State of Vermont

VERMONT YANKEE NUCLEAR POWER STATION

Environmental Radiation Surveillance Report

◆◆◆

2005 Summary

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Vermont Department of Health
Office of Radiological Health

VERMONT

Department of Health
Division of Health Protection
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Agency of Human Services

Executive Summary

April 10, 2006

This Vermont Yankee Nuclear Power Station (VYNPS) Environmental Radiation Surveillance Report 2005 Summary is the most recent such report compiled annually by the Vermont Department of Health (VDH) since 1971. Over these years the annual report has expanded from a relatively small number of surveillances to today where the VDH reports on more than 600 samples and nearly 1,500 measurements.

Environmental surveillance is important. This report profiles the radiological conditions around VYNPS using samples and measurements in the communities surrounding the station. In reviewing the data tabulated here, you will find comparisons of some 2005 results to long-term historical trends. Generally, these comparisons show no significant adverse impact of VYNPS operations. You may also find results that are compared to background levels. Background levels, in this case, are the levels of radioactivity in the air, water and earthen materials not attributable to VYNPS. Measurements above background generally may be attributed to the station, other uses of radioactivity in the measurement area, and changing meteorological conditions. The report also includes maps that show the locations where samples are collected and/or measurements are made.

Some samples and measurements are being collected or made continuously. Other samples are taken periodically. You will find the results of all of these samples and measurements in this report. They include:

- The direct gamma radiation emanations as measured continuously at dozens of thermoluminescent dosimeter (TLD) sites.
- The amount of radioactive particulates and radioactive iodine that may be found in the air as collected with numerous continuous air samplers.
- Water from wells and waterways surrounding the plant which are sampled every month, as is milk from local dairy farms, which are analyzed at the VDH Laboratory to determine the amount of natural and man-made radioactivity within them.
- Various wild and cultivated vegetation, river bed sediments, and soils which are sampled at least annually, and analyzed at the laboratory for man-made and naturally occurring radioactivity.

The results of environmental surveillance help us verify that the VYNPS is operating in compliance with VDH Regulations which are designed to protect the health and safety of Vermonters. Should any measurements indicate a lack of compliance, the station is notified, and an investigation is undertaken to determine if the measurements are accurate, and, if so, the remedial actions to take to prevent recurrence.

There are no significant adverse health effects from the operation of VYNPS to Vermonters for the year 2005. The sampling and measurements reported here are sometimes complex, and we invite all who read this report to contact the Radiological Health staff at the VDH to help answer any questions they may have.

ENVIRONMENTAL RADIATION SURVEILLANCE SUMMARY FOR 2005

ALL SAMPLES FOR THE YEAR 2005 ARE WITHIN THE EXPECTED HISTORICAL RANGE

Sample Media			Historical Range	2005
Air Filter (pCi/m^3)	Gross Alpha		< LLD to 0.0071	0.0009 to 0.0049
	Gross Beta		< LLD to 0.0251	0.0036 to 0.0238
Biota (pCi/kg)	Plant	Cesium-137	< LLD	< LLD
		Potassium-40[1]	2,000 to 13,000	3,060 to 20,400[3]
		Beryllium-7[1]	< LLD to 1,500	< LLD to 2,560[3]
	Fungi	Cesium-137	50 to 9,000	6,130
		Potassium-40[1]	1,000 to 12,000	7,110
		Beryllium-7[1]	< LLD	< LLD
		Cesium-134[2]	< LLD to 45	< LLD
	Fern	Cesium-137	< LLD to 540	< LLD
		Potassium-40[1]	4,000 to 11,000	5,270
		Beryllium-7[1]	100 to 4,000	518
	Honey	Cesium-137	< LLD to 200	NS
		Potassium-40[1]	300 to 2,000	NS
		Beryllium-7[1]	< LLD	NS

Sample Media	Historical Range		2005
Fish (pCi/kg)	Cesium-137	< LLD to 100	< LLD
	Potassium-40[1]	1,000 to 5,000	1,960 to 2,290
Iodine Cartridges (pCi/m^3)	Iodine-131	< LLD	< LLD
Milk (pCi/L)	Iodine-131	< LLD	< LLD
	Potassium-40[1]	1,200 to 2,000	1,350 to 1,690
Sediment (pCi/kg)	Cesium-137	< LLD to 500	< LLD to 83.6
	Potassium-40[1]	6,000 to 22,000	8,290 to 14,500
	Beryllium-7[1]	< LLD to 5,000	< LLD
Soil (pCi/kg)	Cesium-137	< LLD to 500	< LLD to 1,780
	Potassium-40[1]	7,000 to 20,000	604 to 19,800
	Beryllium-7[1]	< LLD to 600	< LLD to 660
Special Study Sediments (pCi/kg)	Beryllium-7[1]	< LLD to 3,000	< LLD to 947
	Cobalt-60	< LLD to 2500	< LLD to 335
	Potassium-40[1]	6,000 to 26,000	12,000 to 24,900
	Cesium-137	< LLD to 500	97.4 to 241
TLD (mR/quarter)	Gross Gamma	0 to 12.5	0 to 4.5
Tritium in Water (nCi/L)	Tritium	< LLD	< LLD

Sample Media	Historical Range		2005
Water (pCi/L)	Alpha	< LLD to 15	< LLD to 8.4
	Beta	< LLD to 15	< LLD to 5.8
Quarterly Air Composite (pCi/m^3)	Beryllium-7[1]	< LLD to 0.21	0.0991 to 0.1945

LLD = Lower Limit of Detection
NS = No Sample
[1] Naturally occurring radionuclide
[2] Due to Chernobyl event
[3] Higher value due to differences in archival atmospheric testing deposition

AIR SAMPLES 2005

All air samples for the Year 2005 are within the expected historical range.

The historical range for alpha is from less than the detection limit to 0.0071 pCi/m^3. The samples for 2005 range from 0.0009 to 0.0049 pCi/m^3.

The historical range for beta is from less than the detection limit to 0.0251 pCi/m^3. The samples for 2005 range from 0.0036 to 0.0238 pCi/m^3.

Air samples are taken at various fixed locations using a line powered piston type compressor operating at a rate of 1 cubic foot per minute nominal. The sample is collected on a fiberglass 2" diameter filter. Collection time is continuous with a nominal sampling period of four weeks. The air filters are analyzed for gross alpha and gross beta using an alpha/beta proportional counter. Results are reported in picocuries per cubic meter of air with 2 sigma (standard deviation) value.

(picocuries/cubic meter)

Sample Period	Windham County Court		Brattleboro State Police	
	Alpha	Beta	Alpha	Beta
1/10 – 2/15/05	0.0040 ± 0.0010	0.0176 ± 0.0016	0.0026 ± 0.0007	0.0154 ± 0.0013
2/15 – 3/30/05	0.0023 ± 0.0007	0.0116 ± 0.0012	0.0029 ± 0.0006	0.0111 ± 0.0010
3/30 – 4/13/05	0.0020 ± 0.0012	0.0127 ± 0.0024	0.0012 ± 00008	0.0100 ± 0.0019
4/13 – 5/25/05	0.0016 ± 0.0006	0.0094 ± 0.0011	0.0016 ± 0.0005	0.0074 ± 0.0009
5/25 – 6/17/05	0.0020± 0.0010	0.0122 ± 0.0017	0.0024 ± 0.0009	0.0103 ± 0.0014
6/17 – 7/13/05	0.0032 ± 0.0010	0.0144 ± 0.0017	0.0029 ± 0.0009	0.0114 ± 0.0014
7/13 – 8/17/05	0.0036 ± 0.0009	0.0210 ± 0.0017	0.0035 ± 0.0008	0.0165 ± 0.0014
8/17 – 9/12/05	0.0028 ± 0.0007	0.0151 ± 0.0018	0.0020 ± 0.0006	0.0116 ± 0.0010
9/12 – 10/11/05	0.0039 ± 0.0012[1]	0.0238 ± 0.0021[1]	0.0028 ± 0.0008	0.0134 ± 0.0013
10/11 – 11/17/05	0.0031 ± 0.0009[2]	0.0156 ± 0.0015[2]	0.0017 ± 0.0007	0.0110 ± 0.0013
11/17 – 12/20/05	0.0025 ± 0.0007	0.0157 ± 0.0013	0.0027 ± 0.0006	0.0157 ± 0.0012

[1] Air meter broke during this time interval and was replaced on 11/17/2005. Calculation used 30 liters per minute of air from 9/12/2005 to 10/11/2005.

[2] Air meter broke during this time interval and was replaced on 11/17/2005. Calculation used 30 liters per minute of air from 10/11/2005 to 11/17/2005.

AIR SAMPLES 2005
(picocuries/cubic meter)

Sample Period	Guilford Town Garage		Henry Transportation, Vernon	
	Alpha	Beta	Alpha	Beta
1/10 – 2/15/05	0.0049 ± 0.0010	0.0193 ± 0.0016	0.0027 ± 0.0007	0.0153 ± 0.0012
2/15 – 3/30/05	0.0031 ± 0.0007	0.0127 ± 0.0012	0.0021 ± 0.0006	0.0115 ± 0.0010
3/30 – 4/13/05	0.0023 ± 0.0012	0.0101 ± 0.0021	0.0025 ± 0.0011	0.0091 ± 0.0018
4/13 – 5/25/05	0.0021 ± 0.0006	0.0086 ± 0.0010	0.0022 ± 0.0006	0.0067 ± 0.0008
5/25 – 6/17/05	0.0022 ± 0.0009	0.0090 ± 0.0014	0.0010 ± 0.0007	0.0076 ± 0.0013
6/17 – 7/13/05	0.0019 ± 0.0008	0.0123 ± 0.0015	0.0021 ± 0.0008	0.0109 ± 0.0013
7/13 – 8/17/05	0.0027 ± 0.0008	0.0141 ± 0.0014	0.0026 ± 0.0008	0.0144 ± 0.0013
8/17 – 9/12/05	0.0024 ± 0.0006	0.0145 ± 0.0017	0.0017 ± 0.0005	0.0089 ± 0.0013
9/12 – 10/11/05	0.0038 ± 0.0010	0.0196 ± 0.0018	0.0026 ± 0.0008	0.0178 ± 0.0016
10/11 – 11/17/05	0.0030 ± 0.0009	0.0144 ± 0.0015	0.0023 ± 0.0007	0.0130 ± 0.0013
11/17 – 12/20/05	0.0033 ± 0.0008	0.0198 ± 0.0014	0.0030 ± 0.0006	0.0145 ± 0.0011

AIR SAMPLES 2005
(picocuries/cubic meter)

Sample Period	Power Line River Crossing		Renaud Brothers (Puffers)	
	Alpha	Beta	Alpha	Beta
1/10 – 2/15/05	0.0041 ± 0.0009	0.0182 ± 0.0014	0.0034 ± 0.0008	0.0159 ± 0.0013
2/15 – 3/30/05	0.0030 ± 0.0007	0.0119 ± 0.0011	0.0025 ± 0.0006	0.0115 ± 0.0011
3/30 – 4/13/05	0.0019 ± 0.0010	0.0107 ± 0.0020	0.0029 ± 0.0012	0.0101 ± 0.0020
4/13 – 5/25/05	0.0025 ± 0.0006	0.0095 ± 0.0010	0.0023 ± 0.0006	0.0081 ± 0.0009
5/25 – 6/17/05	0.0016 ± 0.0008	0.0099 ± 0.0014	0.0018 ± 0.0008	0.0096 ± 0.0014
6/17 – 7/13/05	0.0022 ± 0.0008	0.0119 ± 0.0014	0.0016 ± 0.0007	0.0086 ± 0.0012
7/13 – 8/17/05	0.0035 ± 0.0009	0.0178 ± 0.0015	0.0032 ± 0.0008	0.0162 ± 0.0014
8/17 – 9/12/05	0.0022 ± 0.0006	0.0144 ± 0.0017	0.0017 ± 0.0005	0.0134 ± 0.0015
9/12 – 10/11/05	0.0031 ± 0.0009	0.0201 ± 0.0018	0.0026 ± 0.0008	0.0151 ± 0.0015
10/11 – 11/17/05	0.0031 ± 0.0008	0.0136 ± 0.0014	0.0030 ± 0.0008	0.0118 ± 0.0012
11/17 – 12/20/05	0.0028 ± 0.0007	0.0156 ± 0.0012	0.0022 ± 0.0006	0.0132 ± 0.0011

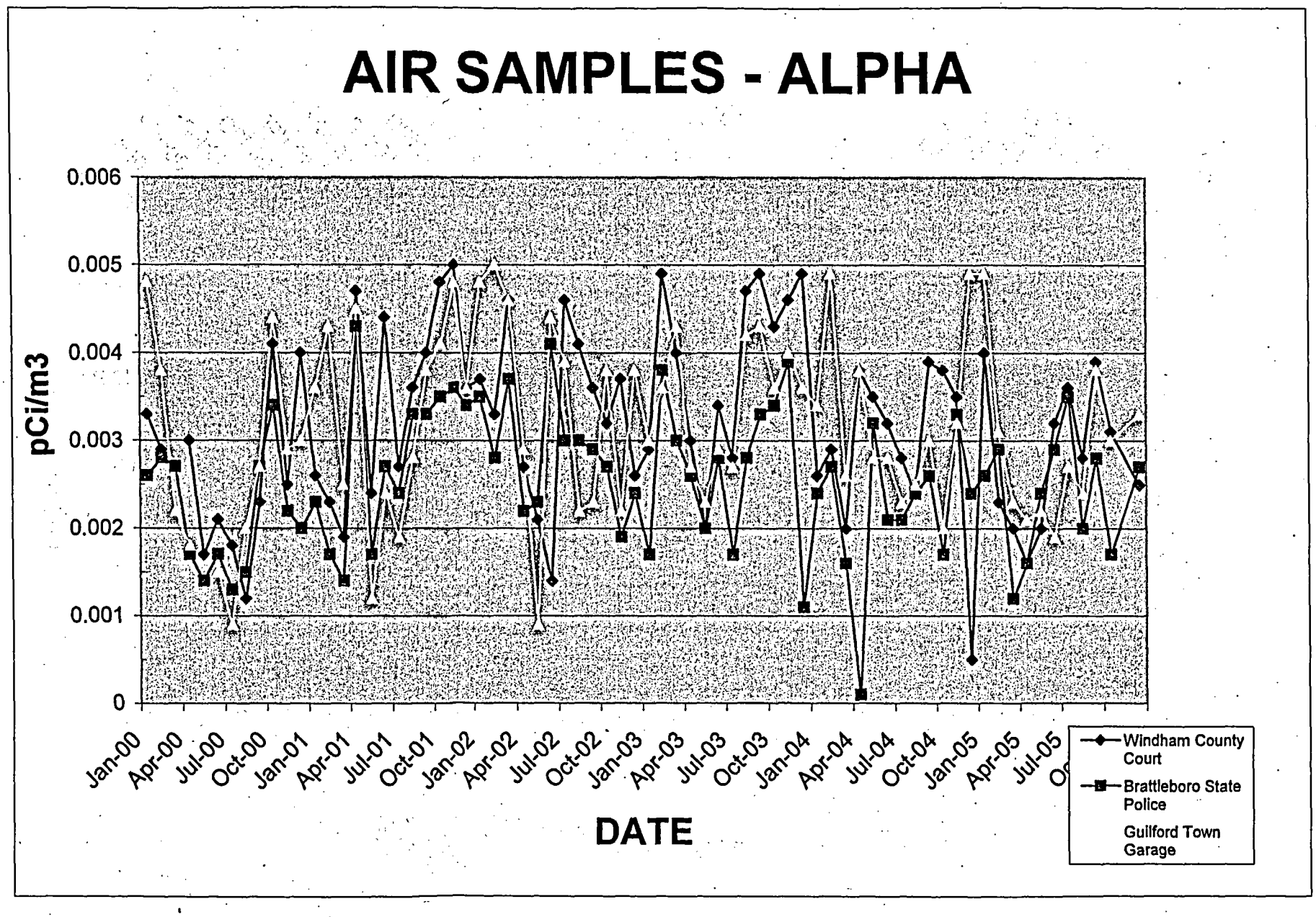
AIR SAMPLES 2005
(picocuries/cubic Meter)

Sample Period	Wilmington State Highway Garage		Vernon Elementary School	
	Alpha	Beta	Alpha	Beta
1/10 – 2/15/05	0.0033 ± 0.0008	0.0132 ± 0.0012	0.0030 ± 0.0007	0.0174 ± 0.0014
2/15 – 3/30/05	0.0024 ± 0.0006	0.0109 ± 0.0010	0.0028 ± 0.0006	0.0127 ± 0.0011
3/30 – 4/13/05	0.0031 ± 0.0012	0.0126 ± 0.0021	0.0026 ± 0.0012	0.0104 ± 0.0020
4/13 – 5/25/05	0.0011 ± 0.0004	0.0037 ± 0.0006	0.0021 ± 0.0006	0.0079 ± 0.0009
5/25 – 6/17/05	0.0019 ± 0.0008	0.0096 ± 0.0014	0.0025 ± 0.0009	0.0088 ± 0.0014
6/17 – 7/13/05	0.0024 ± 0.0008	0.0106 ± 0.0013	0.0024 ± 0.0008	0.0127 ± 0.0015
7/13 – 8/17/05	0.0035 ± 0.0008	0.0173 ± 0.0014	0.0009 ± 0.0005[3]	0.0036 ± 0.0008[3]
8/17 – 9/12/05	0.0022 ± 0.0006	0.0126 ± 0.0015	0.0022 ± 0.0006	0.0130 ± 0.0016
9/12 – 10/11/05	0.0028 ± 0.0008	0.0165 ± 0.0015	0.0030± 0.0009	0.0176 ± 0.0016
10/11 – 11/17/05	0.0025 ± 0.0007	0.0115 ± 0.0012	0.0045 ± 0.0010	0.0151± 0.0014
11/17 – 12/20/05	0.0032 ± 0.0007	0.0147 ± 0.0011	0.0032 ± 0.0007	0.0151 ± 0.0012

[3] Filter was seated improperly in the holder.

