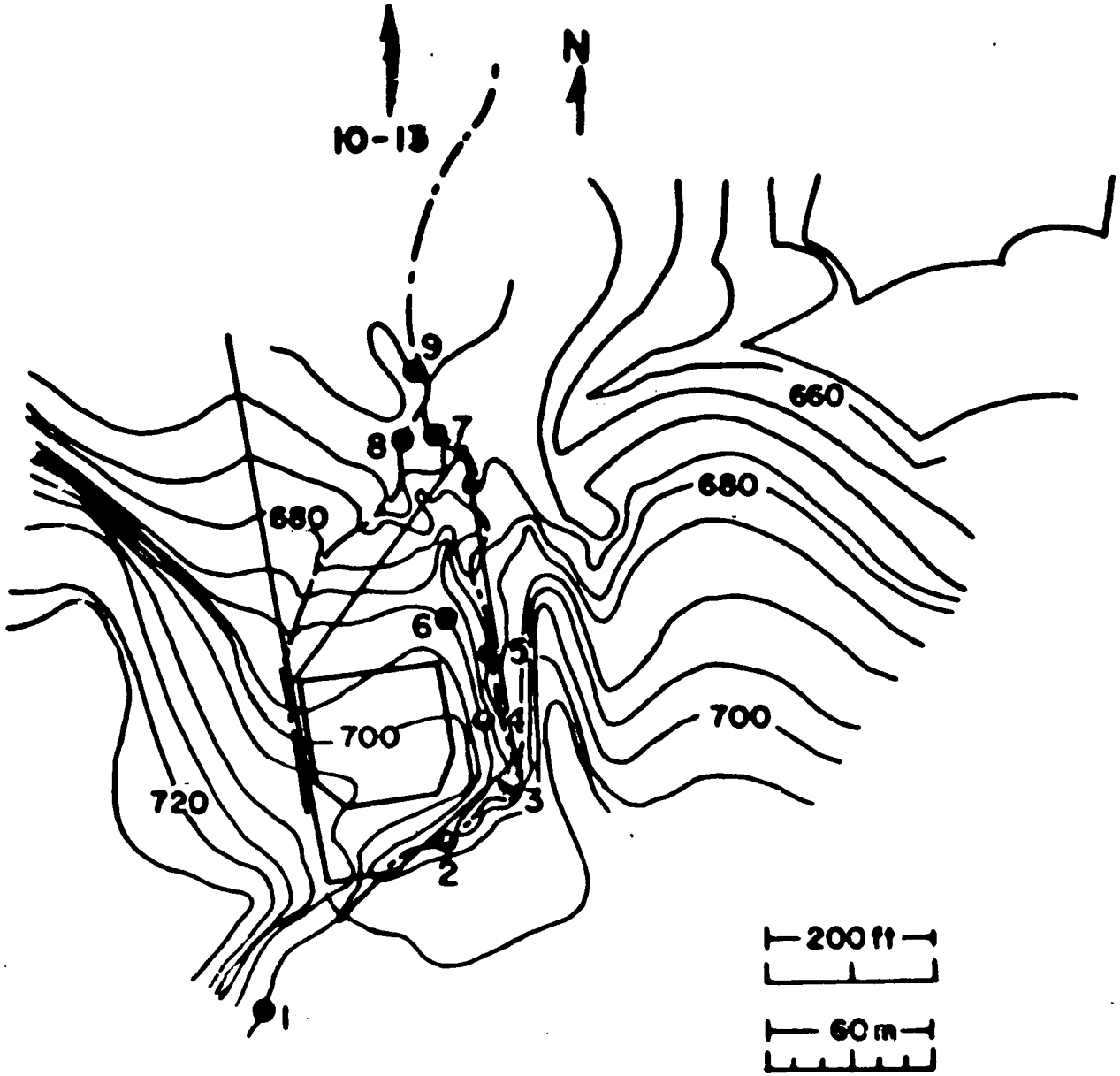

N
0 400 800 1200 1600 feet
0 100 200 300 400 meters
A T & S F RR
DES PLAINES RIVER
DU PAGE COUNTY
COOK COUNTY
SANITARY AND SHIP CANAL
ILLINOIS AND MICHIGAN CANAL
C & A RR
83 Ill
171
ARCHER AVENUE
5218
ST JAMES CHURCH
107th STREET
CALUMET SAG CHANNEL
ARCHER AVENUE
5157
5188
RAINBARREL SLOUGH
5158
5214
5159
5162
5190
RED GATE WOODS
DH9
DH6
5167
DH8
DH5
DH7
DH4
DRAINAGE WAY
PLOT M
DH3
5215
DH2
5031
BULL FROG LAKE
WOLF ROAD
5154
5193
HORSECOLLAR SLOUGH
TOMAHAWK SLOUGH
5226
5232
WOLF ROAD WOODS
SITE A
DHT
5195
APPROXIMATE GROUNDWATER DIVIDE
5021
5148
SAGANASHKEE SLOUGH
LEGEND:
DH3 Hole drilled into dolomite
5215 Hand-pumped forest-preserve well


236
212
188
164
140
116
ALTITUDE, IN METERS
Plot M
Water table
Glacial drift
Dolomite
Vertical Exaggeration x 16
0
1,200
2,400
3,600
DISTANCE, IN METERS



PALOS PARK SITE

SCALE 1" = 100'-0"



3M CATALOG NO.
3M CENTER, S
MADE IN U.S.

PLOT M SURFACE MAP

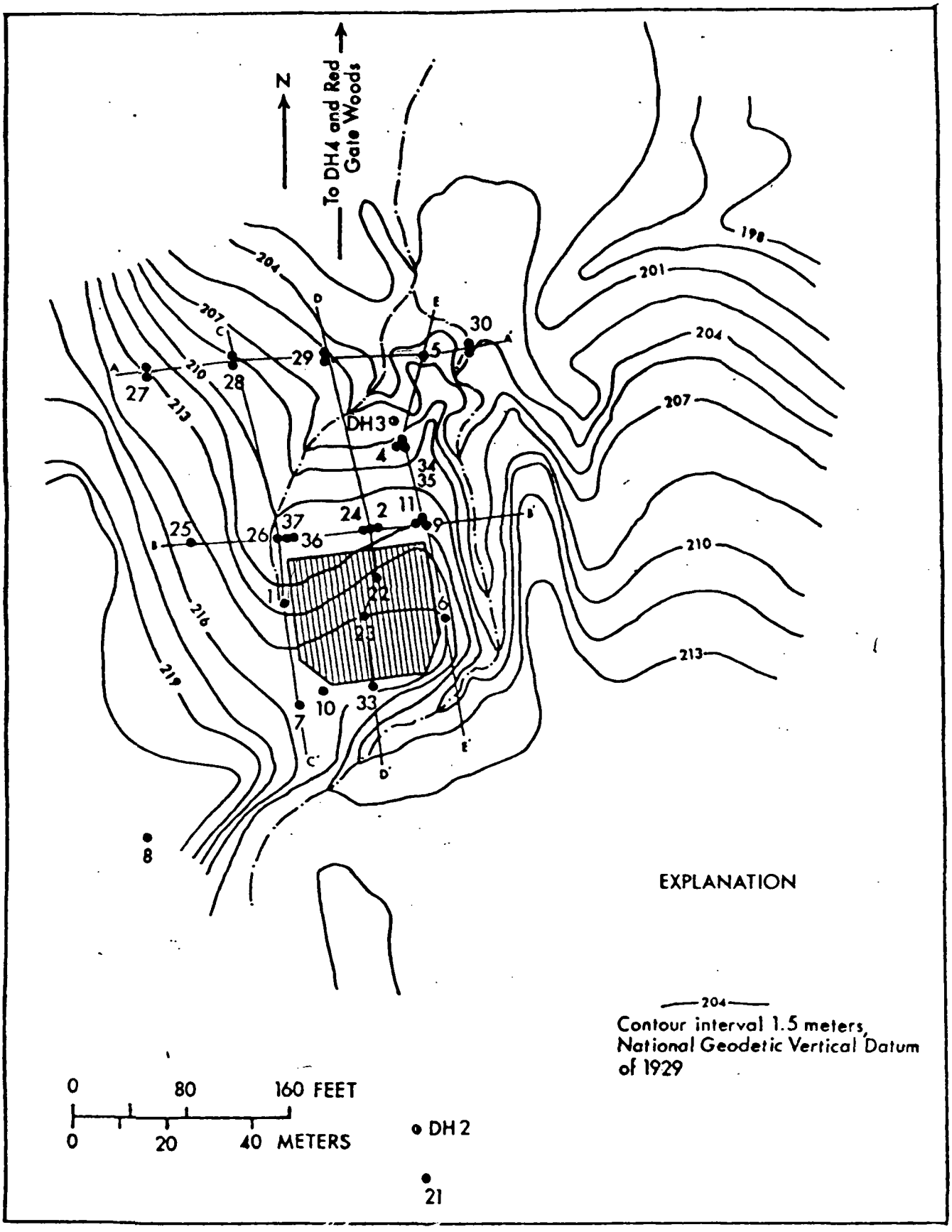
5

SUBJECT NO.