AIR SAMPLES 2005
(picocuries/cubic meter)

Sample Period	Dummerston State Highway Garage	
	Alpha	Beta
1/10 – 2/15/05	0.0024 ± 0.0006	0.0144 ± 0.0012
2/15 – 3/30/05	0.0023 ± 0.0006	0.0109 ± 0.0010
3/30 – 4/13/05	0.0026 ± 0.0012	0.0098 ± 0.0020
4/13 – 5/25/05	0.0020 ± 0.0006	0.0074 ± 0.0009
5/25 – 6/17/05	0.0016 ± 0.0008	0.0089± 0.0014
6/17 – 7/13/05	0.0028 ± 0.0009	0.0117 ± 0.0014
7/13 – 8/17/05	0.0031 ± 0.0008	0.0173 ± 0.0015
8/17 – 9/12/05	0.0019 ± 0.0006	0.0135 ± 0.0016
9/12 – 10/11/05	0.0033 ± 0.0010	0.0203 ± 0.0017
10/11 – 11/17/05	0.0022 ± 0.0007	0.0130 ± 0.0013
11/17 – 12/20/05	0.0027 ± 0.0006	0.0154 ± 0.0012


AIR SAMPLES - ALPHA
pCi/m3
0.006
0.005
0.004
0.003
0.002
0.001
0
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02
Apr-02
Jul-02
Oct-02
Jan-03
Apr-03
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Jan-04
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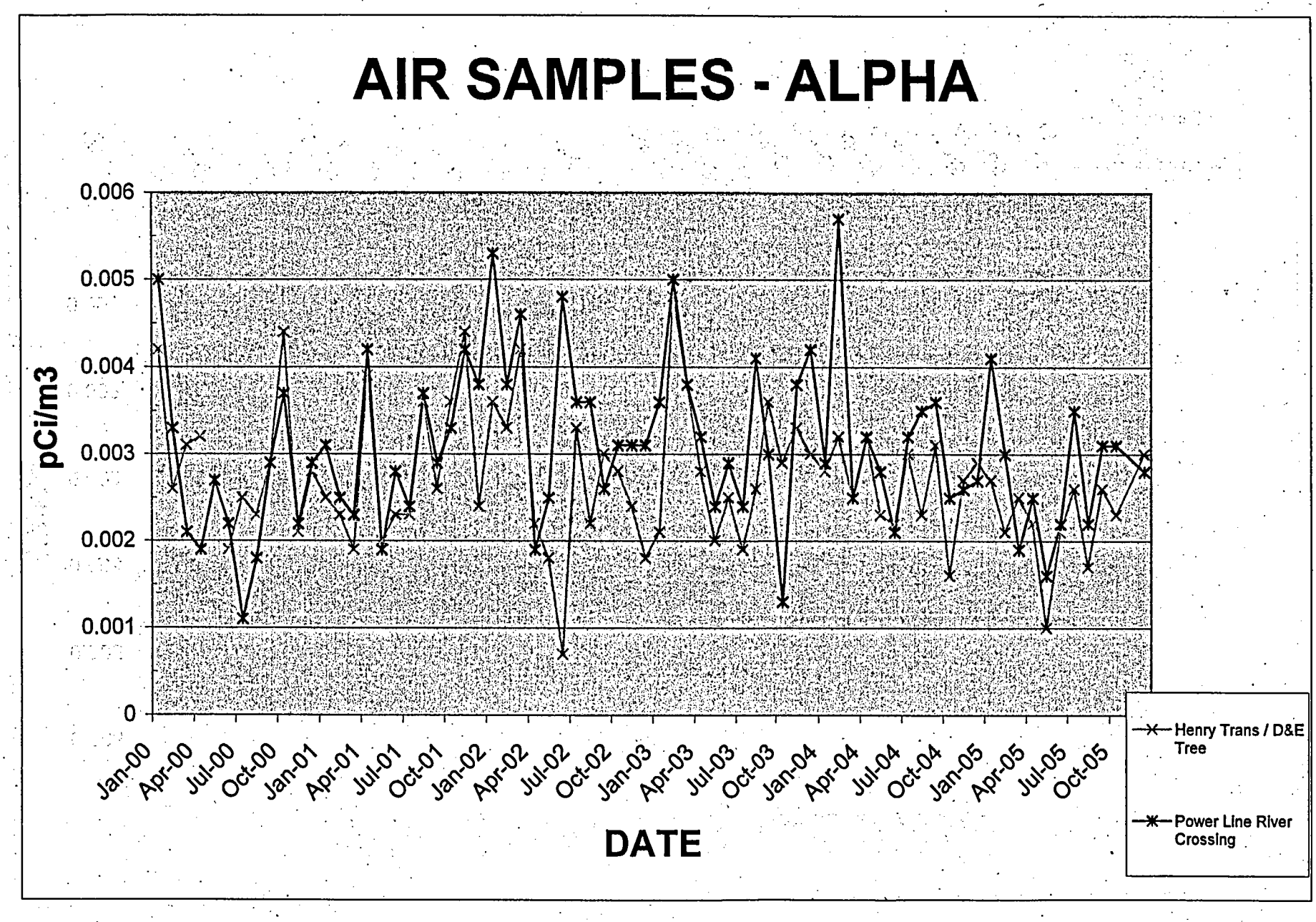
Jul-04
Oct-04
Jan-05
Apr-05
Jul-05
DATE
Windham County Court
Brattleboro State Police
Guilford Town Garage


AIR SAMPLES - ALPHA
pCi/m3
0.006
0.005
0.004
0.003
0.002
0.001
0
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02
Apr-02
Jul-02
Oct-02
Jan-03
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Jul-03
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Jan-04
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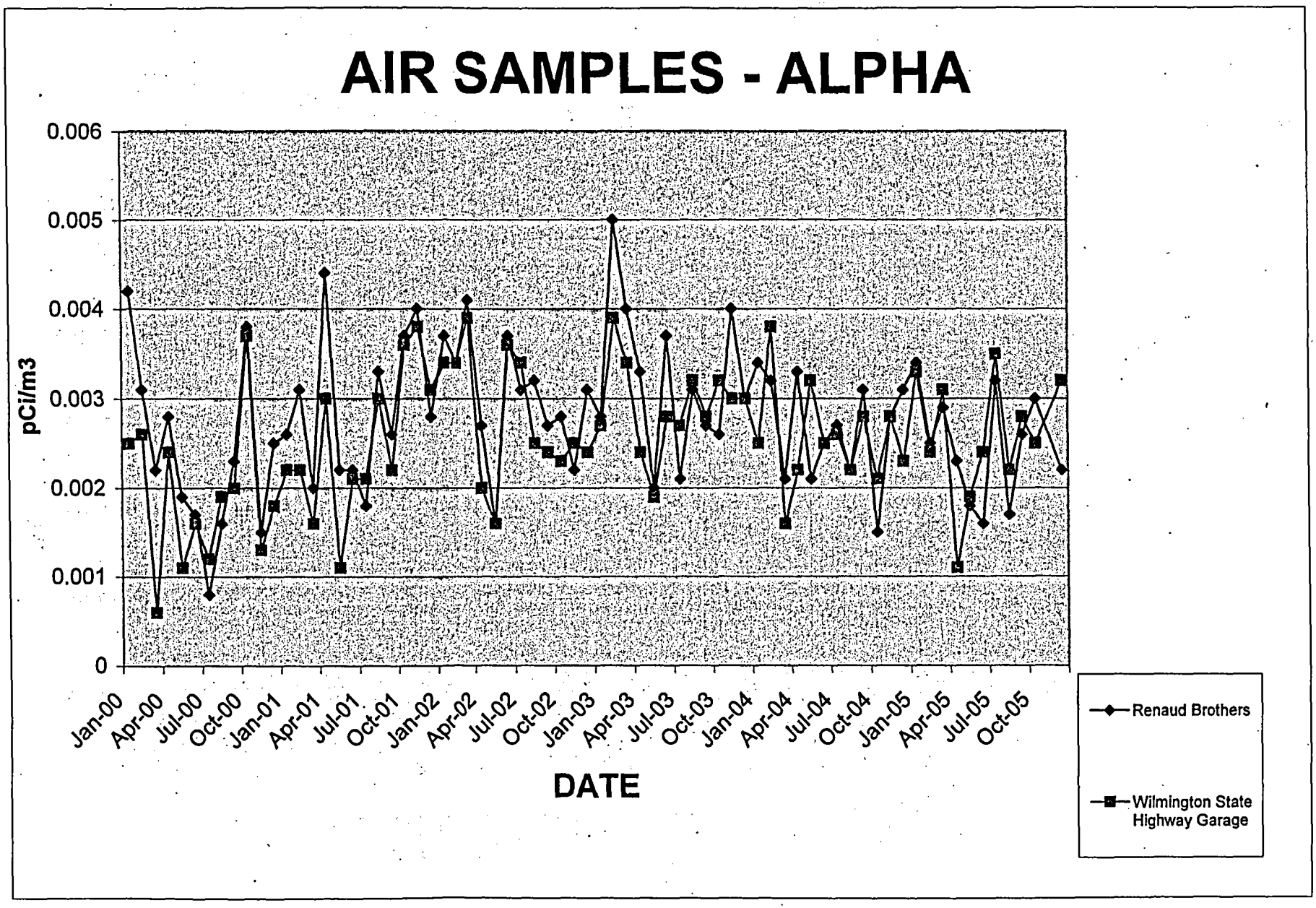
Jul-04
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
DATE
Henry Trans / D&E Tree
Power Line River Crossing


AIR SAMPLES - ALPHA
pCi/m3
0.006
0.005
0.004
0.003
0.002
0.001
0
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02
Apr-02
Jul-02
Oct-02
Jan-03
Apr-03
Jul-03
Oct-03
Jan-04
Apr-04
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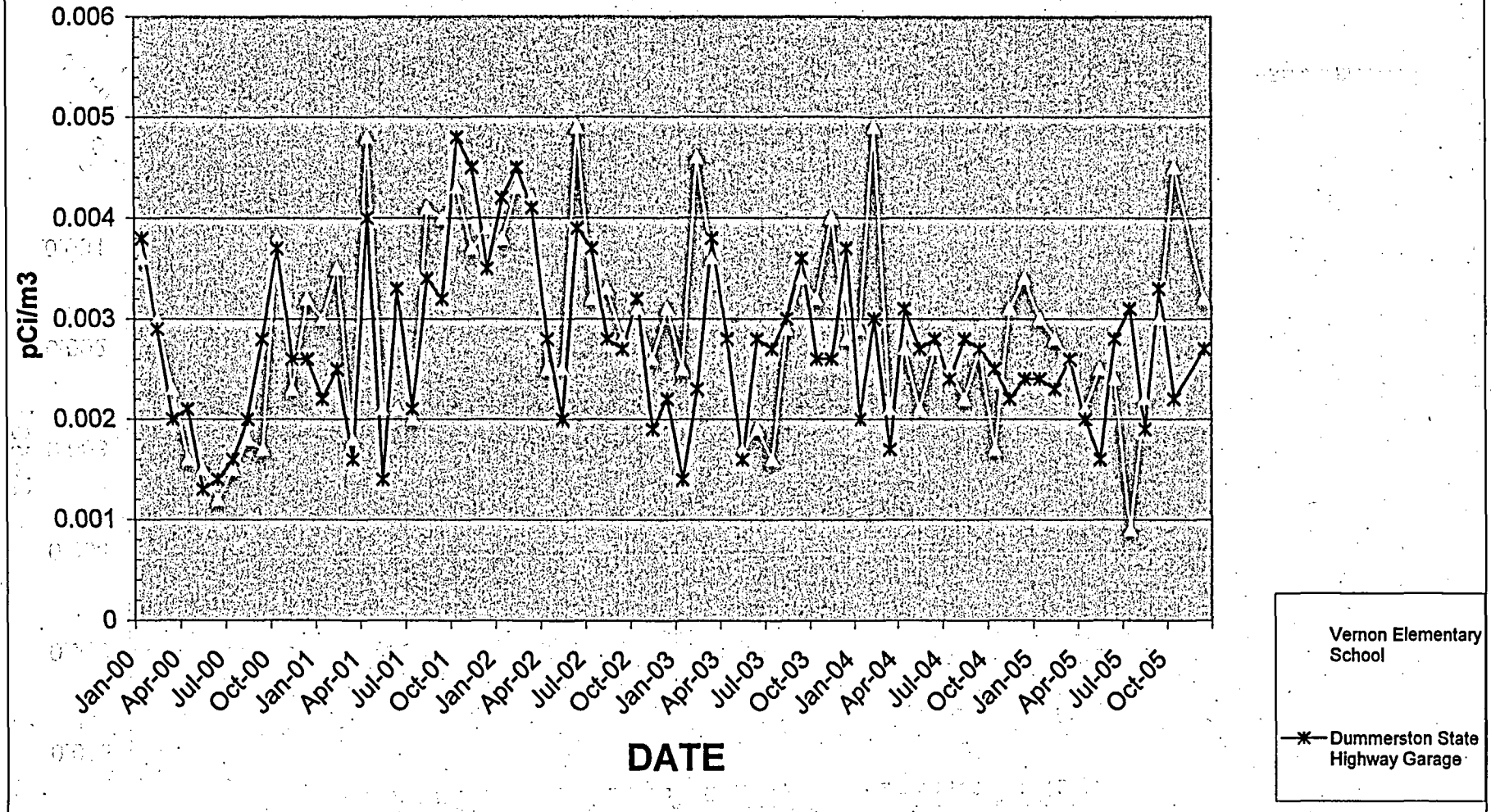
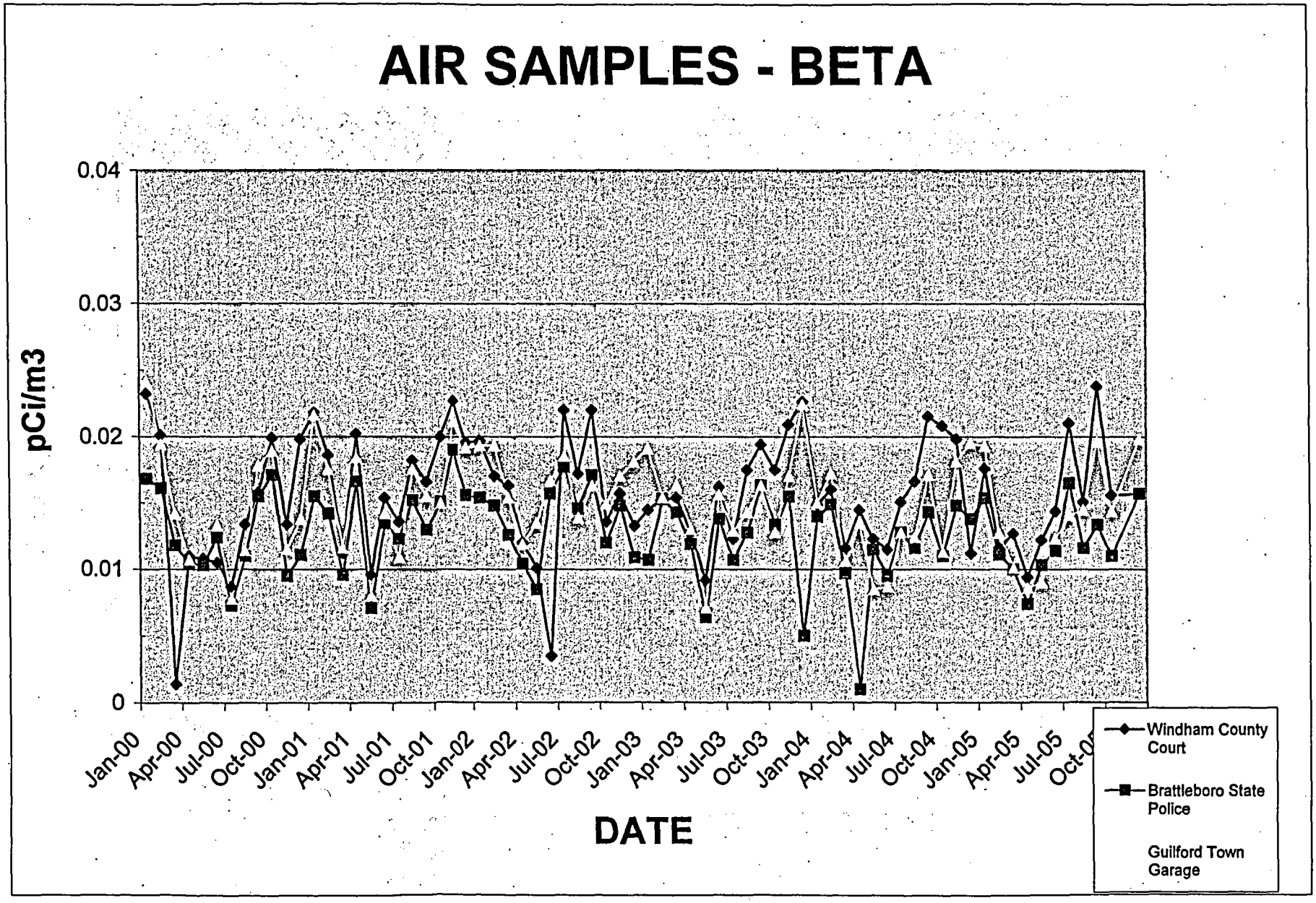
Jul-05
Oct-05
DATE
Renaud Brothers
Wilmington State Highway Garage

AIR SAMPLES - ALPHA




AIR SAMPLES - BETA
pCi/m3
0.04
0.03
0.02
0.01
0
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02
Apr-02
Jul-02
Oct-02
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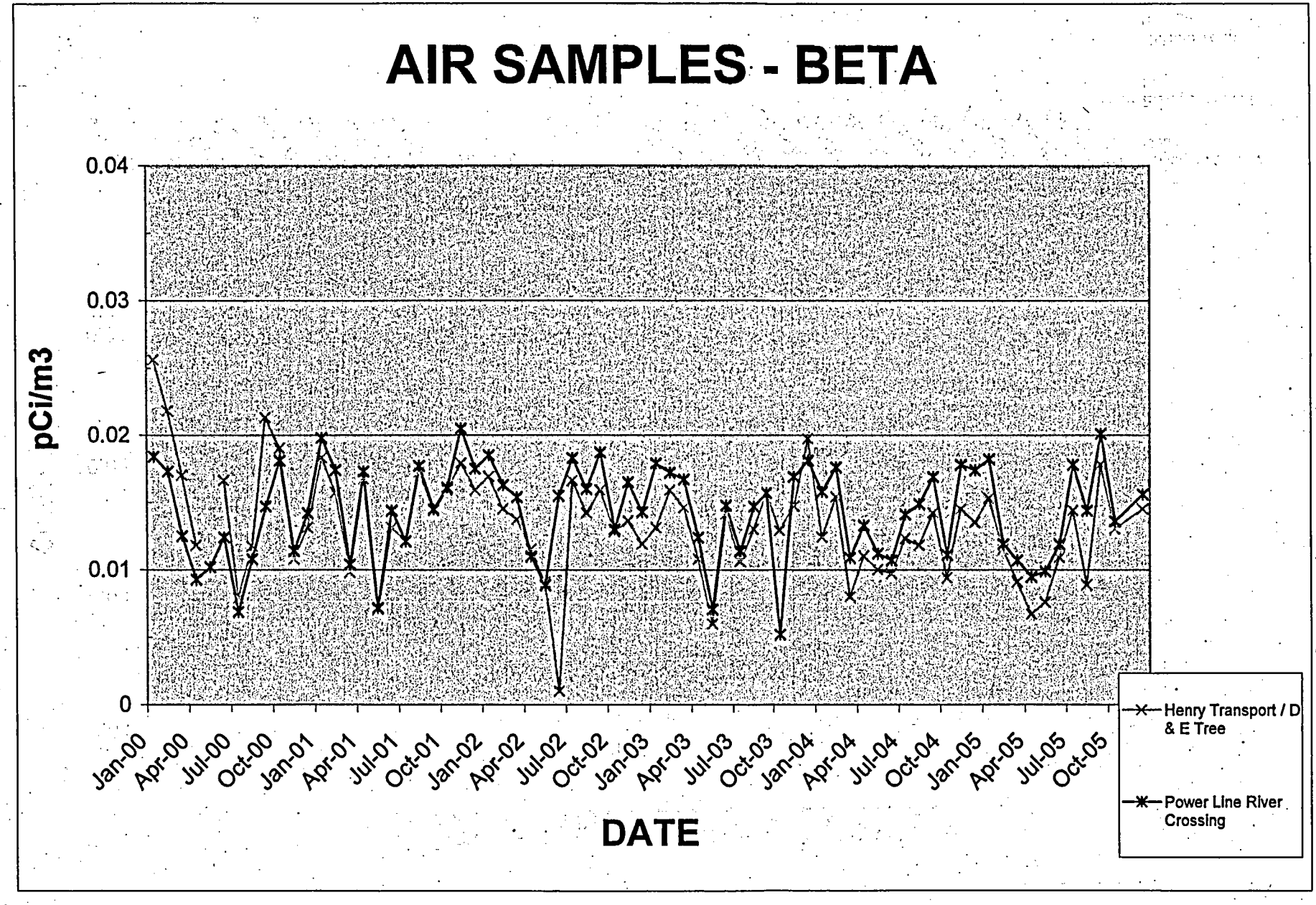
Jan-05
Apr-05
Jul-05
DATE
Windham County Court
Brattleboro State Police
Guilford Town Garage