TRITIATED WATER IN PLOT M STREAM

(AVERAGE CONCENTRATIONS IN nCi/ℓ)

LOCATION	MAP NO.	1954	1976-77	1978-79	1980-81	1982-83
UPSTREAM	1	2	<0.2	0.2	<0.2	<0.2
ADJACENT	2	155	0.8	46	3	1.8
ADJACENT	3-5	205	20	95	97	77
ADJACENT (SEEP)	6	-	1060	445	805	605
DOWNSTREAM	7-8	-	110	105	118	70
DOWNSTREAM	9	1560	70	60	102	59
DOWNSTREAM	10-11	-	53	44	41	26
DOWNSTREAM	12-13	-	8.6	8	7	3.2


N
To DH4 and Red Gate Woods
198
201
204
207
210
213
216
219
DH3
DH2
EXPLANATION
204
Contour interval 1.5 meters, National Geodetic Vertical Datum of 1929
0 80 160 FEET
0 20 40 METERS

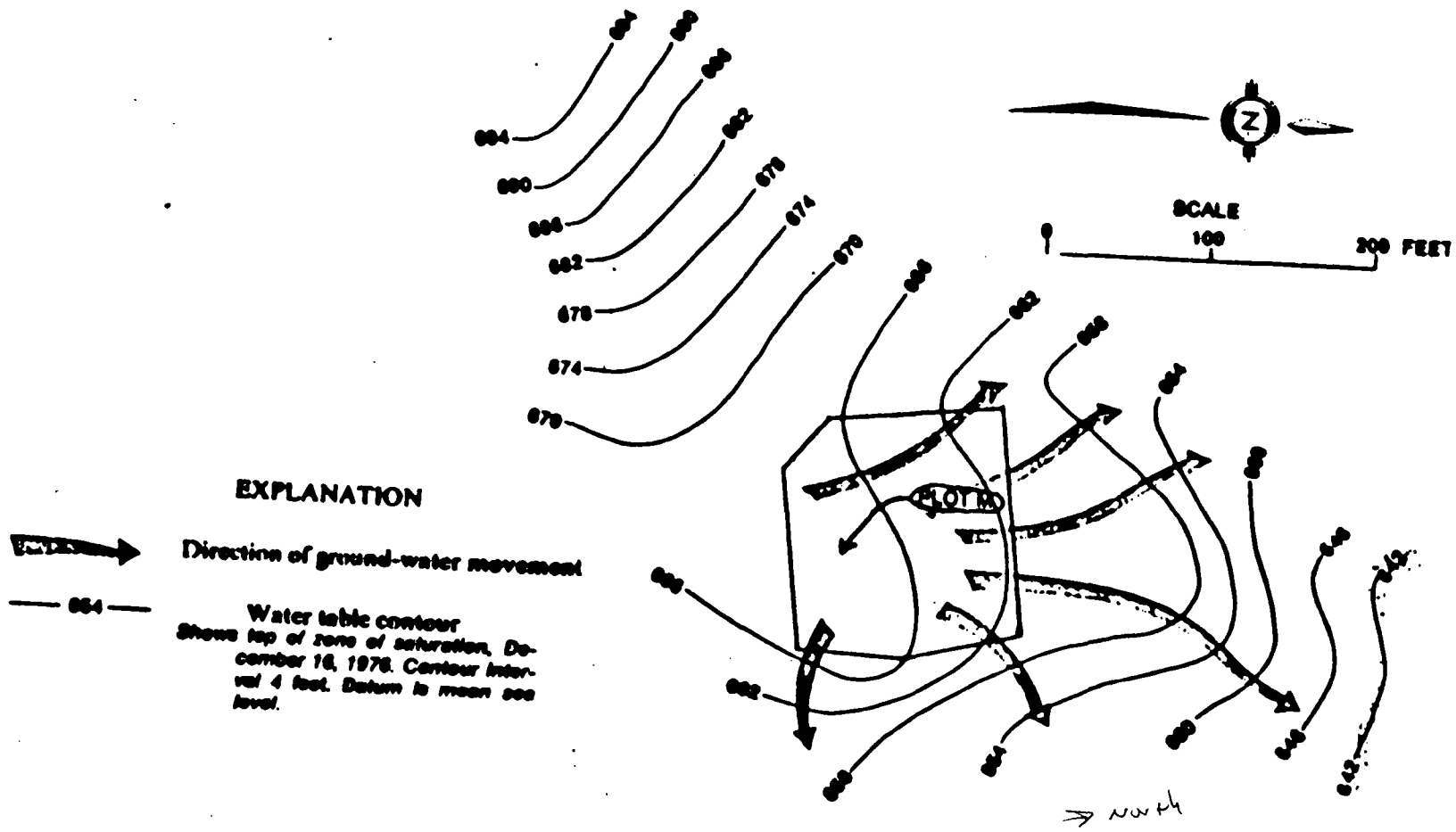


Figure 16. Water table of Plot M, December 1976.