AIR SAMPLES - BETA
pCi/m3
0.04
0.03
0.02
0.01
0
Jan-00
Apr-00
Jul-00
Oct-00
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Apr-01
Jul-01
Oct-01
Jan-02
Apr-02
Jul-02
Oct-02
Jan-03
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Jul-03
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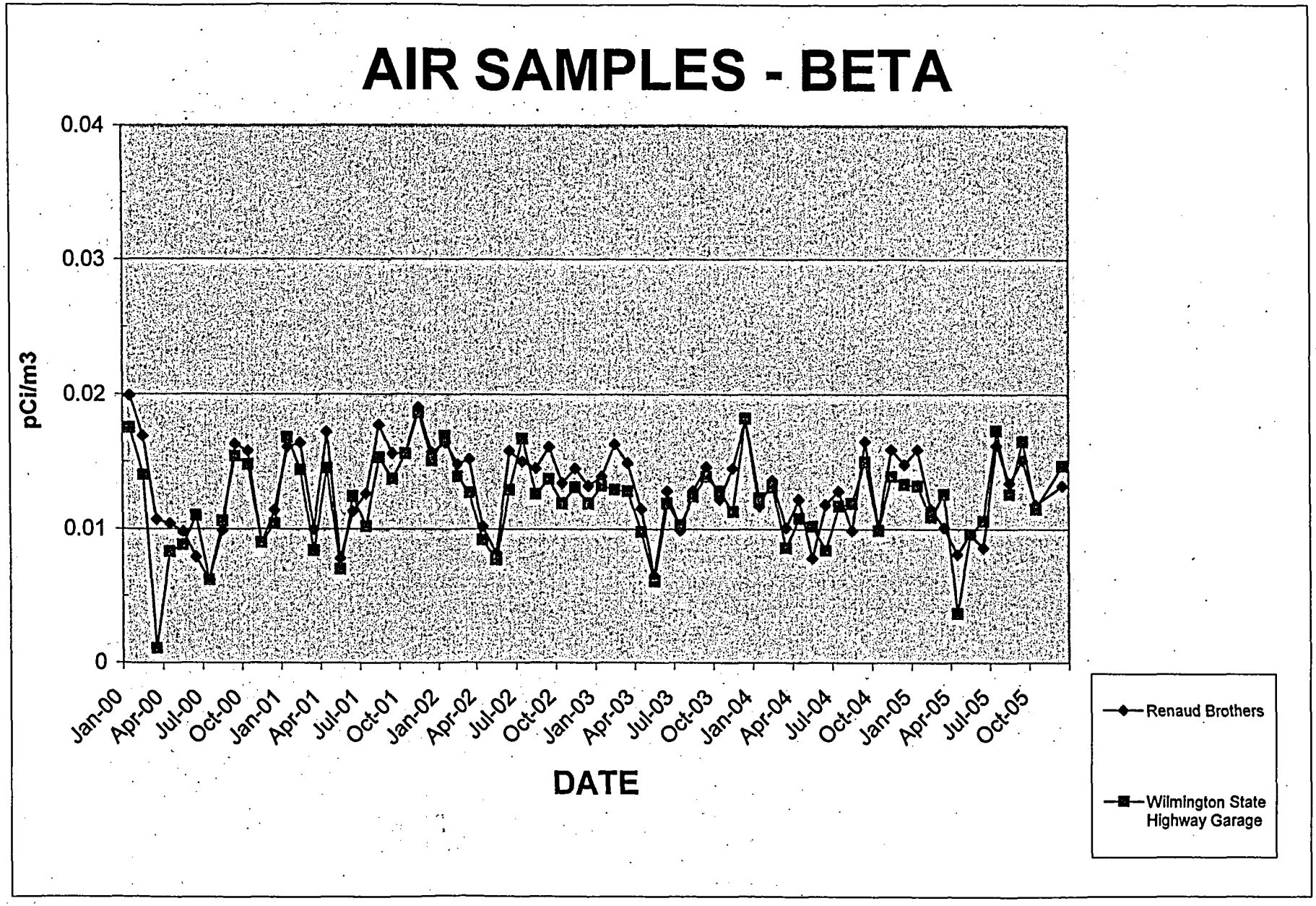
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
DATE
Henry Transport / D & E Tree
Power Line River Crossing


AIR SAMPLES - BETA
pCi/m3
0.04
0.03
0.02
0.01
0
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02
Apr-02
Jul-02
Oct-02
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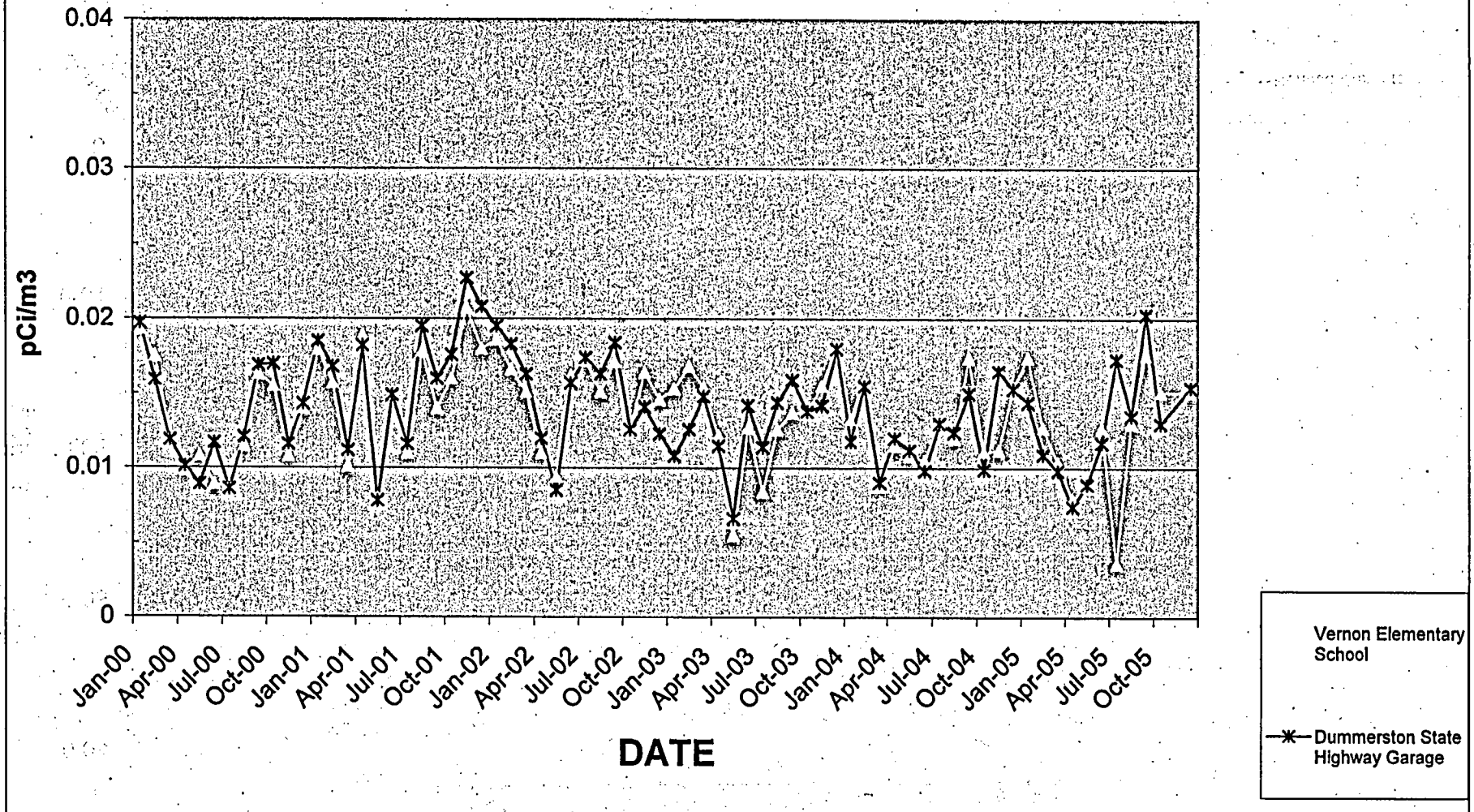
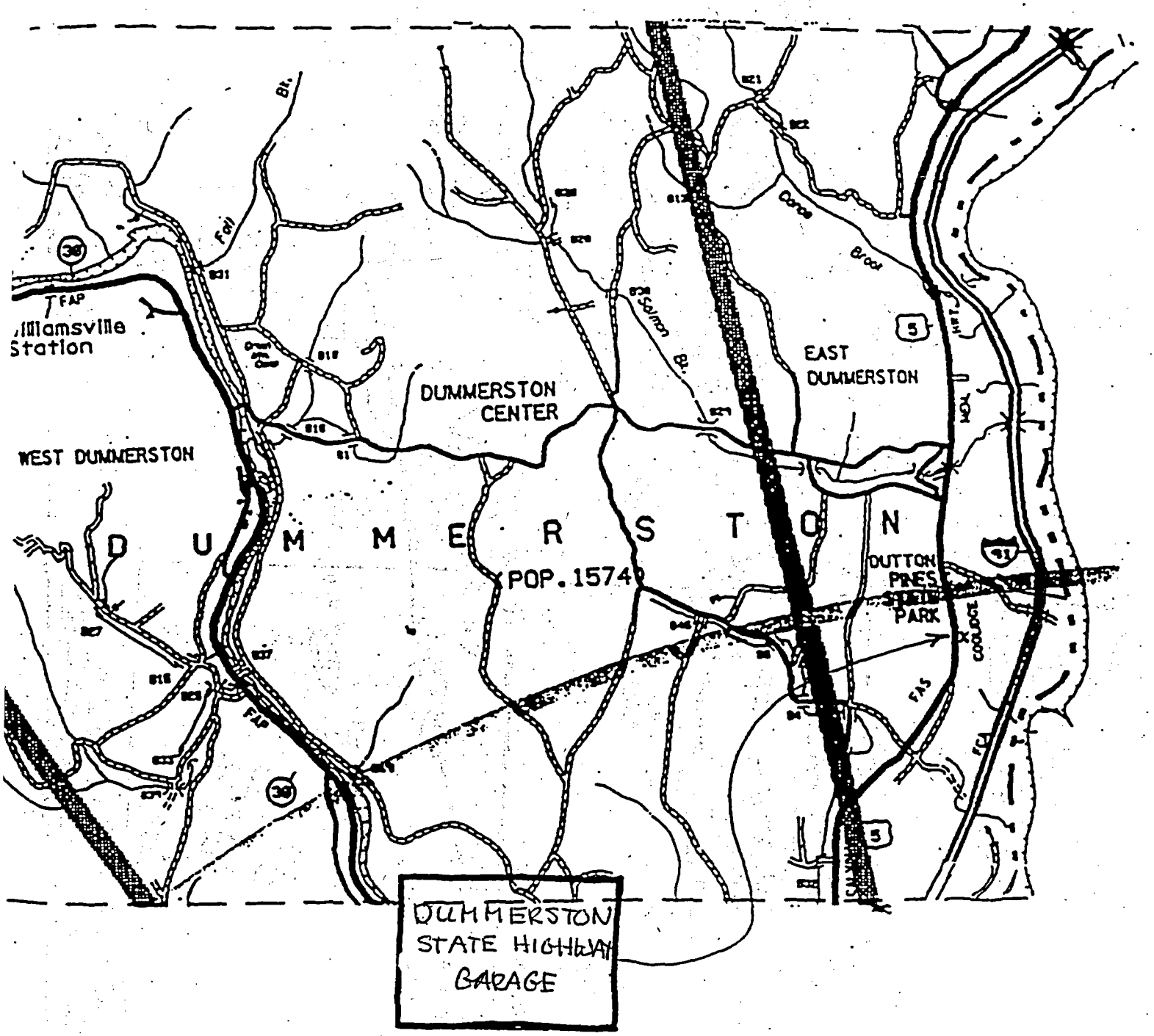
DATE
Renaud Brothers
Wilmington State Highway Garage

AIR SAMPLES - BETA

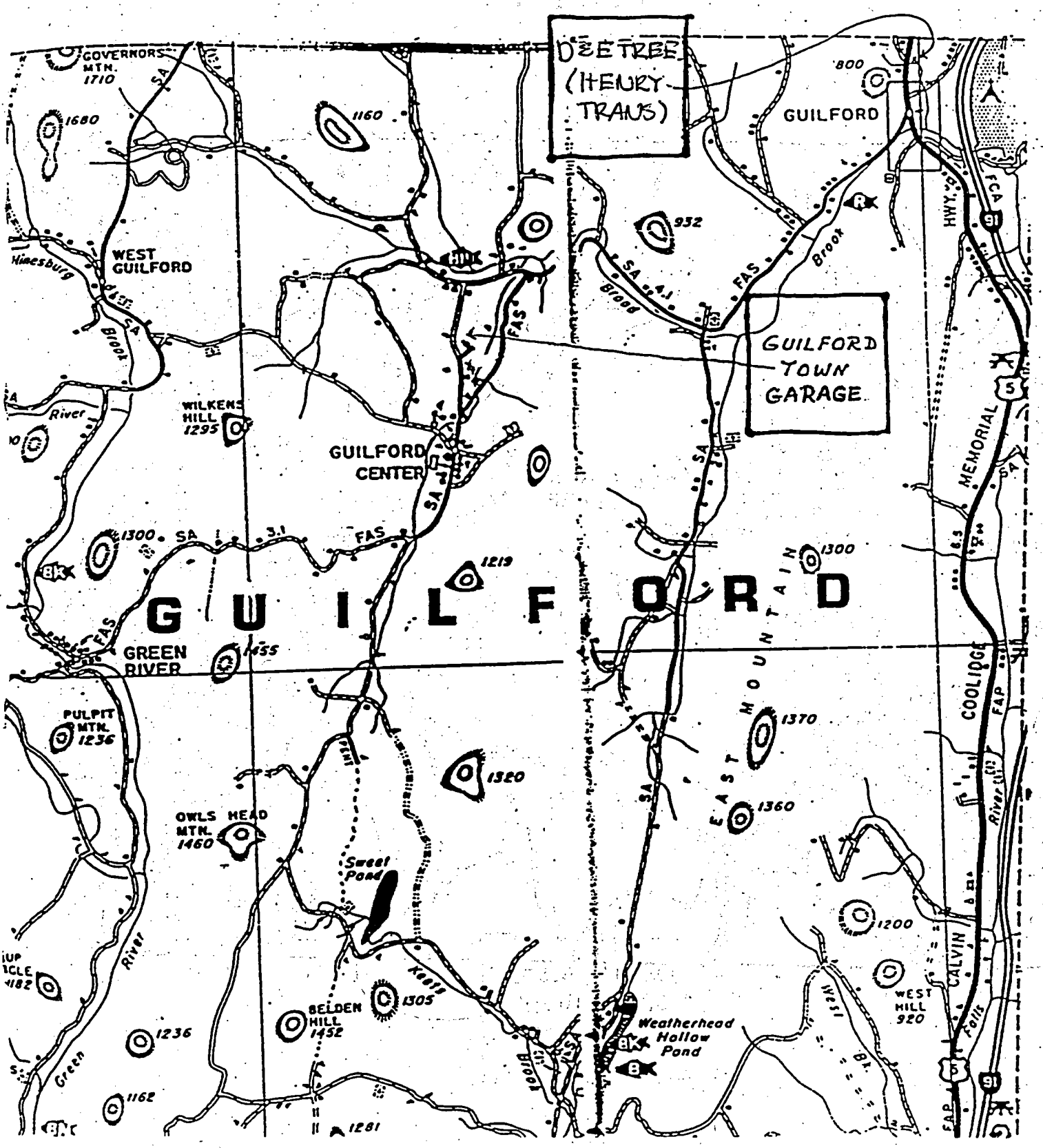


AIR

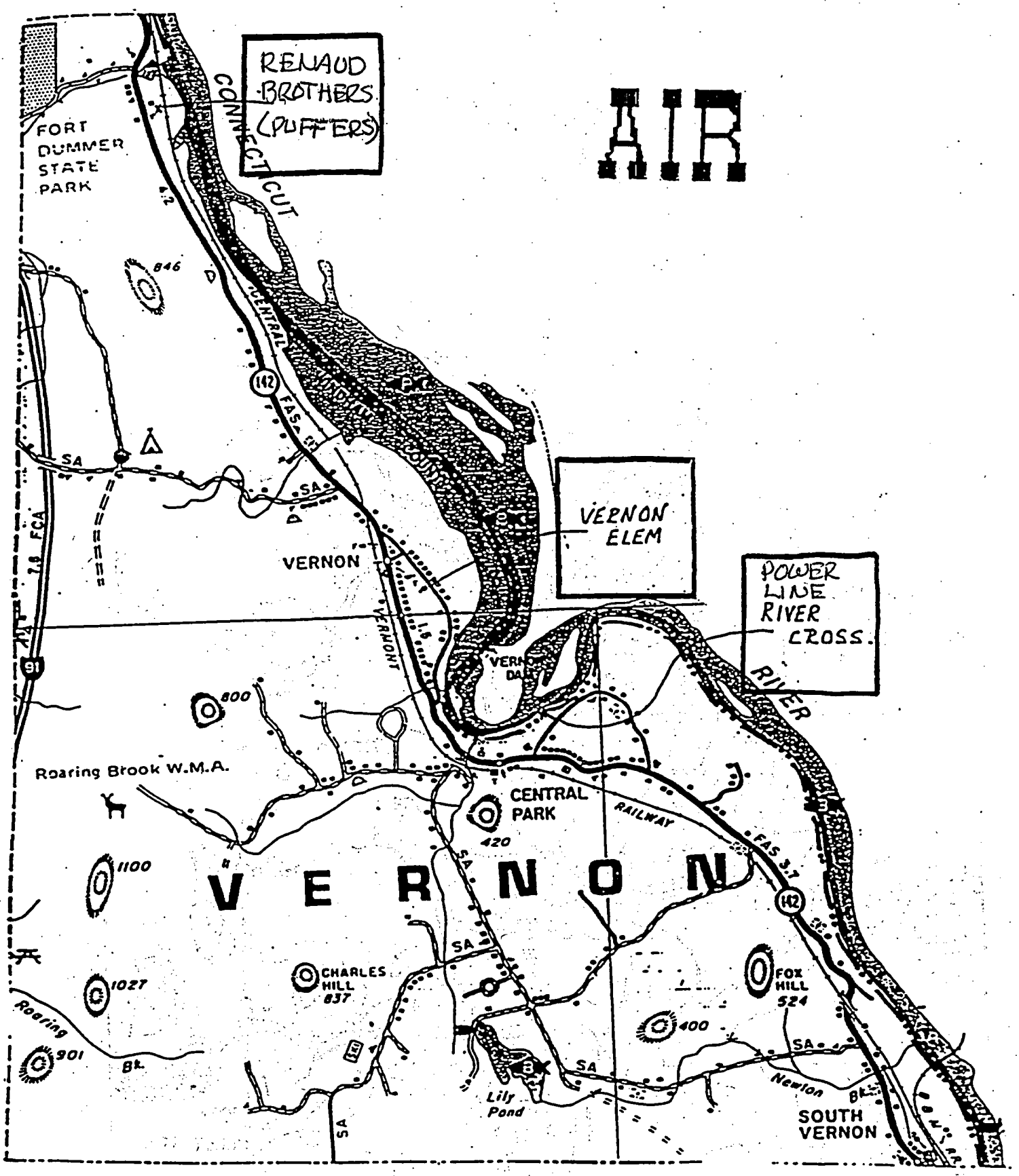


Williamsville Station
FAP
WEST DUMMERSTON
DUMMERSTON CENTER
EAST DUMMERSTON
D U M M E R S T O N
POP. 1574
DUTTON PINES STATE PARK
COOLIDGE
FAS
FCA
Salmon Bk.
Dance Brook
Fall Bk.
DUMMERSTON STATE HIGHWAY GARAGE