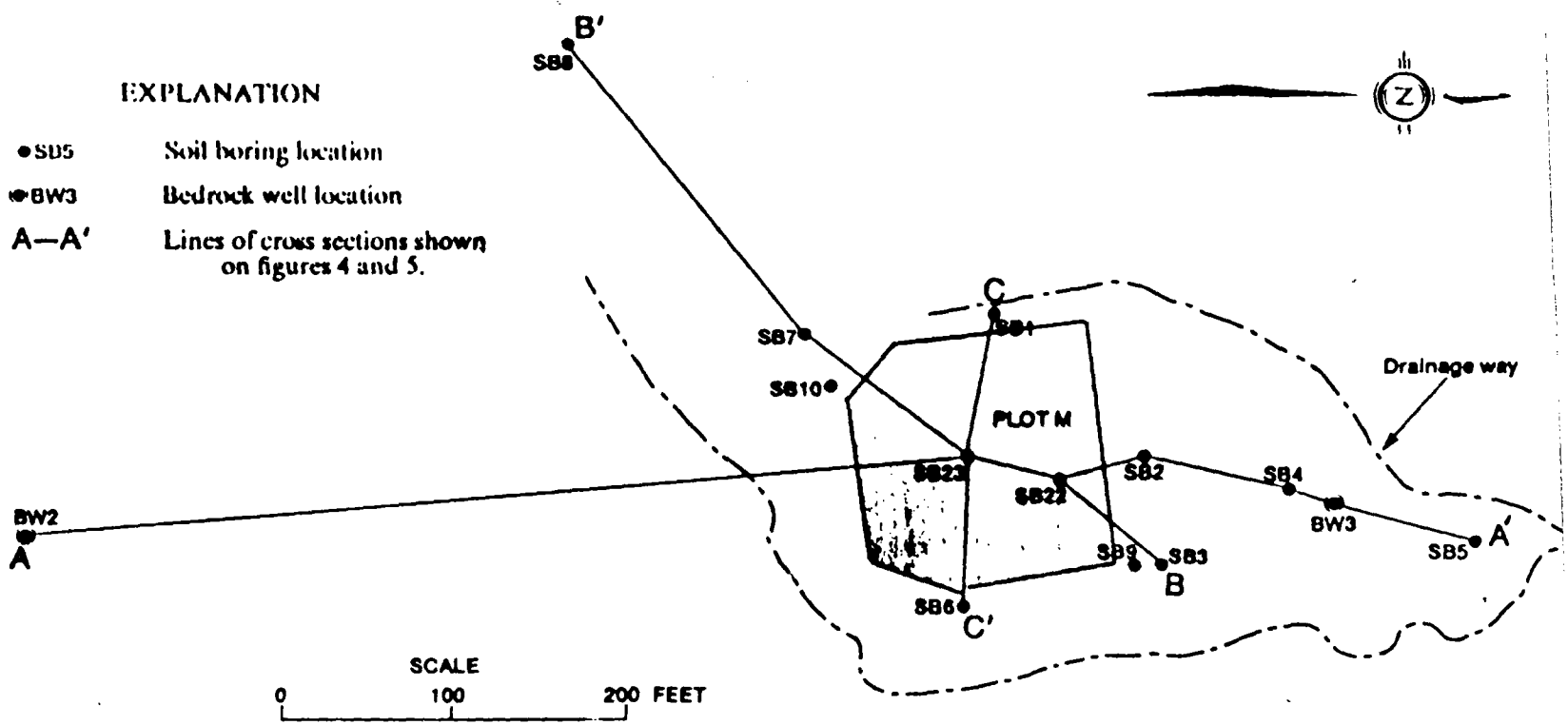


Figure 3. Plan view of Plot M, Argonne Laboratory waste-disposal site.

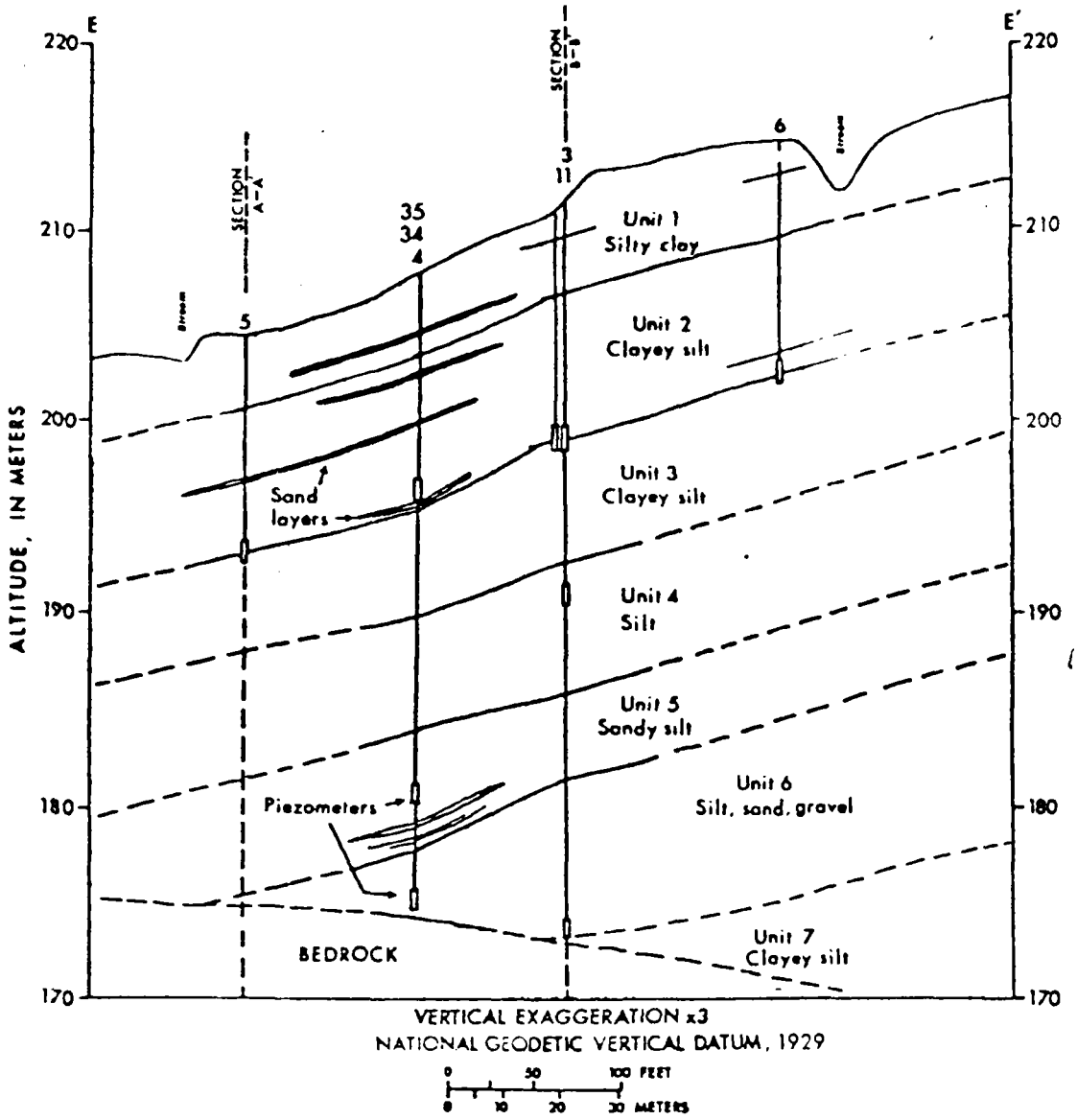
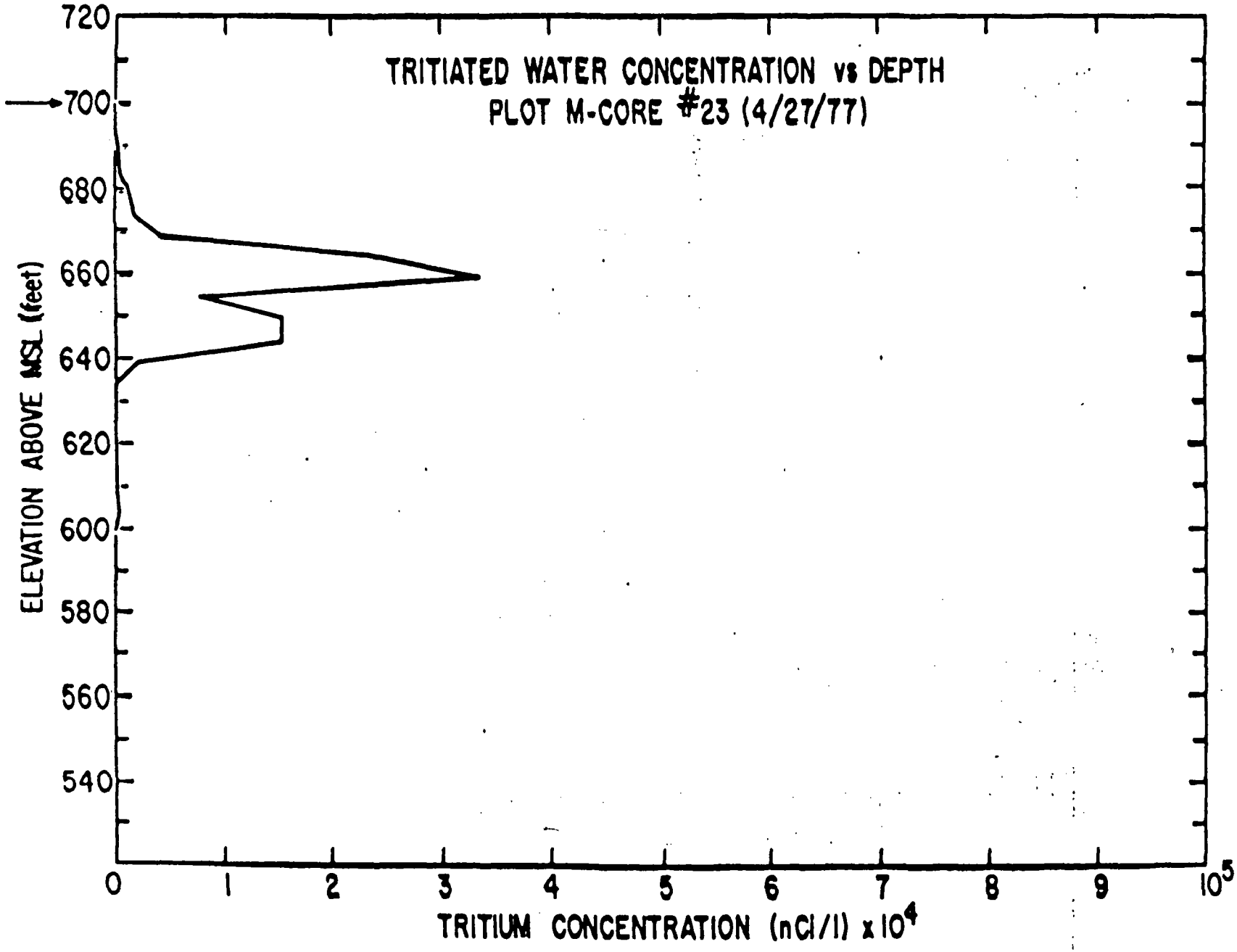
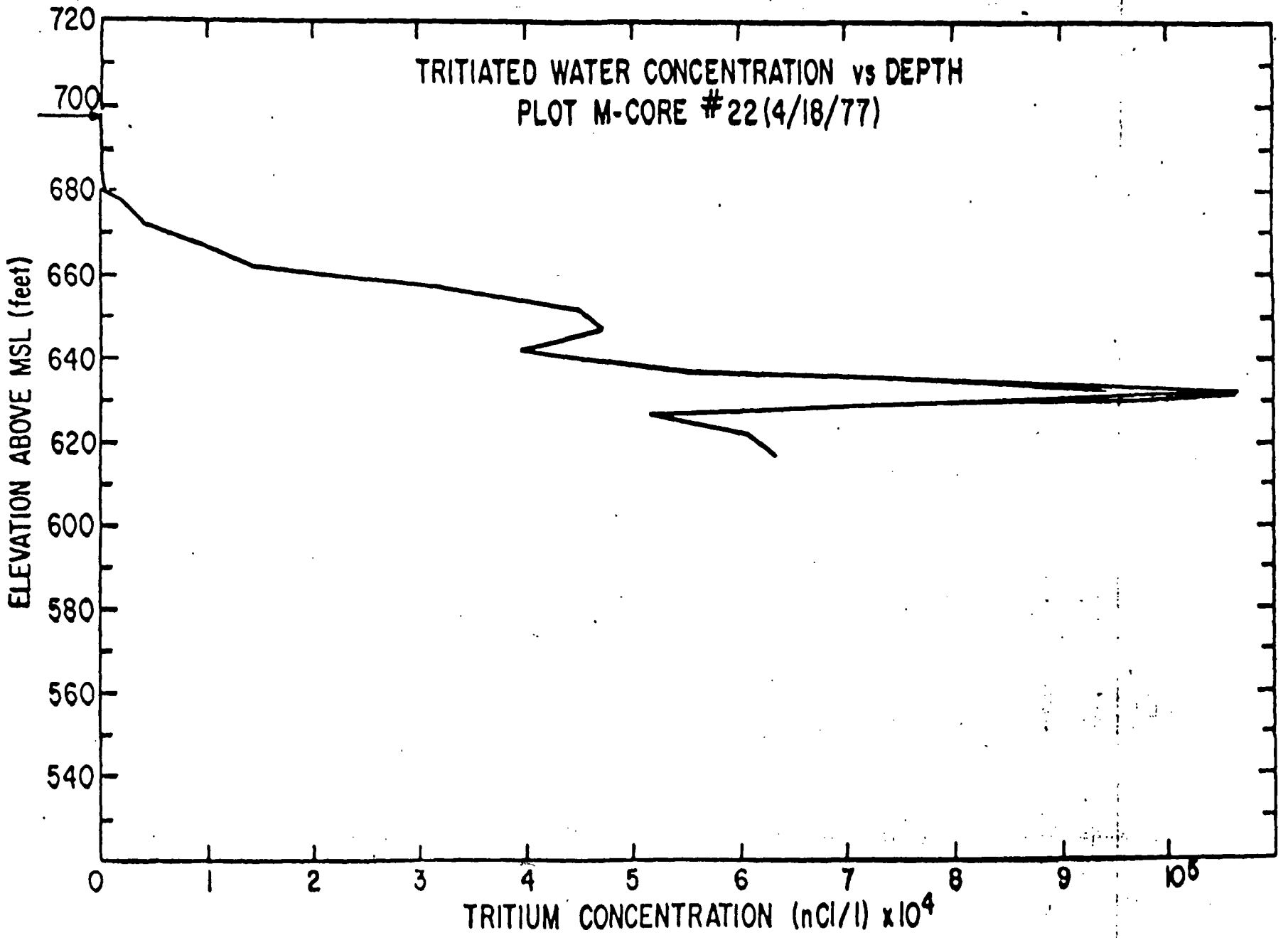
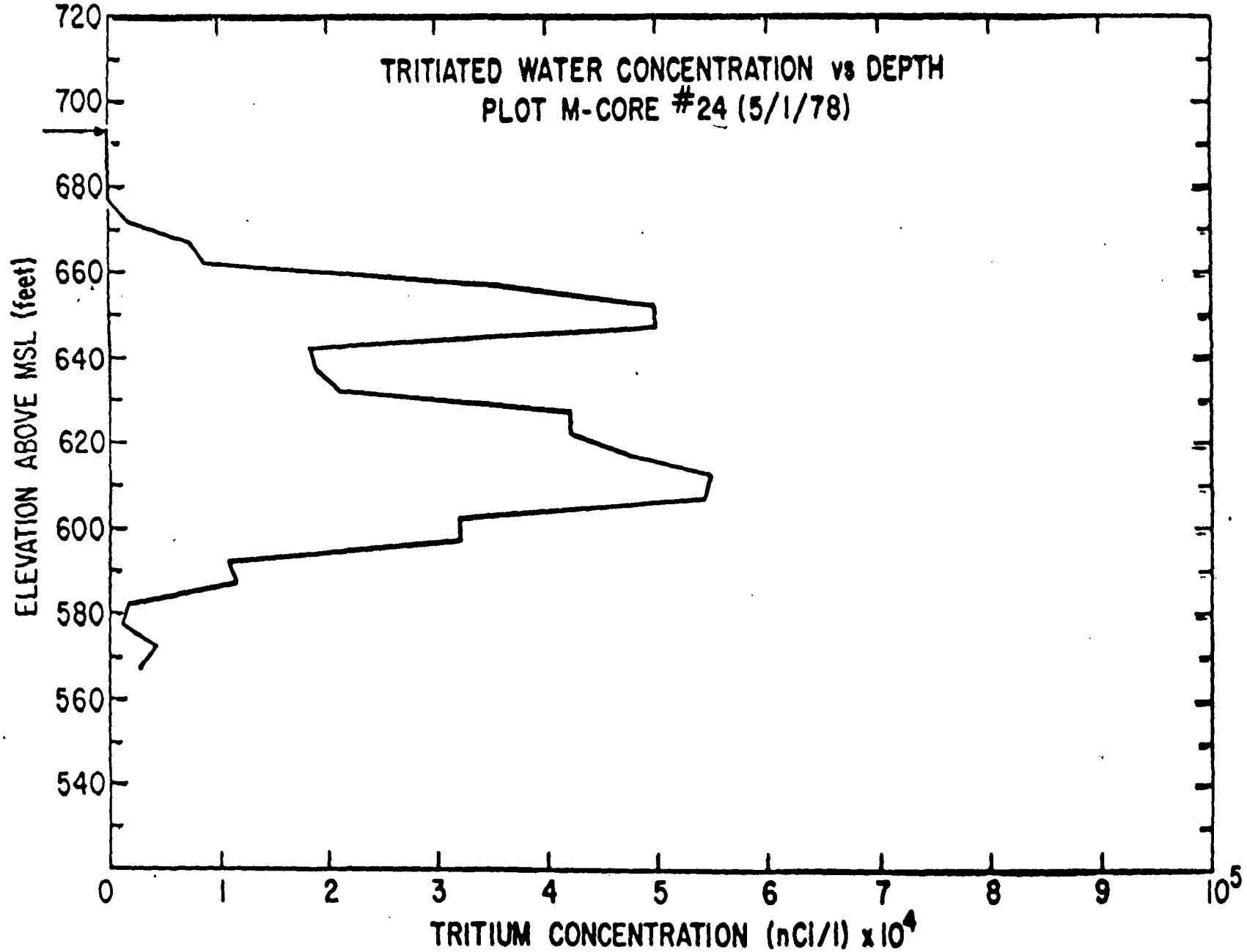
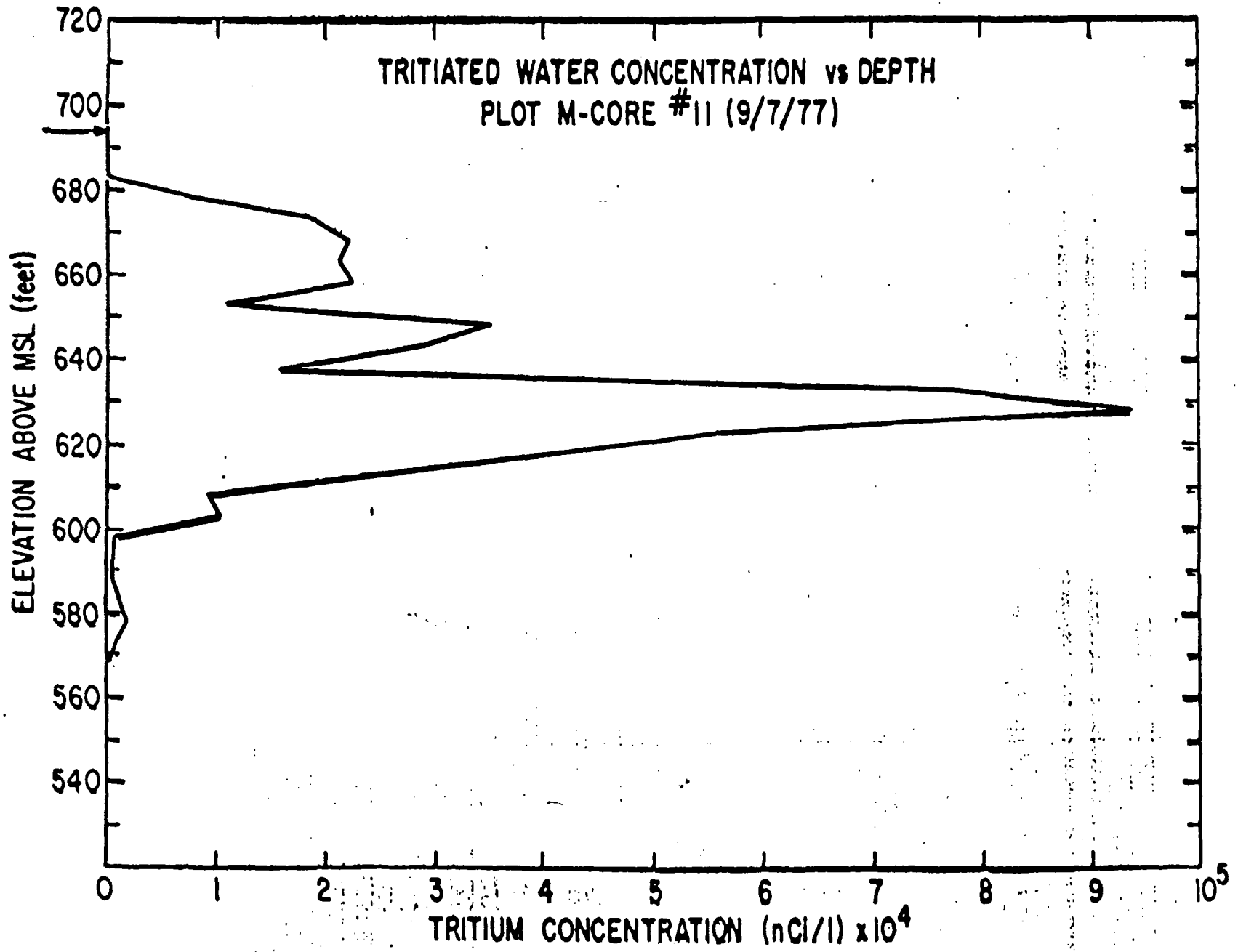