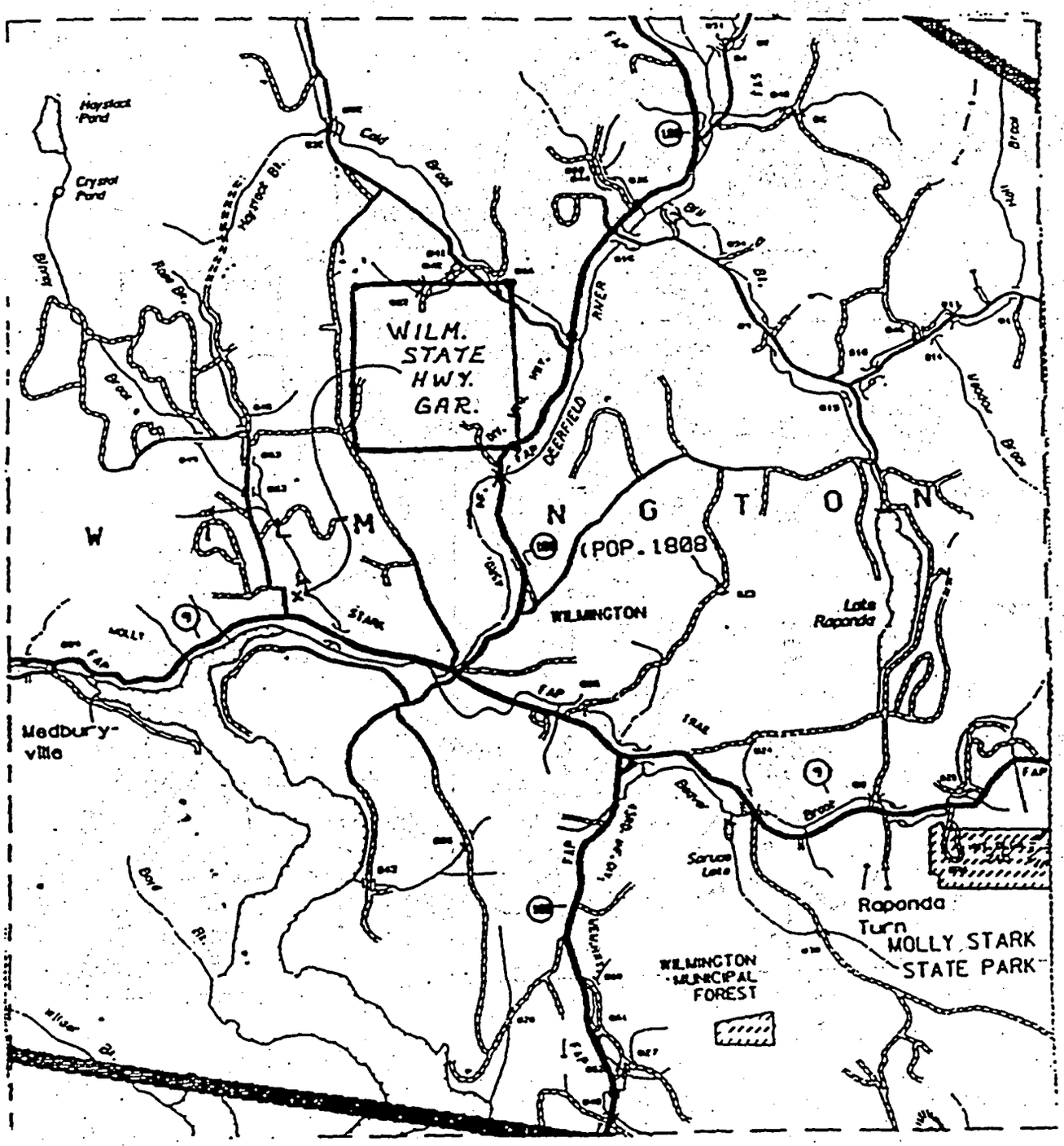
AIR



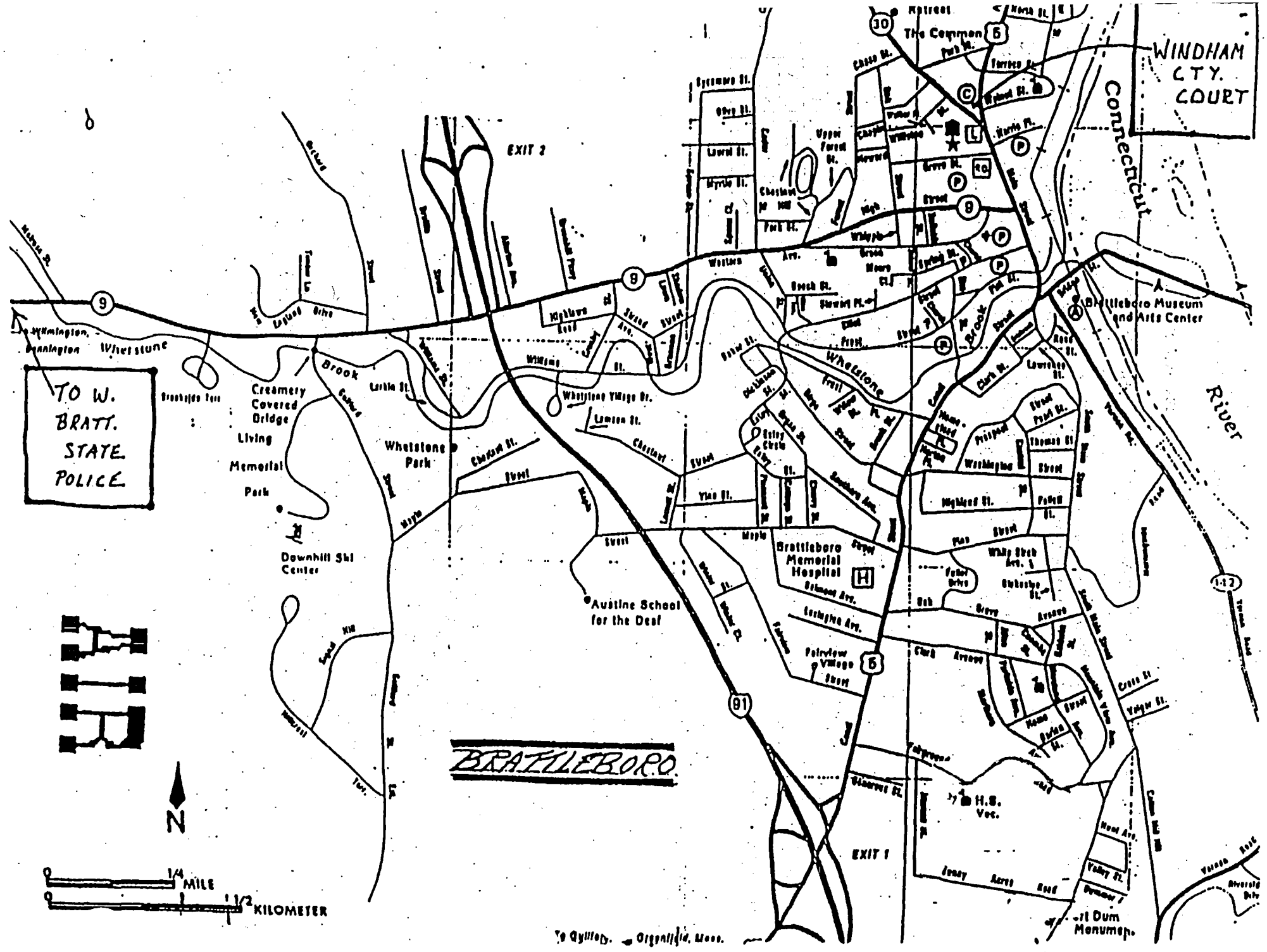
DEETREE (HENRY TRANS)
GUILFORD TOWN GARAGE
GOVERNORS MTN. 1710
1680
1160
800
GUILFORD
932
WEST GUILFORD
Hinesburg
Brook
River
WILKENS HILL 1295
GUILFORD CENTER
1300
1219
GUILFORD
GREEN RIVER
1455
PULPIT MTN. 1236
1320
OWLS HEAD MTN. 1460
Sweet Pond
BELDEN HILL 1452
1305
1236
1162
1281
Green
River
Keats
Brook
Weatherhead Hollow Pond
West Bk.
EAST MOUNTAIN
1370
1360
1200
WEST HILL 920
CALVIN
COOLIDGE
MEMORIAL
HWY.
FCA
FAP
FAS
SA


AIR
RENAUD BROTHERS (PUFFERS)
CONNECTICUT
FORT DUMMER STATE PARK
846
CENTRAL
142
FAS
SA
VERNON
VERNON ELEM
POWER LINE RIVER CROSS.
RIVER
VERMONT
VERNON DAM
91
800
Roaring Brook W.M.A.
CENTRAL PARK
420
RAILWAY
FAS 3.7
1100
VERNON
142
CHARLES HILL
837
FOX HILL
524
1027
400
Roaring
901
Bk.
Lily Pond
Newton
Bk.
SOUTH VERNON

AIR



Haystack Pond
Crystal Pond
Cold Brook
Haystack Bl.
Blinny Brook
Rose Bl.
WILM. STATE HWY. GAR.
DEERFIELD RIVER
W I L M I N G T O N
(POP. 1808
WILMINGTON
Lake Raponda
STARK
MOLLY
FAP
Medbury-ville
Beaver Brook
Sarucs Lake
Raponda Turn
MOLLY STARK STATE PARK
WILMINGTON MUNICIPAL FOREST
Wilder Bl.



WINDHAM CTY. COURT
Connecticut River
The Common
Retreat
EXIT 2
EXIT 1
TO W. BRATT. STATE POLICE
Whetstone
Brook
Creamery Covered Bridge
Living Memorial Park
Downhill Ski Center
Whetstone Park
Austine School for the Deaf
Brattleboro Memorial Hospital
Brattleboro Museum and Arts Center
Fairview Village
H.S. Voc.
BRATTLEBORO
N
1/4 MILE
1/2 KILOMETER

QUARTERLY AIR COMPOSITE 2005

The quarterly air composites for the Year 2005 are within the expected historical range.

The historical range for quarterly air composites (since 2003) for Be-7 is 0.08 to 0.21 pCi/m^3.

Monthly air filters from all air sampling stations were composited for the periods January through March, April through June, July through September, and October through December. Radiochemical analyses were decay corrected to the middle of the composite period, i.e. February 15, May 15, August 16, and November 16. Usual spectra include primordial radionuclides (such as potassium-40), archival cesium-137 and occasional cosmogenic beryllium-7. Reporting units are picocuries per cubic meter (pCi/m^3) with 2 sigma (standard deviation) value.

Quarter	Cesium-137 [1] pCi/m^3	Potassium-40 [2] pCi/m^3	Beryllium-7 [3] pCi/m^3
January to March 2005	< LLD	< LLD	0.1945 ± 0.0133
April to June 2005	< LLD	< LLD	0.1451 ± 0.0113
July to September 2005	< LLD	< LLD	0.1640 ± 0.0115
October to December 2005	< LLD	< LLD	0.0991 ± 0.0078

[1] Archival atmospheric testing
[2] Terrestrial radioactivity
[3] Cosmogenic
LLD = Lower Limit of Detection

BIOTA 2005

All biota samples for the Year 2005 are within the expected historical range.

The historical ranges for plant material:

Cesium-137 [1] is less than the detection limit,
Potassium-40 [2] is from 2,000 to 13,000 pCi/kg,
Beryllium-7 [3] is from less than the detection limit to 1,500 pCi/kg.

The plant sample for 2005 lies within these historical ranges. See table below.

The historical ranges for fungi:

Cesium-137 is 50 to 9,000 pCi/kg,
Potassium-40 is from 1,000 to 12,000 pCi/kg,
Beryllium-7 is less than the detection limit,
Cesium-134 [4] is from less than the detection limit to 45 pCi/kg.

The fungi sample for 2005 lies within these historical ranges. See table below.

The historical ranges for ferns:

Cesium-137 is from less than the detection limit to 540 pCi/kg,
Potassium-40 is from 4,000 to 11,000 pCi/kg,
Beryllium-7 is from 100 to 4,000 pCi/kg.

There fern sample for 2005 lies within these historical ranges. See table below.

Occasional sampling, most often once a year, is done on forage or wild foods as available or needed. Samples are collected (usually in the northwest quadrant) within a mile or two from the facility. These normally consist of ferns (fiddleheads), edible fungi (Clavaria sp., Boleti sp., Russlae sp., grapes, etc.) and grass. Sample sizes range from 250 to 1,000 grams. The samples are weighed, placed wet in re-entrant beakers and analyzed in the Gamma Spectrometer System using a reverse germanium detector. Usual spectra include primordial radionuclides, archival cesium-137 and occasional cosmogenic beryllium-7. Reporting units are picocuries per kilogram with 2 sigma (standard deviation) value.

BIOTA 2005
(picocuries/kilogram)

Location	Season	Biota	Cesium-137 (1)	Potassium-40 (2)	Beryllium-7 (3)
Vernon – Rte 142 Indian Point Park	Summer (June)	Grass	< LLD	5950 ± 680	< LLD
Vernon – Rte 142 Indian Point Park	Fall (October)	Fungi	6130 ± 320	7110 ± 890	< LLD
Vernon – Power Line River Crossing	Spring (May)	Fern	< LLD	5270 ± 570	518 ± 349
Vernon – North of Vernon Elementary School	Summer (June)	Grass	< LLD	4770 ± 450	390 ± 144
Vernon – Miller Farm Outside Milking Parlor	Spring (May)	Grass	< LLD	7530 ± 540	< LLD
Vernon – Miller Farm Outside Milking Parlor	Summer (July)	Grass (5)	< LLD	20400 ± 1200	2560 ± 430
Vernon – North Side of Blodgett Road	Spring (May)	Grass	< LLD	6670 ± 590	< LLD
Vernon – Small Parking Lot on Governor Hunt Road South of Vernon Power Dam Beach	Summer (July)	Grass (4)	< LLD	6570 ± 560	2270 ± 330
Vernon – Vermont Yankee North Fence	Fall (September)	Corn	< LLD	3060 ± 320	689 ± 143
Vernon – Vermont Yankee North Fence	Fall (September)	Alfalfa	< LLD	8620 ± 690	558 ± 139
Wilmington – State Highway Garage	Fall (September)	Sedge/Grass	< LLD	7320 ± 670	< LLD
Shelburne - Background	Fall (September)	Corn	< LLD	3550 ± 300	436 ± 121

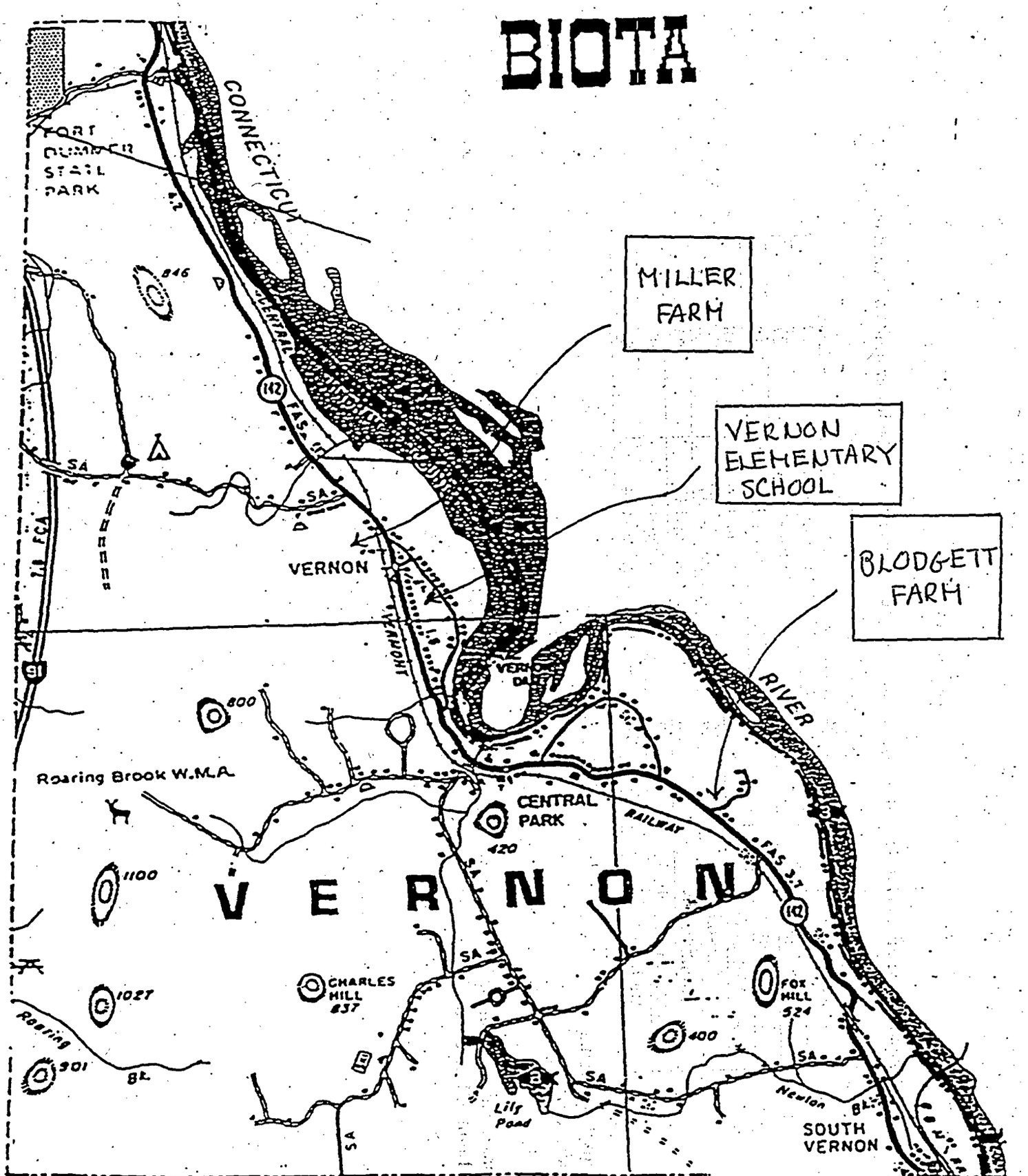
BIOTA 2005

Samples were also evaluated for the radionuclides listed below. None were present in excess of the lower limits of detection.