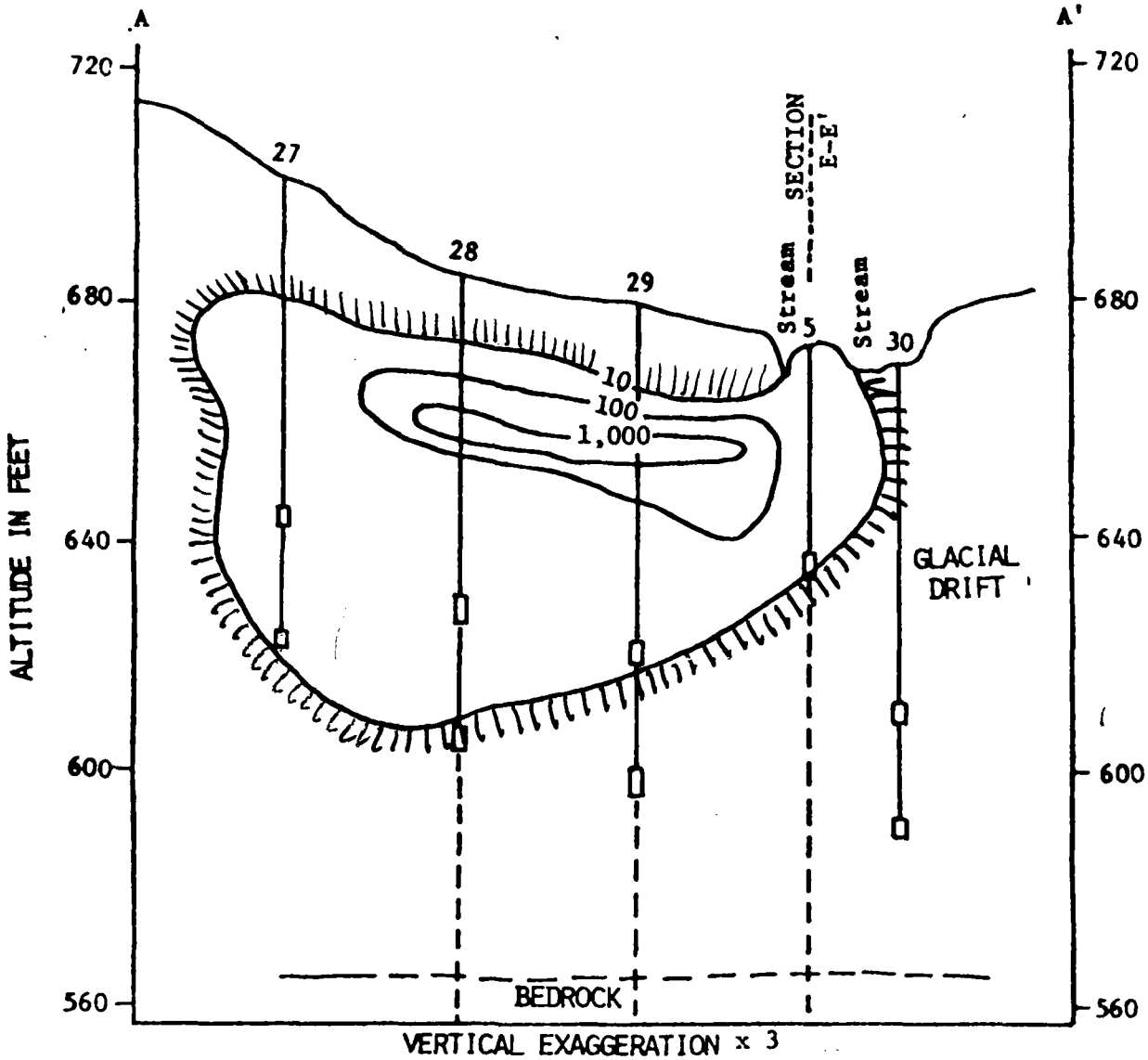
Figure 7.--Geologic section E-E' of the Plot M site. Dashed lines represent approximate litho-stratigraphic contacts in the drift.