Radionuclide	LLD	Radionuclide	LLD
Chromium-51	69	Antimony-126	18
Manganese-54	15	Iodine-131	27
Cobalt-56	15	Cesium-134	58
Cobalt-60	21	Cesium-136	18
Zinc-65	18	Cesium-137	5
Strontium-85	86	Cerium-139	93
Ruthenium/Rhenium-103	32	Cerium-141	98
Antimony-124	18	Cerium-144	98

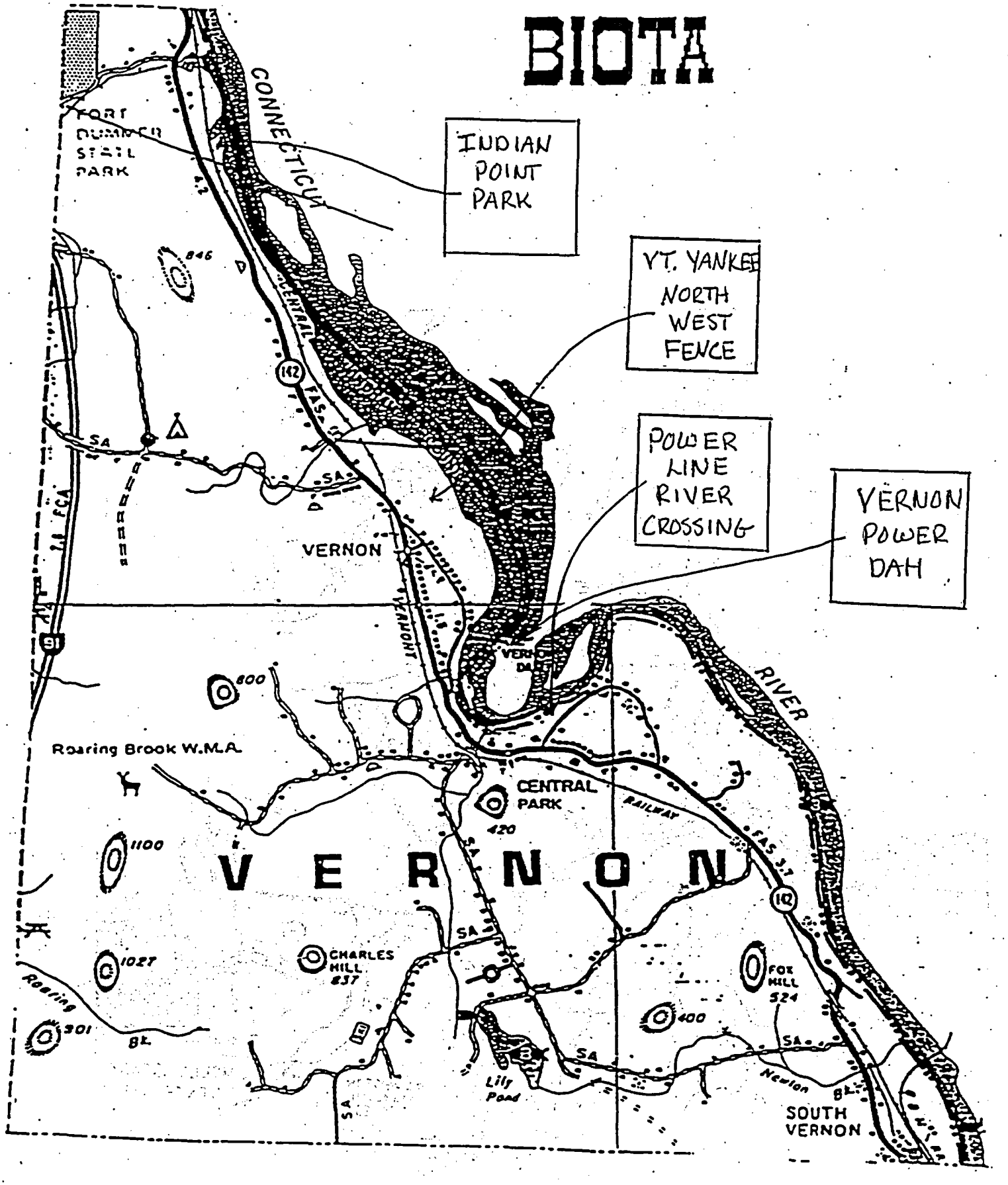
(1)Archival atmospheric testing
(2)Terrestrial radioactivity
(3)Cosmogenic
(4)Chernobyl
(5)Concentrations are higher than the historical range, but are naturally occurring radionuclides.
LLD = Lower Limit of Detection

BIOTA



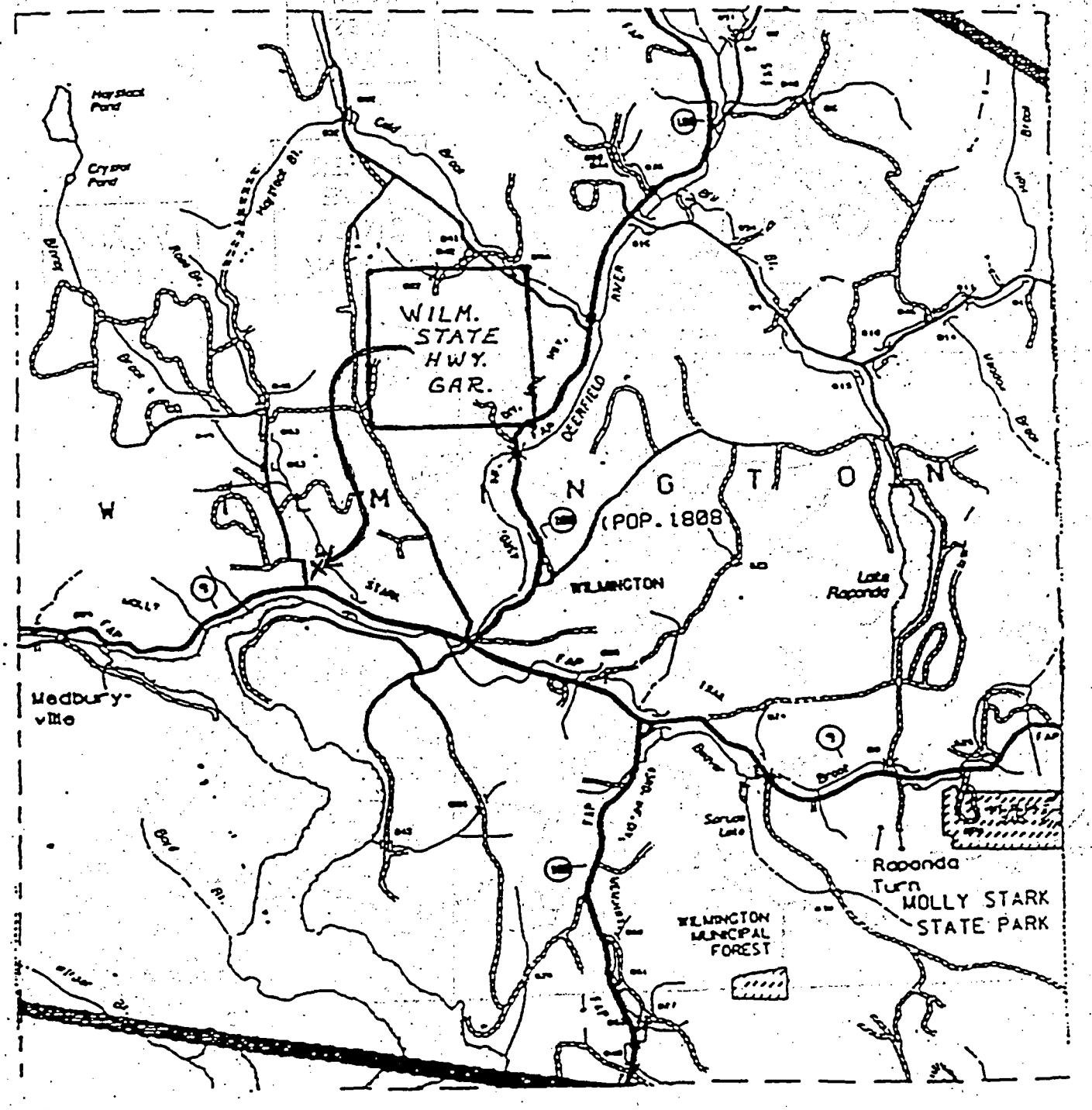
MILLER FARM
VERNON ELEMENTARY SCHOOL
BLODGETT FARM
CONNECTICUT
RIVER
FORT DUMMER STATE PARK
CENTRAL
VERNON
VERMONT
Roaring Brook W.M.A.
CENTRAL PARK
420
RAILWAY
FAS 3.7
VERNON
CHARLES HILL
837
FOX HILL
524
400
Lily Pond
Newton Bk.
SOUTH VERNON
Roaring Bk.
800
1100
1027
901
846
142
91
SA

BIOTA



INDIAN POINT PARK
VT. YANKEE NORTH WEST FENCE
POWER LINE RIVER CROSSING
VERNON POWER DAH
CONNECTICUT
RIVER
FORT DUMMER STATE PARK
VERNON
Roaring Brook W.M.A.
CENTRAL PARK
420
CHARLES HILL
837
FOX HILL
524
Lily Pond
SOUTH VERNON
Newton Bk.
Roaring Bk.
VERNON

BIOTA


WILM.
STATE
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GAR.
W
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(POP. 1808
WILMINGTON
Medbury-
ville
Lake
Raponda
Raponda
Turn
MOLLY STARK
STATE PARK
WILMINGTON
MUNICIPAL
FOREST

FISH 2005

All fish samples for the Year 2005 are within the expected historical range.

The historical range for cesium-137 [1] is from less than the detection limit to 100 pCi/kg. The samples for 2005 are less than the detection limit.

The historical range for potassium-40 [2] is from 1,000 to 5,000 pCi/kg. The samples for 2005 range from 1,960 to 2,290 pCi/kg.

Two locations (3-4 Vernon Pond and 3-8 Route 9 Highway bridge) provide fish samples in the spring and fall of about one kilogram for each sample. Fish are captured via an electroshock method. The fish are frozen whole, weighed, and chopped or blended (entire) for loading into a re-entrant beaker. It is subsequently analyzed with a gamma spectrometer system using a reverse germanium detector. Radionuclides detected usually include naturally occurring potassium-40, thorium and uranium with daughters, archival cesium-137 due to former open atmospheric nuclear tests, and occasional traces of cosmogenic beryllium-7. Reporting units are picocuries per kilogram with 2 sigma (standard deviation) value.

Spring
(picocuries/kilogram)

Site	Cesium-137 Wet Weight	Natural Potassium-40 Wet Weight
3-4	< LLD	1960 ± 610
3-8	< LLD	2030 ± 640

Fall
(picocuries/kilogram)

Site	Cesium-137 Wet Weight	Natural Potassium-40 Wet Weight
3-4	< LLD	2210 ± 690
3-8	< LLD	2290 ± 720

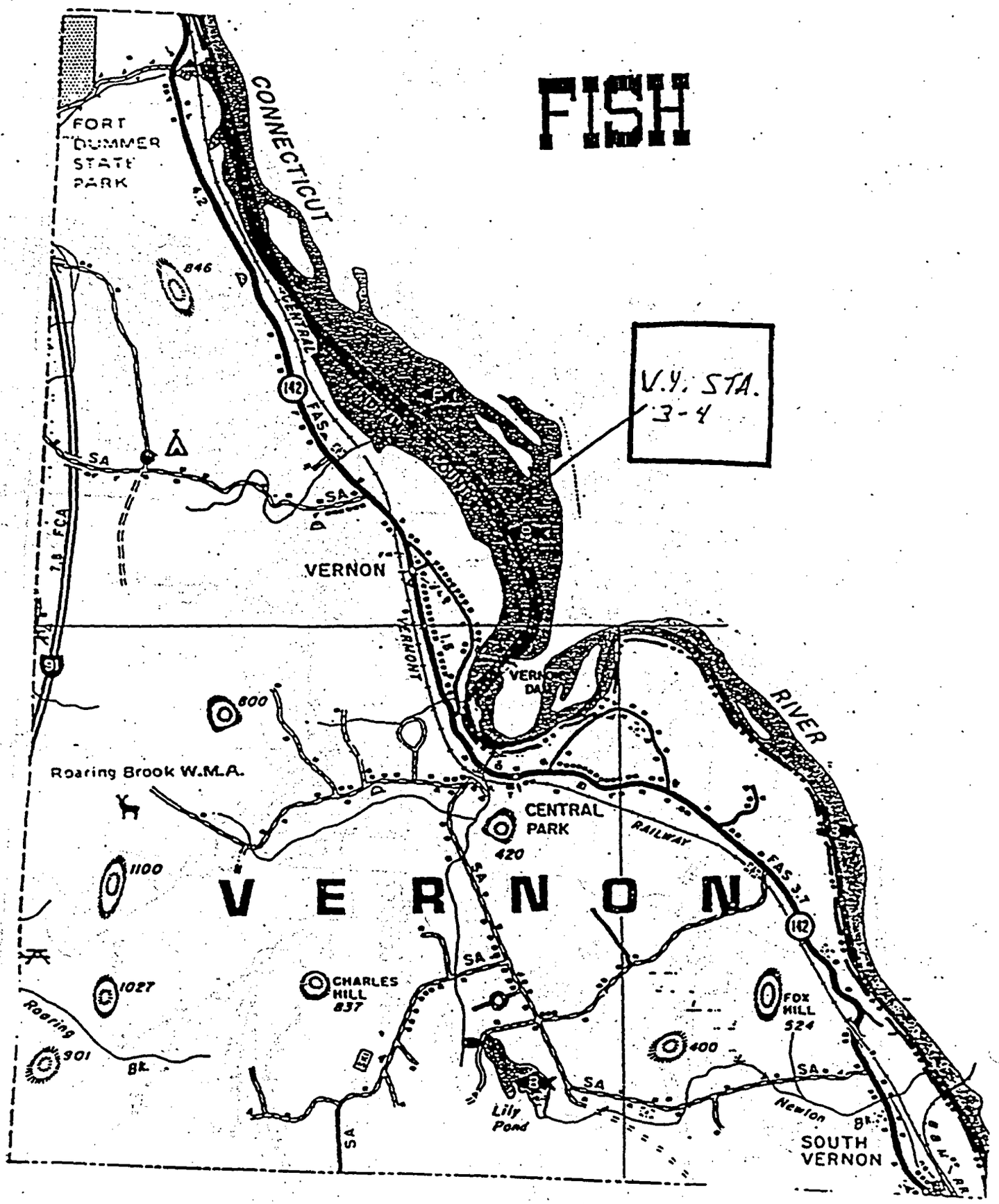
FISH 2005

Samples were also evaluated for the radionuclides listed below. None were present in excess of the lower limits of detection (LLD) which are shown in pCi/kg.

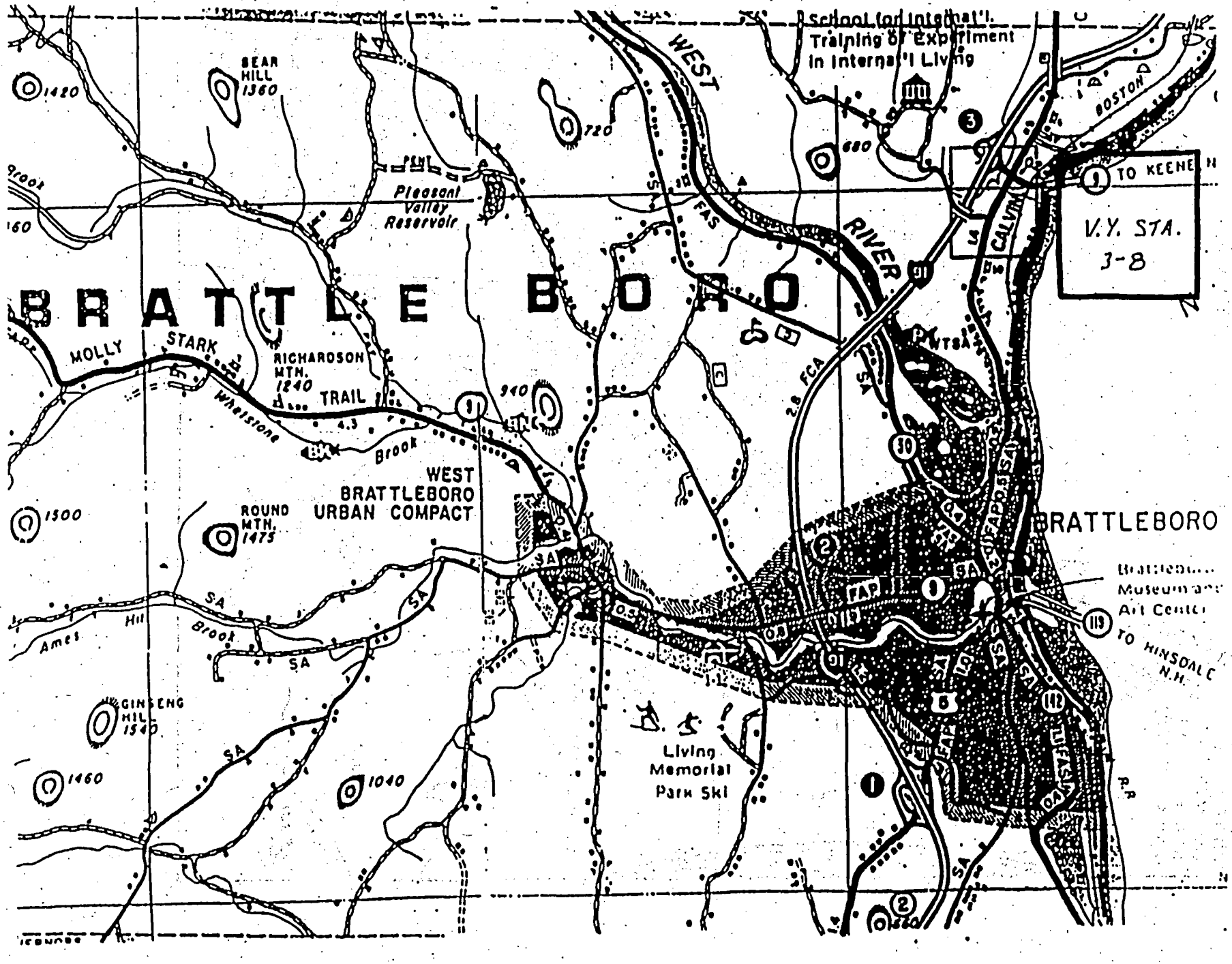
Radionuclide	LLD	Radionuclide	LLD
Chromium-51	69	Antimony-126	18
Manganese-54	15	Iodine-131	27
Cobalt-56	15	Cesium-134	58
Cobalt-60	21	Cesium-136	18
Zinc-65	18	Cesium-137	5
Strontium-85	86	Cerium-139	93
Ruthenium/Rhenium-103	32	Cerium-141	98
Antimony-124	18	Cerium-144	98

(1) Archival atmospheric testing
(2) Terrestrial radioactivity
LLD = Lower Limit of Detection

FISH



V.Y. STA. 3-4
CONNECTICUT
RIVER
FORT DUMMER STATE PARK
846
CENTRAL
142
FAS
SA
VERNON
VERMONT
VERNON DAM
91
800
Roaring Brook W.M.A.
CENTRAL PARK
420
RAILWAY
FAS 3.7
1100
VERNON
1027
CHARLES HILL
837
FOX HILL
524
400
Roaring
901
Bk.
Lily Pond
Newton
Bk.
SOUTH VERNON



School for Internat'l. Training of Experiment in Internat'l Living
BEAR HILL 1360
1420
720
680
WEST
RIVER
BOSTON
TO KEENE
V.Y. STA. 3-8
Pleasant Valley Reservoir
BRATTLE BORO
MOLLY STARK TRAIL
RICHARDSON MTN. 1240
Whetstone Brook
940
WEST BRATTLEBORO URBAN COMPACT
ROUND MTN. 1475
1500
BRATTLEBORO
Museum and Art Center
TO HINSDALE N.H.
Ames Hill Brook
GINSENG HILL 1540
1460
1040
Living Memorial Park Ski

FISH

IODINE CARTRIDGES 2005

All iodine cartridges for the Year 2005 are within the expected historical range.

The historical range for iodine-131 in air cartridges is less than the detection limit. The samples for 2005 were less than the detection limit.

Air samples are taken at various fixed locations using a line powered piston type compressor operating at a rate of 1 cubic foot per minute nominal. The sample is collected on a charcoal cartridge loaded with TEDA (triethylenediamine) for iodine collection. The charcoal cartridge follows the filtration of air by a glass fiber filter in the air sampling train at all air sampling stations. Collection time is continuous with a nominal sampling period of four weeks. Response to the Chernobyl iodine release was marked in 1986, proving the sensitivity to environmental trace levels of iodine of this system. The air cartridges are analyzed for iodine-131 with the gamma spectrometer system using a reverse germanium detector. The nominal lower limit of detection is 2×10^{-2} picocuries per cubic meter of air.