TRITIATED WATER CONCENTRATION vs DEPTH
PLOT M-CORE #23 (4/27/77)
ELEVATION ABOVE MSL (feet)
720
700
680
660
640
620
600
580
560
540
0
1
2
3
4
5
6
7
8
9
10^5
TRITIUM CONCENTRATION (nCi/l) x 10^4


TRITIATED WATER CONCENTRATION vs DEPTH
PLOT M-CORE #22 (4/18/77)
ELEVATION ABOVE MSL (feet)
720
700
680
660
640
620
600
580
560
540
0
1
2
3
4
5
6
7
8
9
10^6
TRITIUM CONCENTRATION (nCi/l) x10^4


TRITIATED WATER CONCENTRATION vs DEPTH
PLOT M-CORE #24 (5/1/78)
ELEVATION ABOVE MSL (feet)
720
700
680
660
640
620
600
580
560
540
0
1
2
3
4
5
6
7
8
9
10^5
TRITIUM CONCENTRATION (nCi/l) x 10^4


TRITIATED WATER CONCENTRATION vs DEPTH
PLOT M-CORE #11 (9/7/77)
ELEVATION ABOVE MSL (feet)
720
700
680
660
640
620
600
580
560
540
0
1
2
3
4
5
6
7
8
9
10^5
TRITIUM CONCENTRATION (nCi/l) x10^4



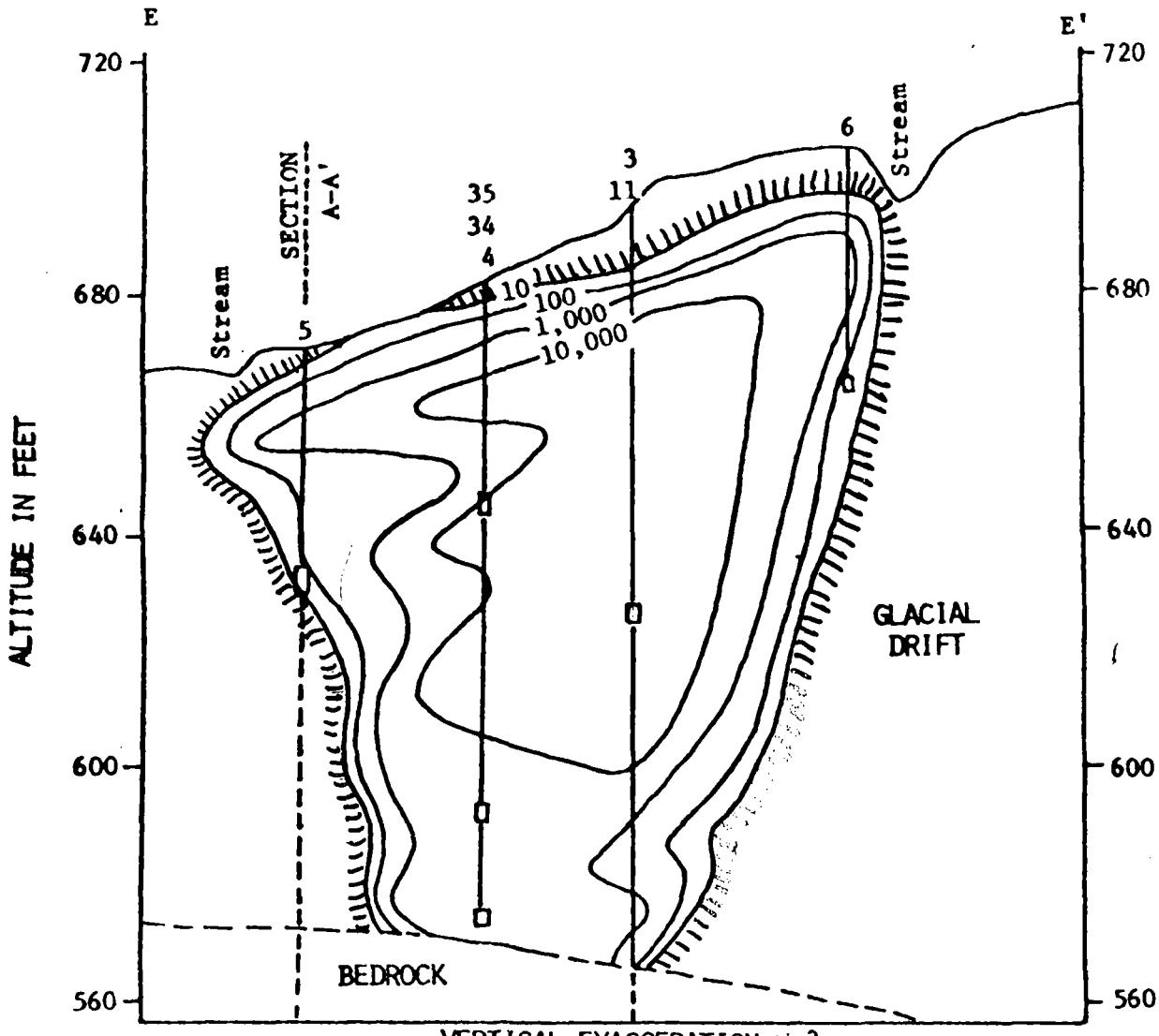
VERTICAL EXAGGERATION x 3
NATIONAL GEODETIC VERTICAL DATUM, 1929

0 50 100 FEET
0 10 20 30 METERS

EXPLANATION

—— 1,000 ——

LINE OF EQUAL TRITIUM CONCENTRATION, nanocuries per liter; concentration levels in shaded area are less than 10 nCi/l