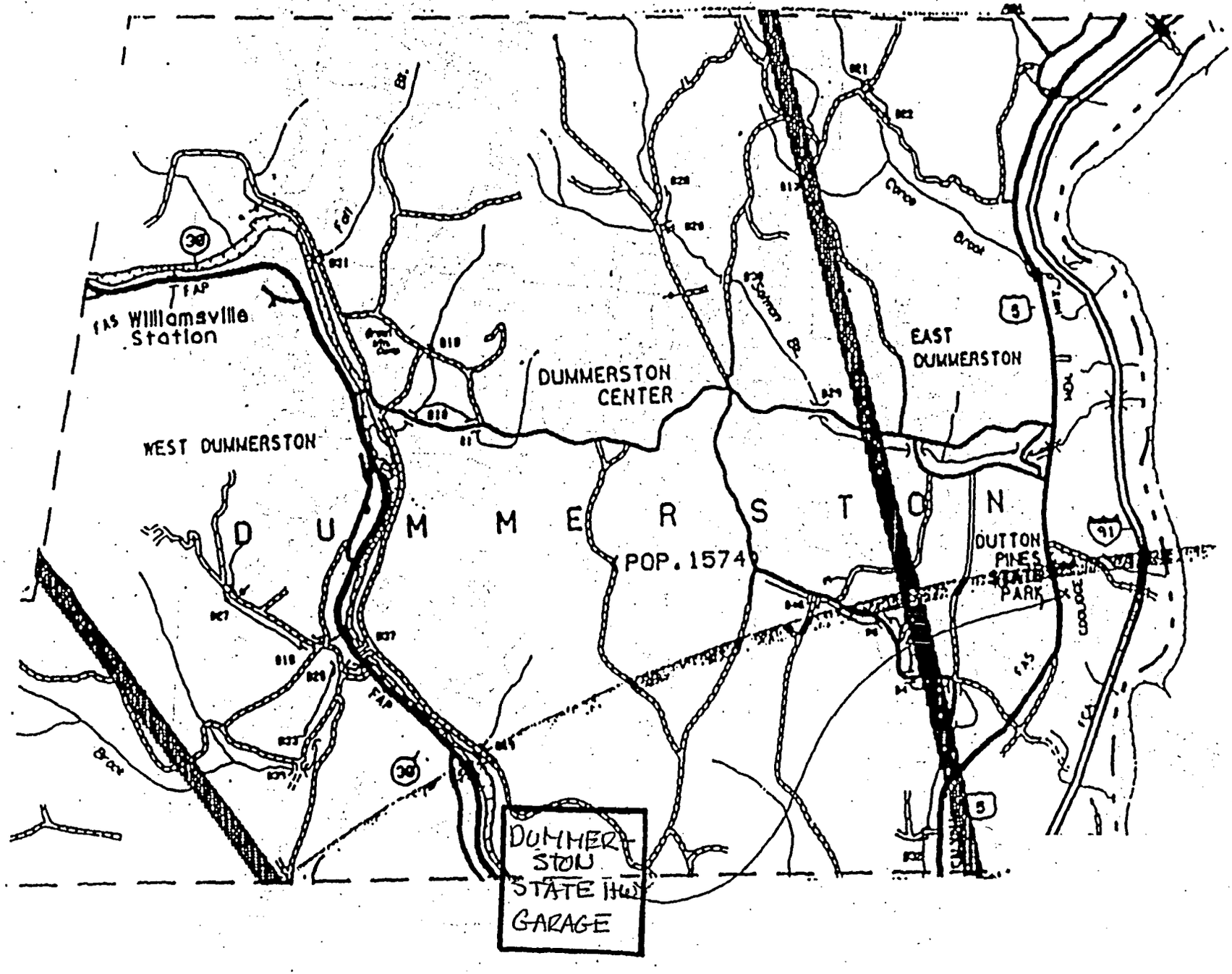
IODINE CARTRIDGES 2005

Sample Period	Dummerston Highway Garage	Vernon School	Renaud Bros Vernon	Brattleboro State Police	Windham County Court
January	< LLD	< LLD	< LLD	< LLD	< LLD
February	< LLD	< LLD	< LLD	< LLD	< LLD
March	< LLD	< LLD	< LLD	< LLD	< LLD
April	< LLD	< LLD	< LLD	< LLD	< LLD
May	< LLD	< LLD	< LLD	< LLD	< LLD
June	< LLD	< LLD	< LLD	< LLD	< LLD
July	< LLD	< LLD	< LLD	< LLD	< LLD
August	< LLD	< LLD	< LLD	< LLD	< LLD
September	< LLD	< LLD	< LLD	< LLD	< LLD
October	< LLD	< LLD	< LLD	< LLD	< LLD
November	< LLD	< LLD	< LLD	< LLD	< LLD
December	< LLD	< LLD	< LLD	< LLD	< LLD

IODINE CARTRIDGES 2005

Sample Period	Powerline River Crossing	Guilford Highway Garage	Wilmington State Highway	D & E Henry's
January	< LLD	< LLD	< LLD	< LLD
February	< LLD	< LLD	< LLD	< LLD
March	< LLD	< LLD	< LLD	< LLD
April	< LLD	< LLD	< LLD	< LLD
May	< LLD	< LLD	< LLD	< LLD
June	< LLD	< LLD	< LLD	< LLD
July	< LLD	< LLD	< LLD	< LLD
August	< LLD	< LLD	< LLD	< LLD
September	< LLD	< LLD	< LLD	< LLD
October	< LLD	< LLD	< LLD	< LLD
November	< LLD	< LLD	< LLD	< LLD
December	< LLD	< LLD	< LLD	< LLD

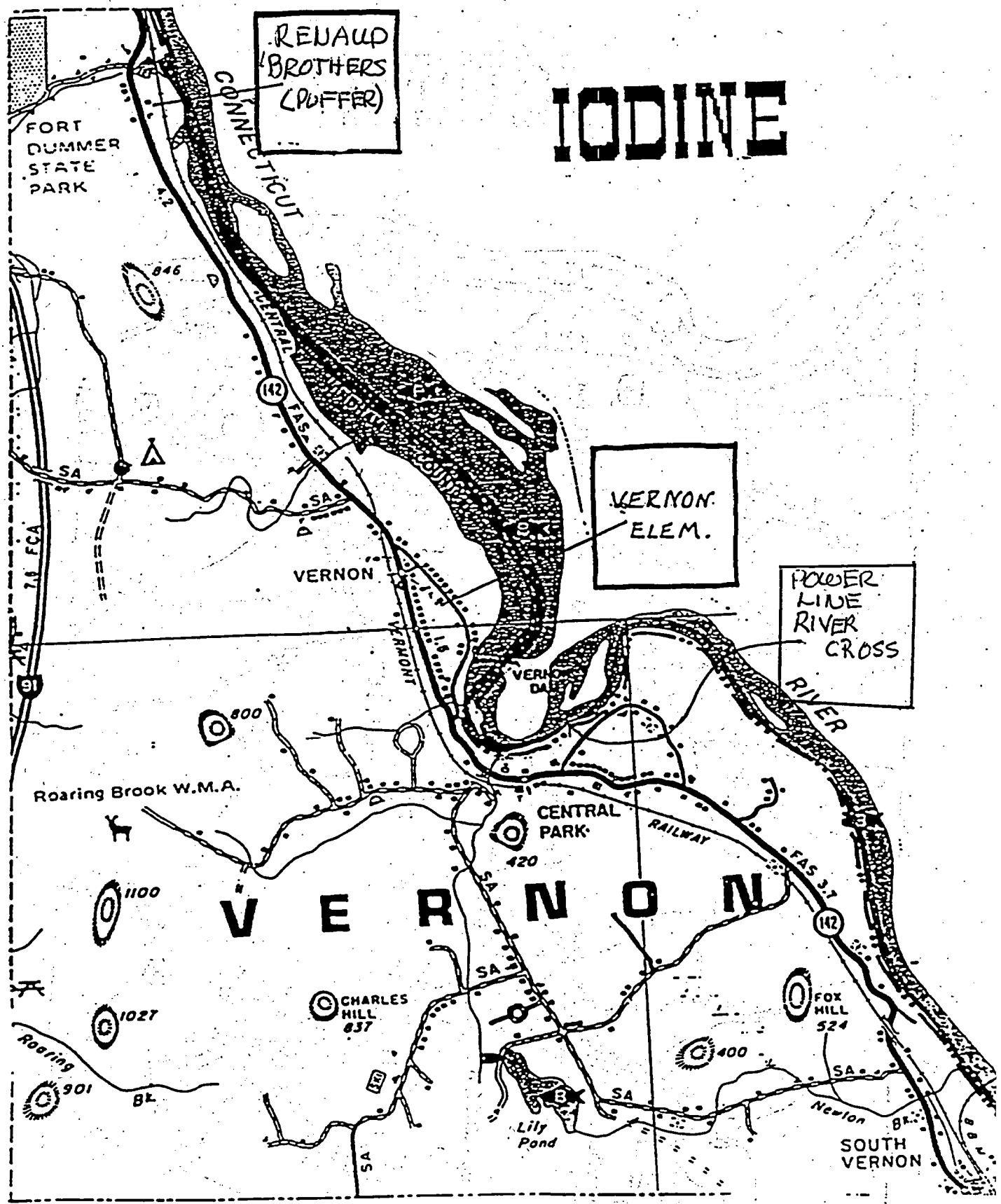
LLD = Lower Limit of Detection



Williamsville Station
WEST DUMMERSTON
DUMMERSTON CENTER
EAST DUMMERSTON
D U M M E R S T O N
POP. 1574
DUTTON PINES STATE PARK
DUMMERSTON STATE HWY GARAGE

IODINE

IODINE


RENAUD BROTHERS (PUFFER)
FORT DUMMER STATE PARK
CONNECTICUT
CENTRAL
VERMONT
VERNON
VERNON ELEM.
POWER LINE RIVER CROSS
RIVER
VERNON DAM
Roaring Brook W.M.A.
CENTRAL PARK
RAILWAY
FAS 3.7
VERNON
CHARLES HILL 837
FOX HILL 524
Roaring Bk.
Lily Pond
Newton Bk.
SOUTH VERNON
846
800
1100
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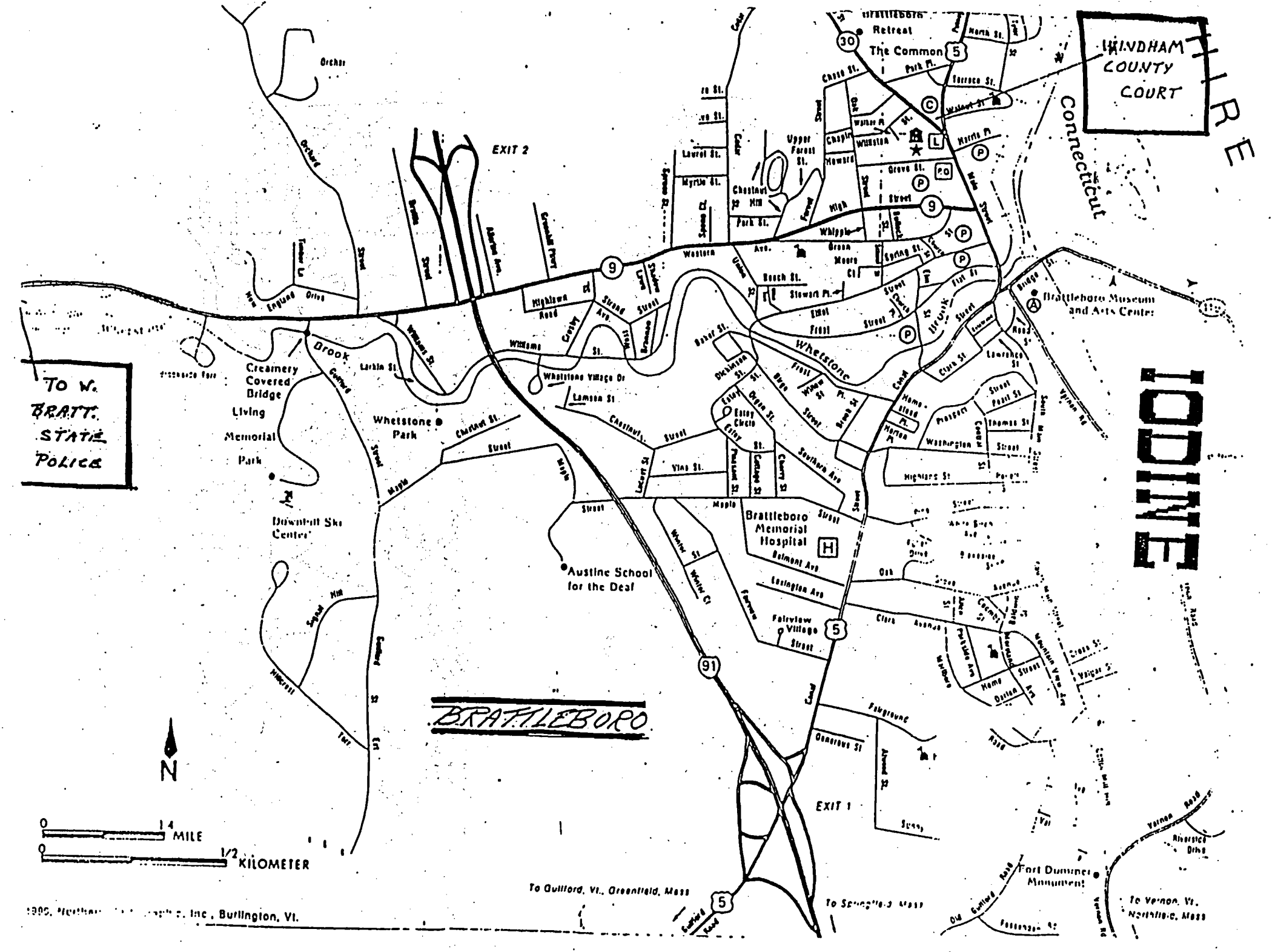
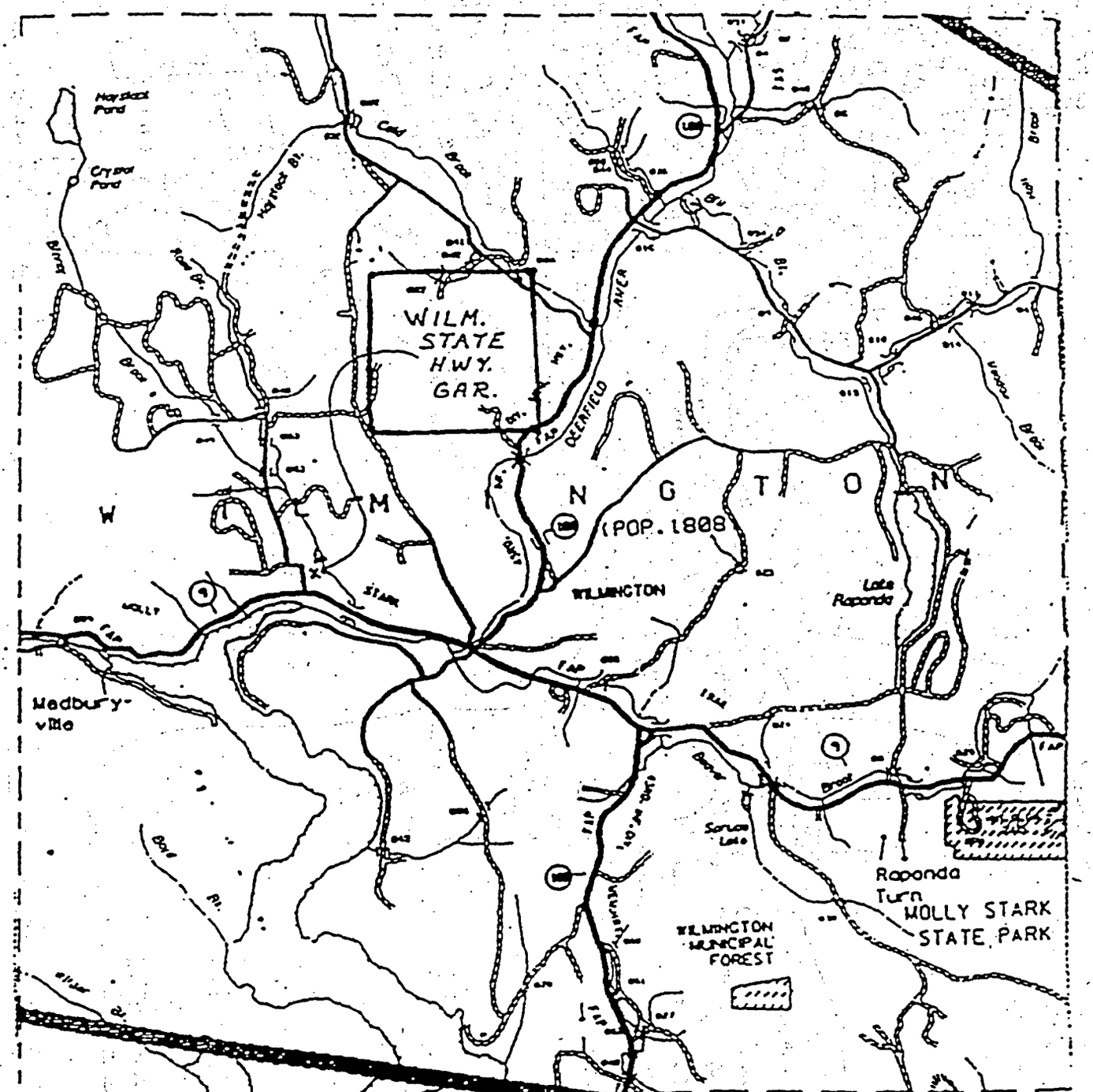
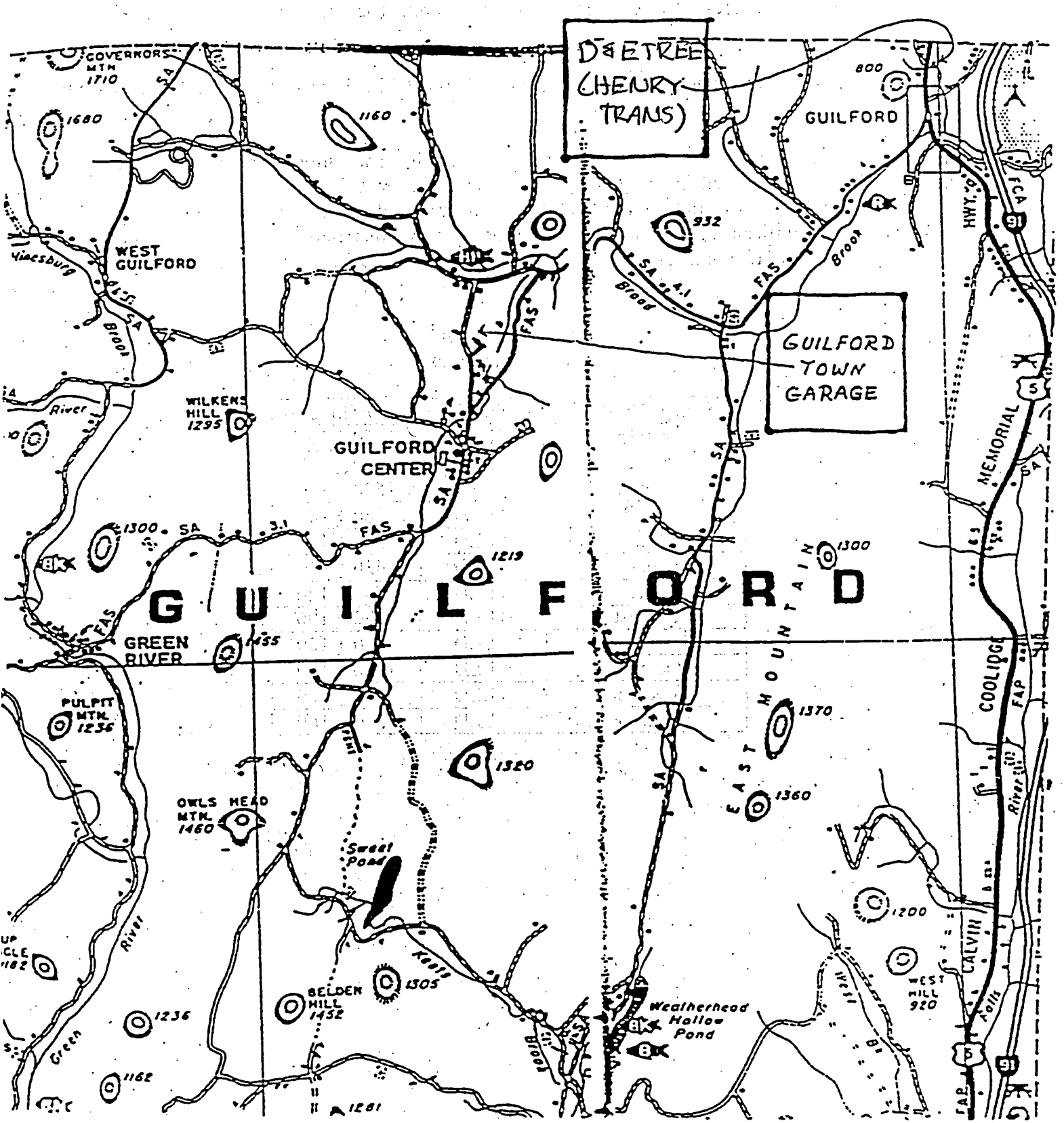
142
91
SA


WINDHAM COUNTY COURT
HIRE
IODINE
TO W. BRATT. STATE POLICE
BRATTLEBORO
Brattleboro Retreat
The Common
Connecticut
EXIT 2
EXIT 1
Brattleboro Museum and Arts Center
Whetstone
Whetstone Park
Creamery Covered Bridge
Living Memorial Park
Downhill Ski Center
Austine School for the Deaf
Brattleboro Memorial Hospital
Fairview Village
Fort Dummer Monument
Brook
Orchard
Upper Forest St.
Chestnut Hill
Western Ave.
Whetstone Village Dr
Lamson St
Chestnut St.
Maple Street
Belmont Ave
Lexington Ave
Fairground
Generous St
Clark Avenue
Washington Street
Highland St
Vernon Road
Riverside Drive
Old Guilford Road
To Guilford, Vt., Greenfield, Mass
To Springfield, Mass
To Vernon, Vt., Northfield, Mass
N
0 1/4 MILE
0 1/2 KILOMETER
1990, Northern Graphic, Inc., Burlington, Vt.

IODINE


WILM.
STATE
H.W.Y.
GAR.
W
M
N G T O N
(POP. 1808)
WILMINGTON
Medbury-
ville
Lake
Raponda
Raponda
Turn
MOLLY STARK
STATE PARK
WILMINGTON
MUNICIPAL
FOREST

IODINE



D&E TREE (HENRY TRANS)
GUILFORD TOWN GARAGE
GUILFORD
GUILFORD CENTER
WEST GUILFORD
GREEN RIVER
GUILFORD
EAST MOUNTAIN
COOLIDGE
MEMORIAL
HWY.
CALVIN
Weatherhead Hollow Pond
Sweet Pond
WILKENS HILL 1295
PULPIT MTN. 1236
OWLS HEAD MTN. 1460
BELDEN HILL 1452
WEST HILL 920
COVERNORS MTN 1710
1680
1160
800
932
1300
1219
1455
1320
1370
1360
1200
1305
1236
1162
1281
SA
FAS
FCA
FAP
Broad
Brook
River
Green
Keats
Falls

MILK 2005

All milk samples for the Year 2005 are within the expected historical range.

The historical range for iodine-131 is less than the detection limit. The samples for 2005 are all less than the detection limit.

The historical range for potassium-40 [1] is from 1,200 to 2,000 pCi/L. The samples for 2005 range from 1,350 to 1,690 pCi/L.

Milk sampling is performed at a frequency of once per month. The samples are measured, placed into reentrant beakers and analyzed in the gamma spectrometer system using a reverse germanium detector. Usual spectra include terrestrial potassium-40. The nominal detection limit for iodine-131 is 10 picoCuries/liter. Significant indications of the presence of any other radionuclides are investigated and reported if found. Reporting units are picocuries per liter with 2 sigma (standard deviation) value.

Blodgett Farm
(picocuries/liter)

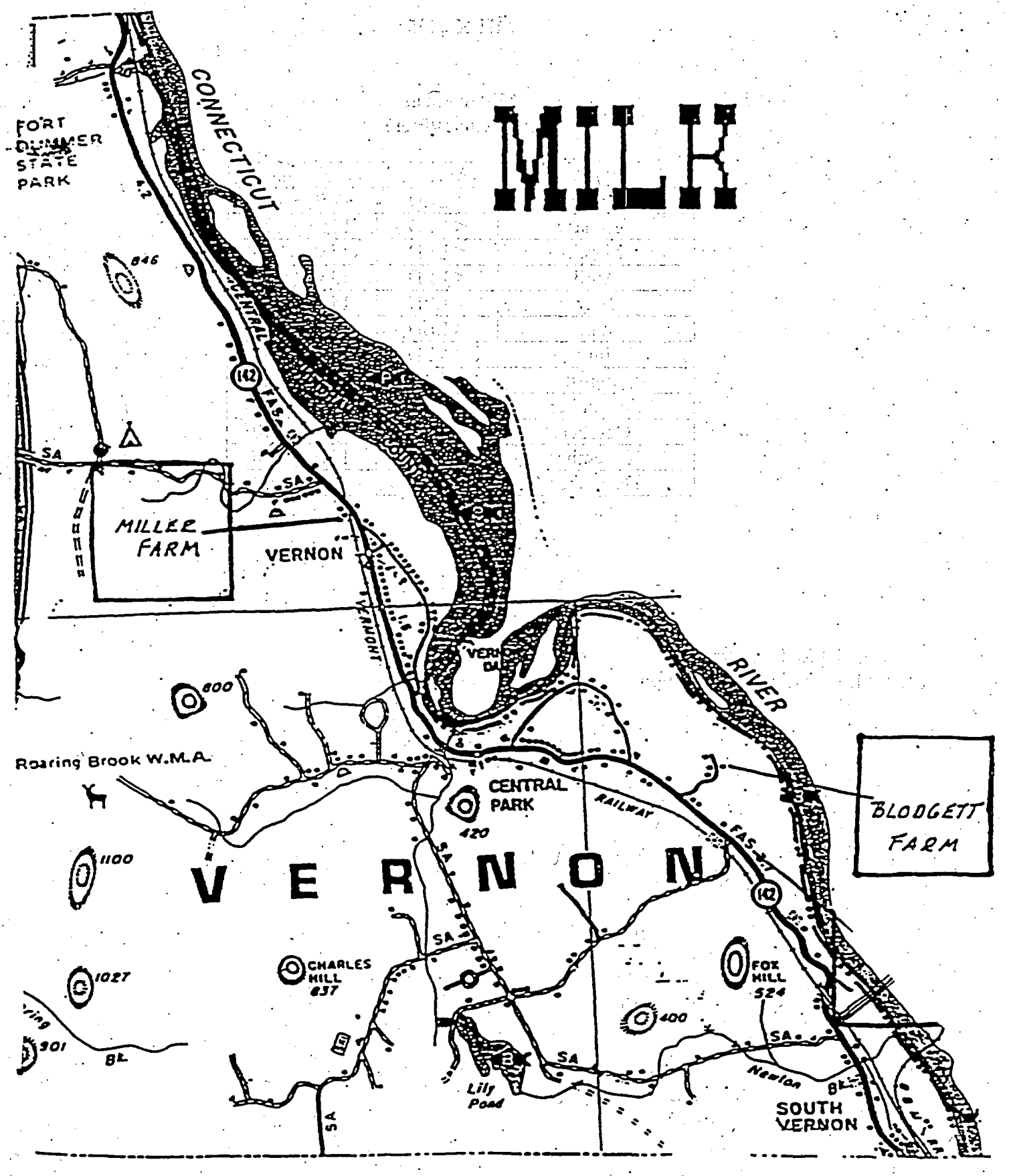
Sample Period	Iodine-131	Potassium-40
January	< LLD	1650 ± 130
February	< LLD	1490 ± 130
March	< LLD	1520 ± 120
April	< LLD	1360 ± 100
May	< LLD	1520 ± 120
June	< LLD	1430 ± 110
July	< LLD	1580 ± 120
August	< LLD	1550 ± 100
September	< LLD	1560 ± 120
October	< LLD	1610 ± 120
November	< LLD	1530 ± 120
December	< LLD	1520 ± 100

MILK 2005

Miller Farm
(picocuries/liter)

Sample Period	Iodine-131	Potassium-40
January	< LLD	1450 ± 120
February	< LLD	1350 ± 120
March	< LLD	1580 ± 130
April	< LLD	1450 ± 110
May	< LLD	1440 ± 120
June	< LLD	1500 ± 100
July	< LLD	1360 ± 90
August	< LLD	1460 ± 120
September	< LLD	1600 ± 120
October	< LLD	1470 ± 100
November	< LLD	1690 ± 120
December	< LLD	1510 ± 100

[1]Terrestrial Radioactivity
LLD = Lower Limit of Detection


MILK
CONNECTICUT
RIVER
FORT DUMMER STATE PARK
846
CENTRAL
142
FAS
SA
MILLER FARM
VERNON
VERMONT
800
Roaring Brook W.M.A.
CENTRAL PARK
420
RAILWAY
FAS
BLODGETT FARM
1100
VERNON
142
SA
CHARLES HILL
837
FOX HILL
524
1027
400
901
BK
SA
Lily Pond
Newton
BK
SOUTH VERNON
SA

NORTH STORM DRAIN SEDIMENTS 2005

All north storm drain sediment samples for the Year 2005 are within the expected historical range.

The historical range for beryllium-7 [1] is from less than the detection limit to 3,000 pCi/kg. The samples for 2005 range from less than the detection limit to 947 pCi/kg.

The historical range for cobalt-60 [2] is from less than the detection limit to 2,500 pCi/kg. The samples for 2005 range from less than the detection limit to 335 pCi/kg.

The historical range for potassium-40 [3] is from 6,000 to 26,000 pCi/kg. The samples for 2005 range from 12,200 to 24,900 pCi/kg.

The historical range for cesium-137 [4] is from less than the detection limit to 500 pCi/kg. The samples for 2005 ranged from 97.4 to 241 pCi/kg.

Sediment samples from the north storm drain are taken biannually in the spring and fall. A sediment sample is taken ranging from approximately 0.75 to 1.25 kilograms from the Connecticut River at up to 40 separate locations in a grid around the discharge structure. The sample is dried, weighed on a top loaded balance and placed in a 500 milliliter HDPE (high density polyethylene) bottle. The sample is counted on the gamma spectrometer system using a reverse germanium detector. A normal spectrum will include primordial radionuclides with daughters, and archival cesium-137 from former open atmospheric nuclear testing. On occasion short-lived cosmogenic beryllium-7 and cobalt-60 can be discerned. Reporting units are picocuries per kilogram with 2 sigma (standard deviation) value.

NORTH STORM DRAIN SEDIMENTS 2005

SPRING 2005
(picocurie/kilogram)

Grid Location	Beryllium-7	Cobalt-60	Potassium-40	Cesium-137
S-1	< LLD	< LLD	20200 ± 1300	165 ± 34
S-2	< LLD	< LLD	24900 ± 1500	241 ± 57
S-3	*	*	*	*
S-4	*	*	*	*
S-5	*	*	*	*
T-1	< LLD	< LLD	16400 ± 1000	153 ± 51
T-2	< LLD	335 + 39	17800 ± 1100	150 ± 33
T-3	< LLD	< LLD	16400 ± 1100	149 ± 41
T-4	*	*	*	*
T-5	*	*	*	*
U-1	< LLD	< LLD	17100 ± 1200	129 ± 50
U-2	< LLD	< LLD	22200 ± 1300	172 ± 42
U-3	< LLD	< LLD	19600 ± 1300	144 ± 53
U-4	< LLD	< LLD	18000 ± 1200	117 ± 37
U-5	*	*	*	*
V-1	*	*	*	*
V-2	*	*	*	*
V-3	*	*	*	*
V-4	< LLD	< LLD	18300 ± 1200	180 + 41
V-5	< LLD	< LLD	16000 ± 1100	126 + 43
W-1	*	*	*	*
W-2	*	*	*	*
W-3	*	*	*	*
W-4	< LLD	< LLD	16100 ± 1000	120 ± 28
W-5	< LLD	< LLD	17600 ± 1100	122 ± 31
X-1	*	*	*	*
X-2	*	*	*	*
X-3	*	*	*	*
X-4	*	*	*	*
X-5	*	*	*	*
Y-1	*	*	*	*
Y-2	*	*	*	*
Y-3	*	*	*	*
Y-4	*	*	*	*
Y-5	*	*	*	*
Z-1	*	*	*	*
Z-2	*	*	*	*
Z-3	*	*	*	*
Z-4	*	*	*	*
Z-5	*	*	*	*

NORTH STORM DRAIN SEDIMENTS 2005

FALL 2005
(picocurie/kilogram)

Grid Location	Beryllium-7	Cobalt-60	Potassium-40	Cesium-137
S-1	< LLD	< LLD	18000 ± 1100	108 ± 46
S-2	< LLD	< LLD	19400 ± 1200	169 ± 30
S-3	*	*	*	*
S-4	*	*	*	*
S-5	*	*	*	*
T-1	< LLD	< LLD	12200 ± 700	97.4 ± 23.0
T-2	947 ± 252	< LLD	12200 ± 800	114 ± 27
T-3	< LLD	< LLD	18900 ± 1200	147 ± 35
T-4	*	*	*	*
T-5	*	*	*	*
U-1	< LLD	< LLD	18000 ± 1200	107 ± 43
U-2	< LLD	< LLD	18300 ± 1100	127 ± 42
U-3	< LLD	< LLD	18900 ± 1100	159 ± 33
U-4	< LLD	< LLD	16600 ± 1000	102 ± 34
U-5	*	*	*	*
V-1	*	*	*	*
V-2	*	*	*	*
V-3	< LLD	< LLD	17500 ± 1600	111 ± 28
V-4	< LLD	< LLD	18800 ± 1100	129 ± 31
V-5	< LLD	< LLD	15100 ± 1000	99.7 ± 37.4
W-1	*	*	*	*
W-2	*	*	*	*
W-3	*	*	*	*
W-4	< LLD	< LLD	17800 ± 1700	157 ± 42
W-5	< LLD	< LLD	16200 ± 1000	93.6 ± 24.5
X-1	*	*	*	*
X-2	*	*	*	*
X-3	*	*	*	*
X-4	*	*	*	*
X-5	< LLD	< LLD	16400 ± 1000	112 ± 32
Y-1	*	*	*	*
Y-2	*	*	*	*
Y-3	*	*	*	*
Y-4	*	*	*	*
Y-5	*	*	*	*
Z-1	*	*	*	*
Z-2	*	*	*	*
Z-3	*	*	*	*
Z-4	*	*	*	*
Z-5	*	*	*	*

NORTH STORM DRAIN SEDIMENTS 2005

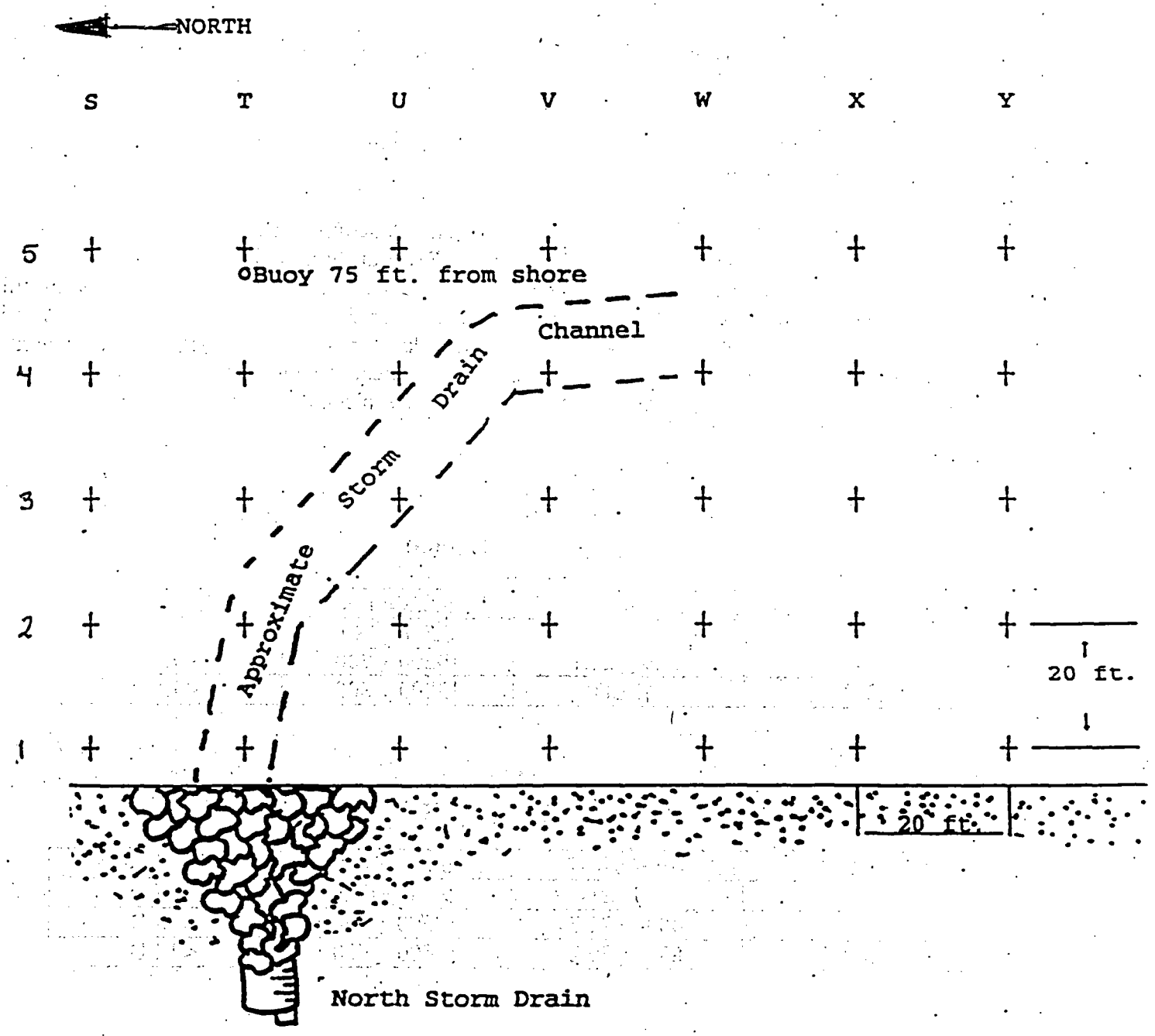
Samples were also evaluated for the radionuclides listed below. None were present in excess of the lower limits of detectability which are shown in pCi/kg.

Radionuclide	LLD	Radionuclide	LLD
Chromium-51	69	Antimony-126	18
Manganese-54	15	Iodine-131	27
Cobalt-56	15	Cesium-134	58
Cobalt-60	21	Cesium-136	18
Zinc-65	18	Cesium-137	5
Strontium-85	86	Cerium-139	93
Ruthenium/Rhenium-103	32	Cerium-141	98
Antimony-124	18	Cerium-144	98

* Location not included for sampling
(1) Cosmogenic
(2) Hot particles from Vermont Yankee Nuclear Power Plant
(3) Terrestrial radioactivity
(4) Archival atmospheric testing
LLD = Lower Limit of Detection

APPENDIX A

RADIOLOGICAL SAMPLING PROGRAM OF BOTTOM SEDIMENT
NORTH STORM DRAIN



SEDIMENT 2005

All sediment samples for the Year 2005 are within the expected historical range.

The historical range for cesium-137 [1] is from less than the detection limit to 500 pCi/kg. The samples for 2005 range from less than the detection limit to 83.6 pCi/kg.

The historical range for potassium-40 [2] is from 6,000 to 22,000 pCi/kg. The samples for 2005 range from 8,290 to 14,500 pCi/kg.

The historical range for beryllium-7 [3] is from less than the detection limit to 5,000 pCi/kg. The samples for 2005 range are less than the detection limit.

Sediment samples are taken biannually in the spring and fall. A sediment sample is taken ranging from approximately 0.75 to 1.25 kilograms from the Connecticut River at three separate locations in the spring and fall of each year. The sample is dried, weighed on a top loaded balance and placed in a 500 milliliter HDPE (high density polyethylene) bottle. The sample is counted on the gamma spectrometer system using a reverse germanium detector. A normal spectrum will include primordial radionuclides with daughters, and archival cesium-137 from former open atmospheric nuclear testing. On occasion short-lived cosmogenic beryllium-7 can be discerned. Reporting units are picocuries per kilogram with 2 sigma (standard deviation) value.