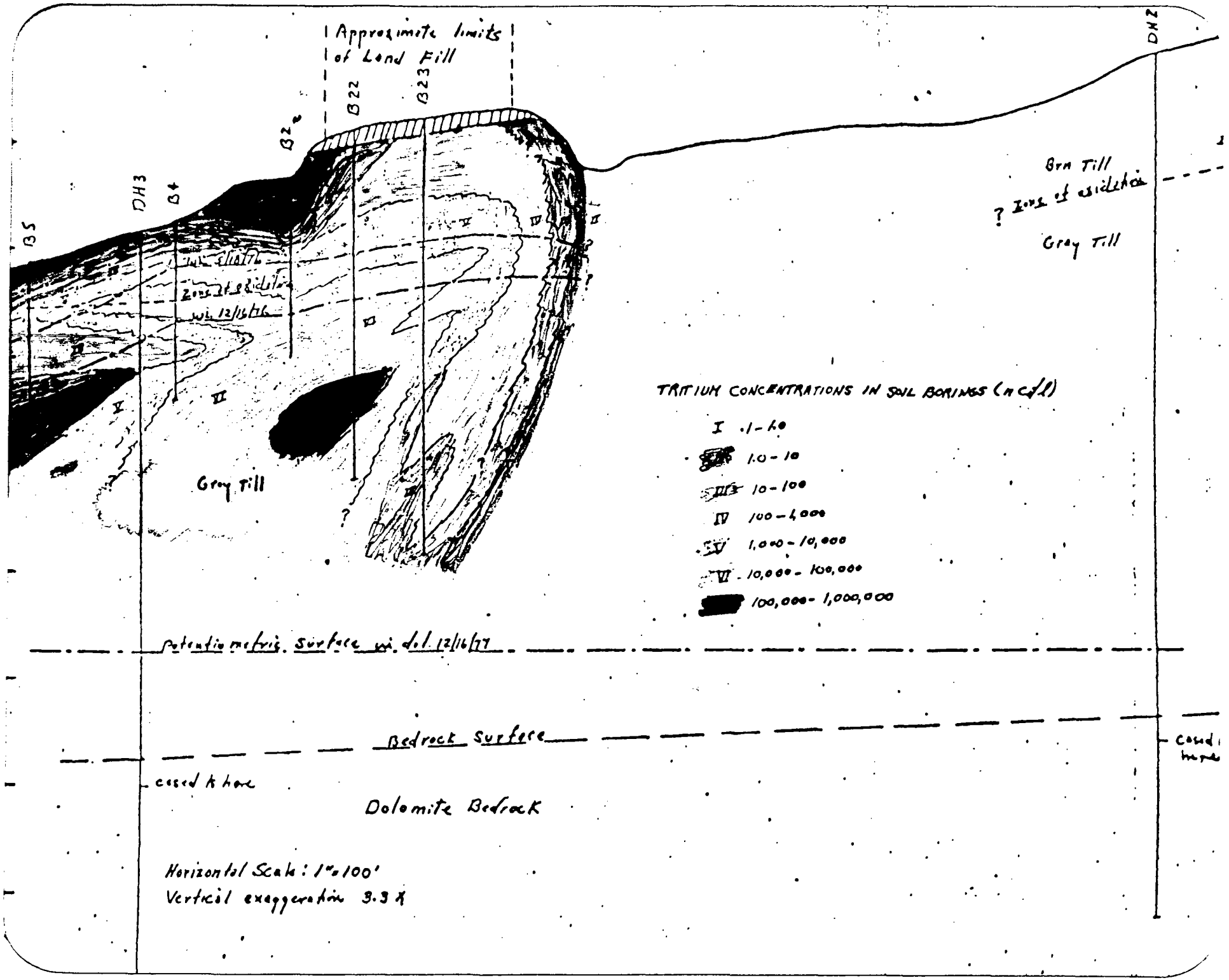
VERTICAL EXAGGERATION × 3
NATIONAL GEODETIC VERTICAL DATUM, 1929

0 50 100 FEET
0 10 20 30 METERS

EXPLANATION

——— 1,000 ———

LINE OF EQUAL TRITIUM CONCENTRATION
nanocuries per liter; concentration levels in shaded area are less than 10 nCi/l


Approximate limits of Land Fill
B5
DH3
B4
B2
B22
B23
DH2
Brn Till
? Zone of oxidation
Gray Till
Zone of oxidation
wl. 12/16/76
Gray Till
TRITIUM CONCENTRATIONS IN SOIL BORINGS (nCi/l)
I .1-1.0
1.0-10
10-100
IV 100-1,000
1,000-10,000
VI 10,000-100,000
100,000-1,000,000
Potentiometric surface wl. 12/16/77
Bedrock surface
cased to here
Dolomite Bedrock
Horizontal Scale: 1" = 100'
Vertical exaggeration 3.3 X

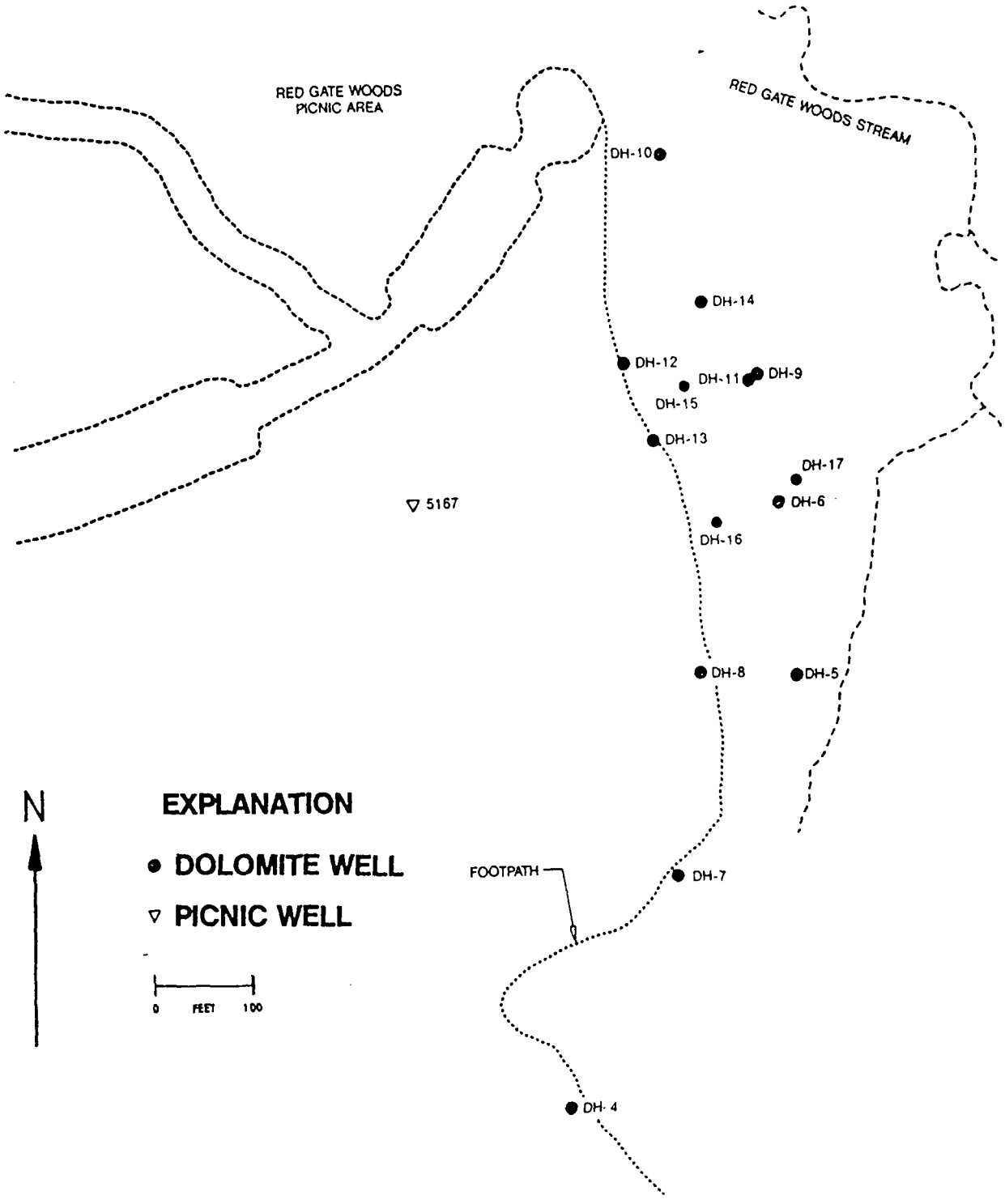
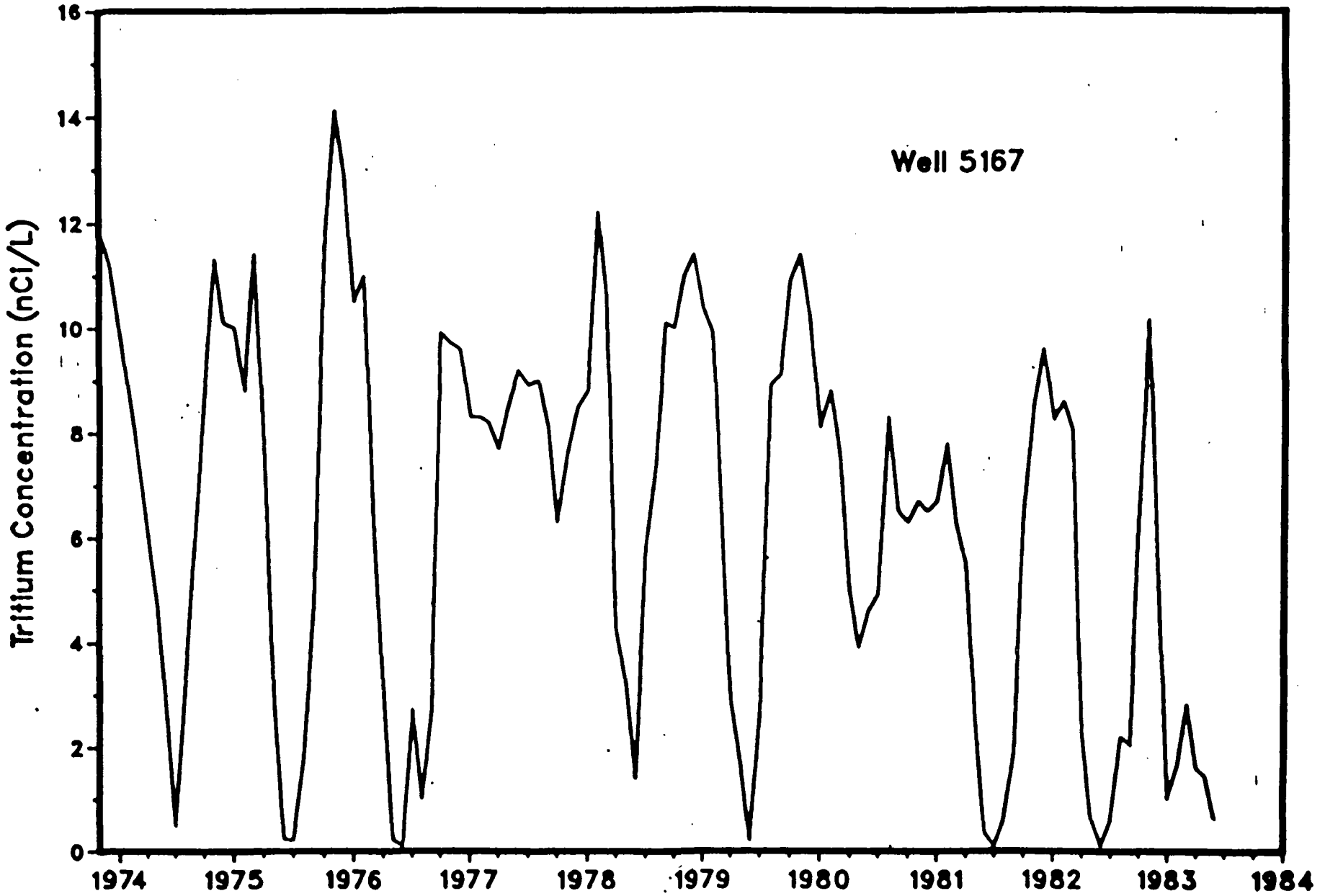


Figure 3.3 Locations of Dolomite Holes North of Plot M


Well 5167
Tritium Concentration (nCi/L)
0
2
4
6
8
10
12
14
16
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984

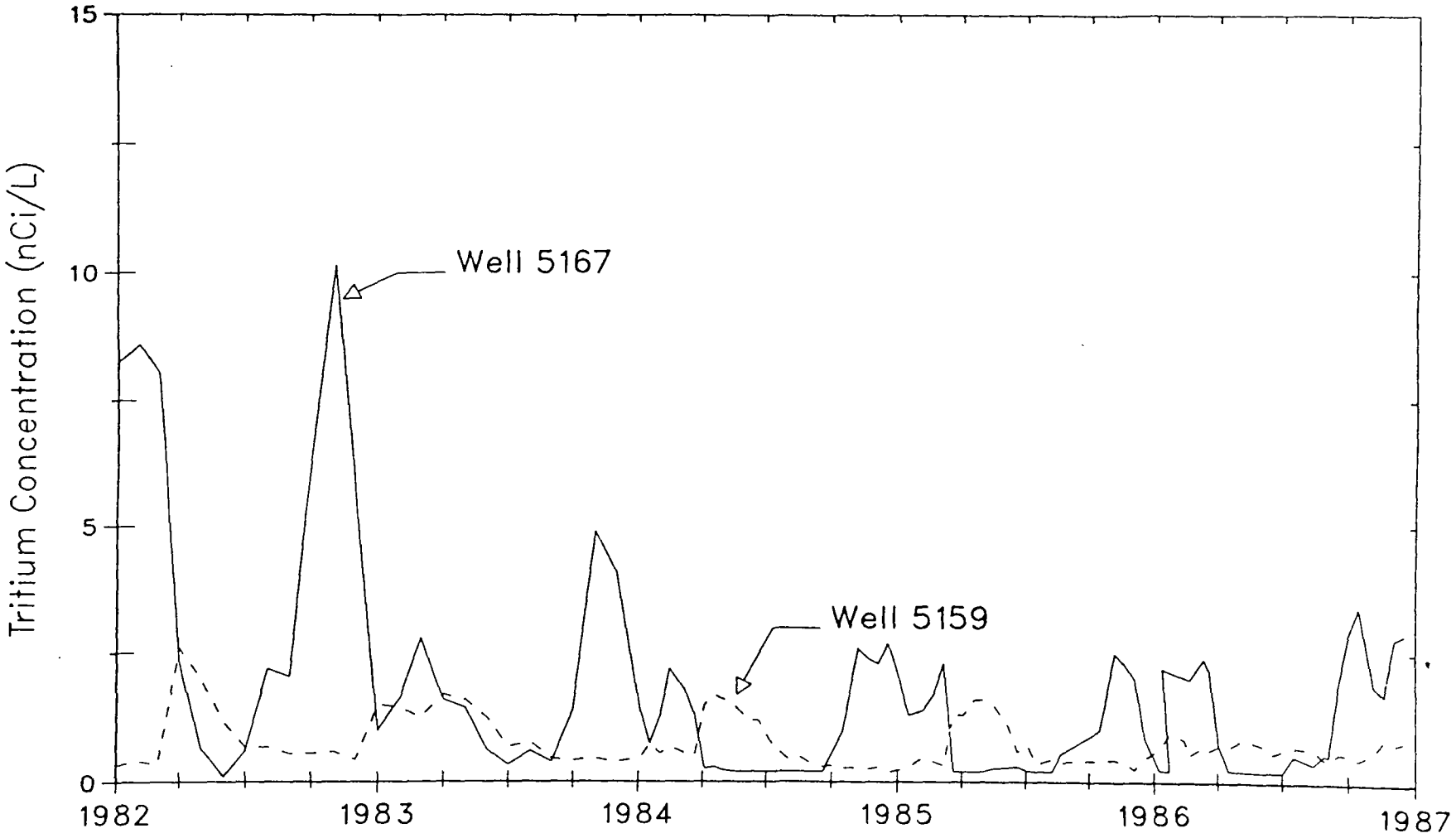


Figure 3.4 Tritiated Water Concentrations in Red Gate Woods Well (5167) and Opposite Red Gate Woods (5159) From 1982 to 1986

PLOT M TRITIUM CHRONOLOGY

FEBRUARY 1944 TO JULY 1948	BURIAL IN TRENCHES
JULY 1948 - MAY 1949	BURIAL IN BINS
MAY 1944 - DECEMBER 1954	CP-3 OPERATED
1955	CP-3 BURIAL
1948 - 1952 OR 1953	Li IRRADIATION AND ^{3}H SEPARATIONS
PRIOR TO 1950	LiF IRRADIATED
POST 1950	Li-Al IRRADIATED

TRITIUM DOSE FROM RED GATE WOODS WELL WATER COMPARED TO OTHER RADIATION SOURCES

Source	Annual Dose Equivalent
Consume one liter (7 nCi/L)	0.002 mrem
Consume one liter each day for a year	0.7 mrem
Total Natural Exposure:	
Cosmic-Rays	50 mrem
Terrestrial Radiation	50 mrem
Internal Irradiations	25 mrem
Total	125 mrem
Medical Radiation	55 mrem
Industrial Exposures	0.8 mrem
Consumer Products	1.5 mrem
Air Travel (0.7 mrem/hr.) Flight From Chicago To San Francisco	2.5 mrem