SPRING
(picocurie/kilogram)

Site	Cesum-137	Potassium-40	Beryllium-7
3-3	< LLD	8290 ± 580	< LLD
3-4	57.9 ± 21.1	10200 ± 700	< LLD
3-8	< LLD	13800 ± 800	< LLD

FALL
(picocurie/kilogram)

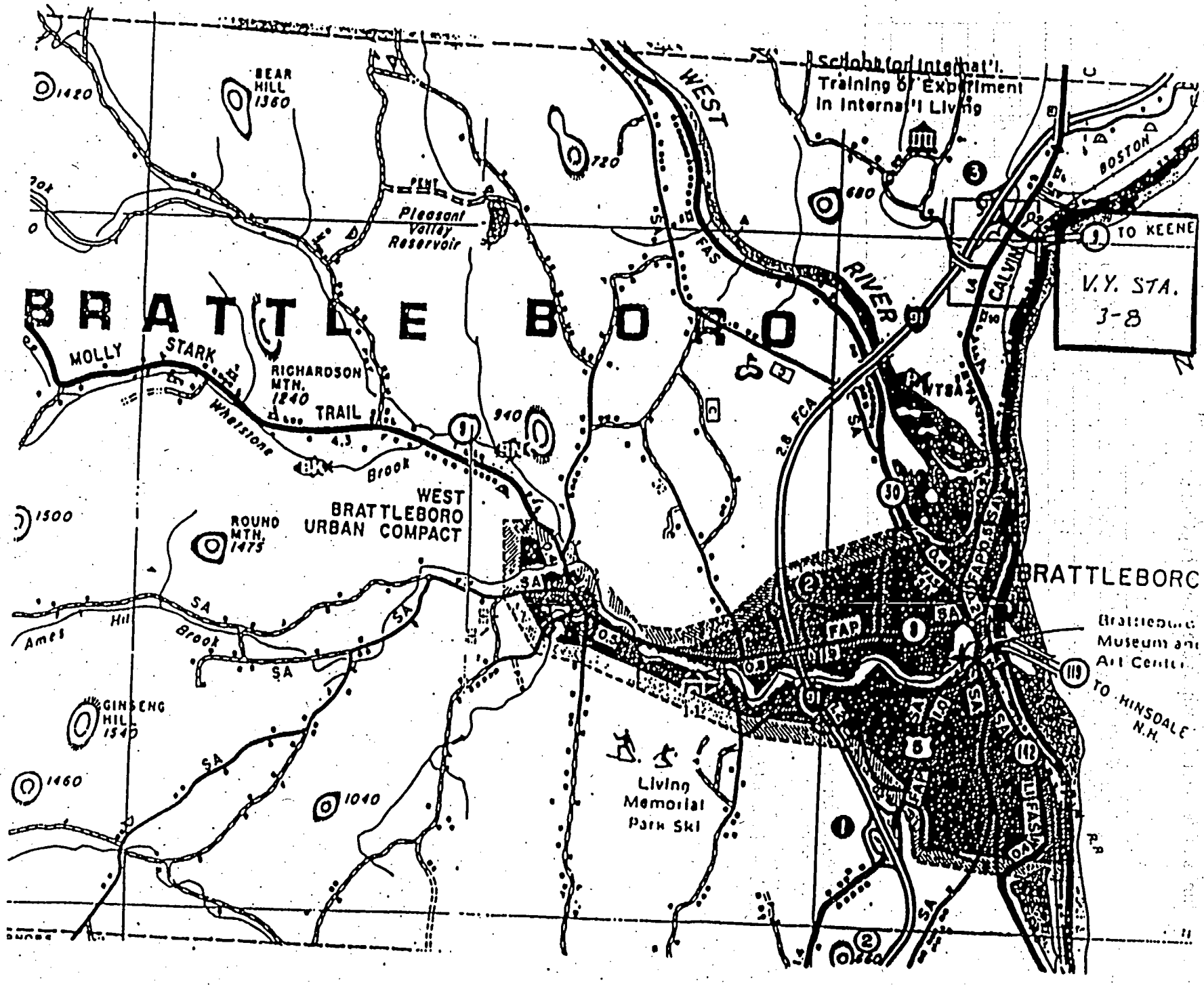
Site	Cesum-137	Potassium-40	Beryllium-7
3-3	< LLD	9560 ± 660	< LLD
3-4	48.8 ± 21.7	12500 ± 900	< LLD
3-8	83.6 ± 29.2	14500 ± 900	< LLD

SEDIMENT 2005

Samples were also evaluated for the radionuclides listed below. None were present in excess of the lower limits of detectability which are shown in pCi/kg.

Radionuclide	LLD	Radionuclide	LLD
Chromium-51	69	Antimony-126	18
Manganese-54	15	Iodine-131	27
Cobalt-56	15	Cesium-134	58
Cobalt-60	21	Cesium-136	18
Zinc-65	18	Cesium-137	5
Strontium-85	86	Cerium-139	93
Ruthenium/Rhenium-103	32	Cerium-141	98
Antimony-124	18	Cerium-144	98

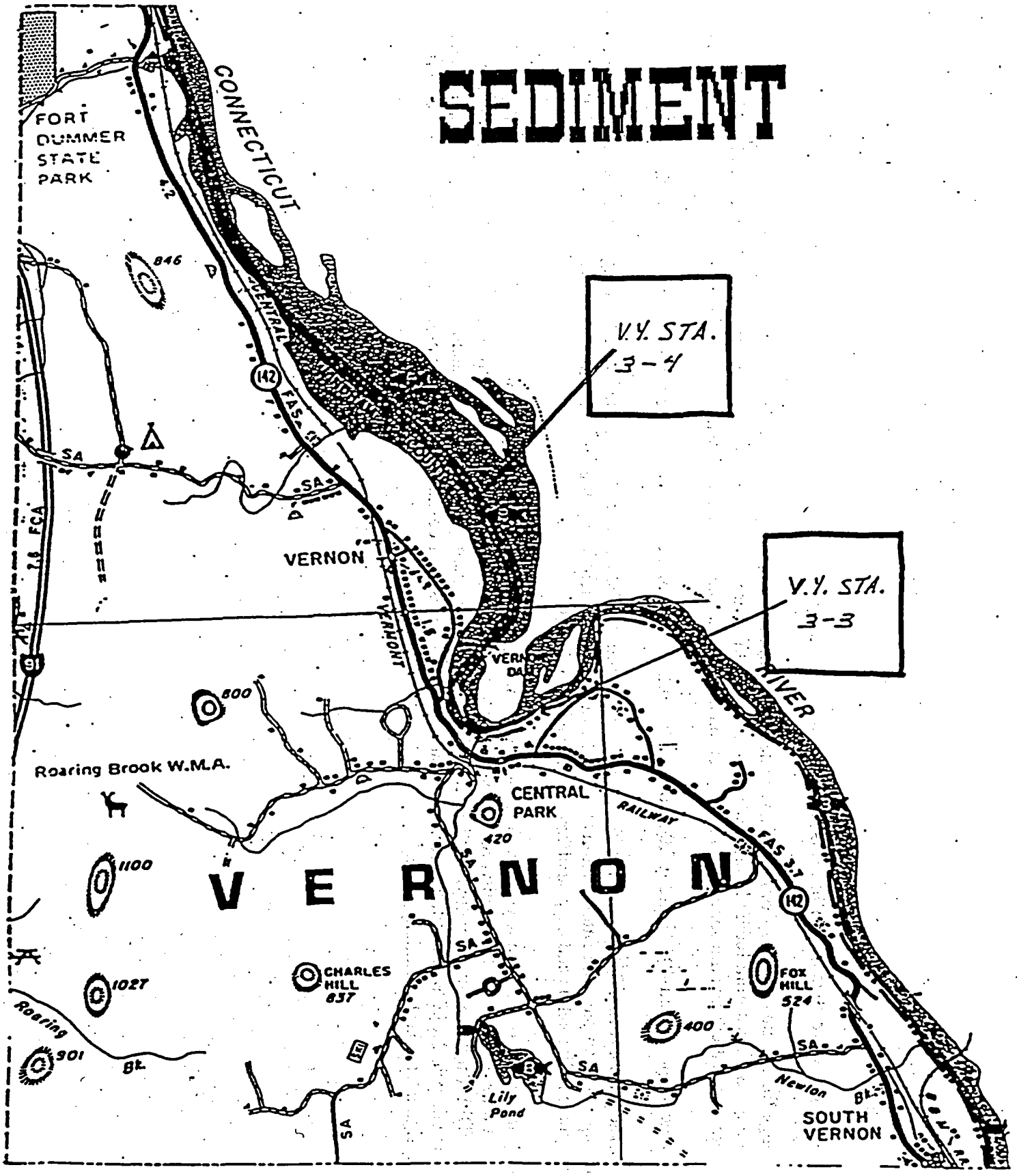
(1) Archival atmospheric testing
(2) Terrestrial radioactivity
(3) Cosmogenic
LLD = Lower Limit of Detection



BRATTLE BORO
BEAR HILL 1360
1420
720
680
Pleasant Valley Reservoir
WEST
RIVER
FAS
School for Internat'l. Training of Experiment in Internat'l Living
BOSTON
TO KEENE
V.Y. STA. 3-8
CALVIN
MOLLY STARK TRAIL
RICHARDSON MTN. 1240
Whetstone Brook
940
WEST BRATTLEBORO URBAN COMPACT
ROUND MTN. 1475
1500
Ames Hill Brook
GINSENG HILL 1540
1460
1040
Living Memorial Park Ski
2.8 FCA
WTSA
FAP
BRATTLEBORO
Brattleboro Museum and Art Center
TO HINSDALE N.H.

SEDIMENT

SEDIMENT



FORT DUMMER STATE PARK
CONNECTICUT
V.Y. STA. 3-4
V.Y. STA. 3-3
846
CENTRAL
142
FAS
SA
VERNON
VERMONT
VERNON DAM
RIVER
800
Roaring Brook W.M.A.
CENTRAL PARK
420
RAILWAY
FAS 3.7
1100
VERNON
1027
CHARLES HILL 837
FOX HILL 524
400
Roaring Bk.
901
Lily Pond
Newton Bk.
SOUTH VERNON

SOIL 2005

All soil samples for the Year 2005 are within the expected historical range.

The historical range for cesium-137 [(1)] is from less than the detection limit to 500 pCi/kg. The samples for 2005 range from less than the detection limit to 1,780 pCi/kg. Samples from Indian Point Park and Renaud Brothers are greater than the historical limit, but are likely to have been affected by differences in archival atmospheric testing deposition or unintentional collection of ash from old sites where trees or scrub were burnt.

The historical range for potassium-40 [(2)] is from 7,000 to 20,000 pCi/kg. The samples for 2005 range from 604 to 19,800 pCi/kg.

The historical range for beryllium-7 [(3)] is from less than the detection limit to 600 pCi/kg. The samples for 2005 range from less than the detection limit to 660 pCi/kg. The sample from Dummerston State Highway Garage is greater than the historical limit, however Be-7 is a naturally occurring cosmogenic radionuclide and may be affected by human activities.

Occasional sampling, most often once a year, is done on other soils as available or needed. Samples are collected (usually in the northwest quadrant) within a mile or two from the facility. Sample sizes range from 250 to 1,000 grams. The samples are weighed, dried and placed in 500 ml wide mouth HDPE (high density polyethylene) bottles and analyzed on the gamma spectrometer system using a reverse germanium detector. Usual spectra include primordial radionuclides, archival cesuim-137 and occasional cosmogenic beryllium-7. Reporting units are picocuries per kilogram with 2 sigma (standard deviation) value.

SOIL 2005
(picocuries/kilogram)

Location	Season	Cesium-137 (1)	Potassium-40 (2)	Beryllium-7 (3)
Northwest Corner Vermont Yankee Fence	Fall (October)	148 ± 29	15000 ± 900	< LLD
Indian Point Park	Summer (July)	1510 ± 100	10300 ± 900	< LLD
Miller Farm Outside of Milking Parlor	Summer (July)	196 ± 35	17600 ± 1100	< LLD
Renaud Brothers	Spring (May)	1780 ± 100	19800 ± 1200	< LLD
Renaud Brothers	Summer (June)	488 ± 44	12600 ± 700	390 ± 203
Renaud Brothers	Summer (June)	139 ± 36	12800 ± 700	530 ± 157
Renaud Brothers	Summer (June)	236 ± 37	12400 ± 800	< LLD
Power Line River Crossing	Spring (May)	118 ± 30	12800 ± 800	< LLD
Dummerston State Highway Garage	Summer (June)	< LLD	18000 ± 1000	660 ± 1000
New England Power Dam Beach Sand	Summer (June)	< LLD	8630 ± 570	< LLD
D & E Tree Mulch	Summer (June)	< LLD	604 ± 89	< LLD
Wilmington State Highway Garage	Fall (September)	110 ± 22	15200 ± 1000	< LLD

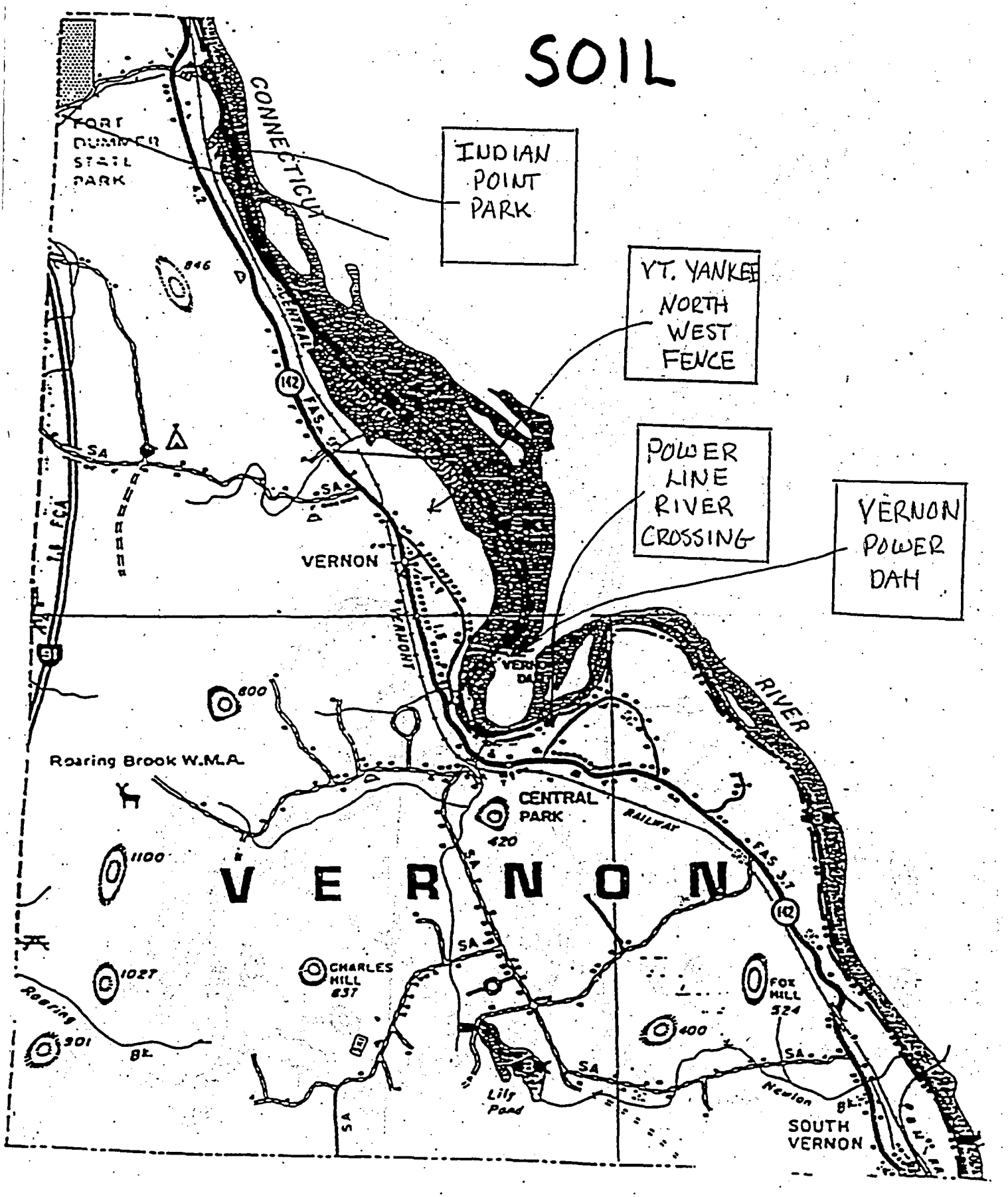
SOIL 2005

Samples were also evaluated for the radionuclides listed below. None were present in excess of the lower limits of detectability which are shown in pCi/kg.

Radionuclide	LLD	Radionuclide	LLD
Chromium-51	69	Antimony-126	18
Manganese-54	15	Iodine-131	27
Cobalt-56	15	Cesium-134	58
Cobalt-60	21	Cesium-136	18
Zinc-65	18	Cesium-137	5
Strontium-85	86	Cerium-139	93
Ruthenium/Rhenium-103	32	Cerium-141	98
Antimony-124	18	Cerium-144	98

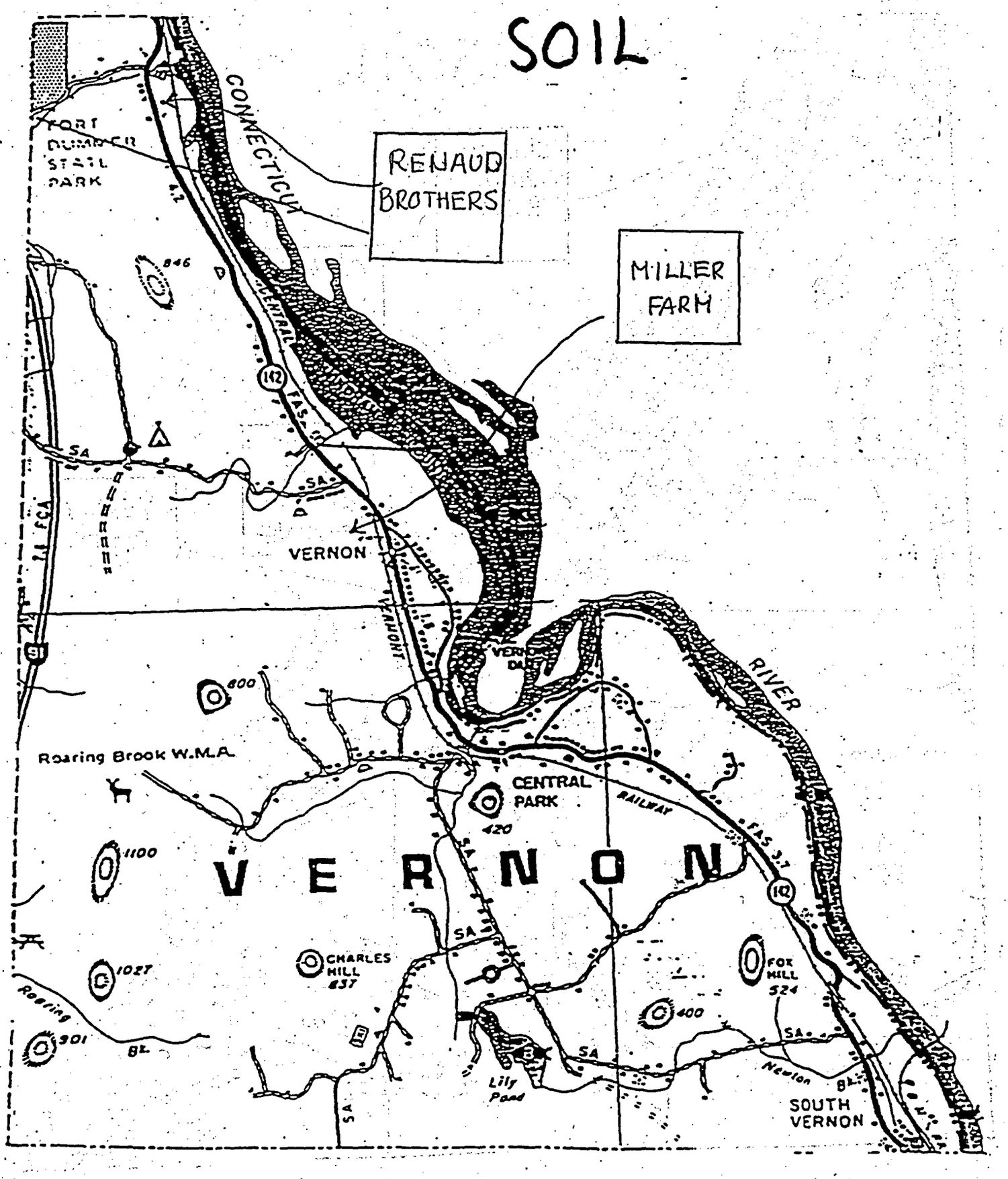
(1) Archival atmospheric testing
(2) Terrestrial radioactivity
(3) Cosmogenic
LLD = Lower Limit of Detection

SOIL



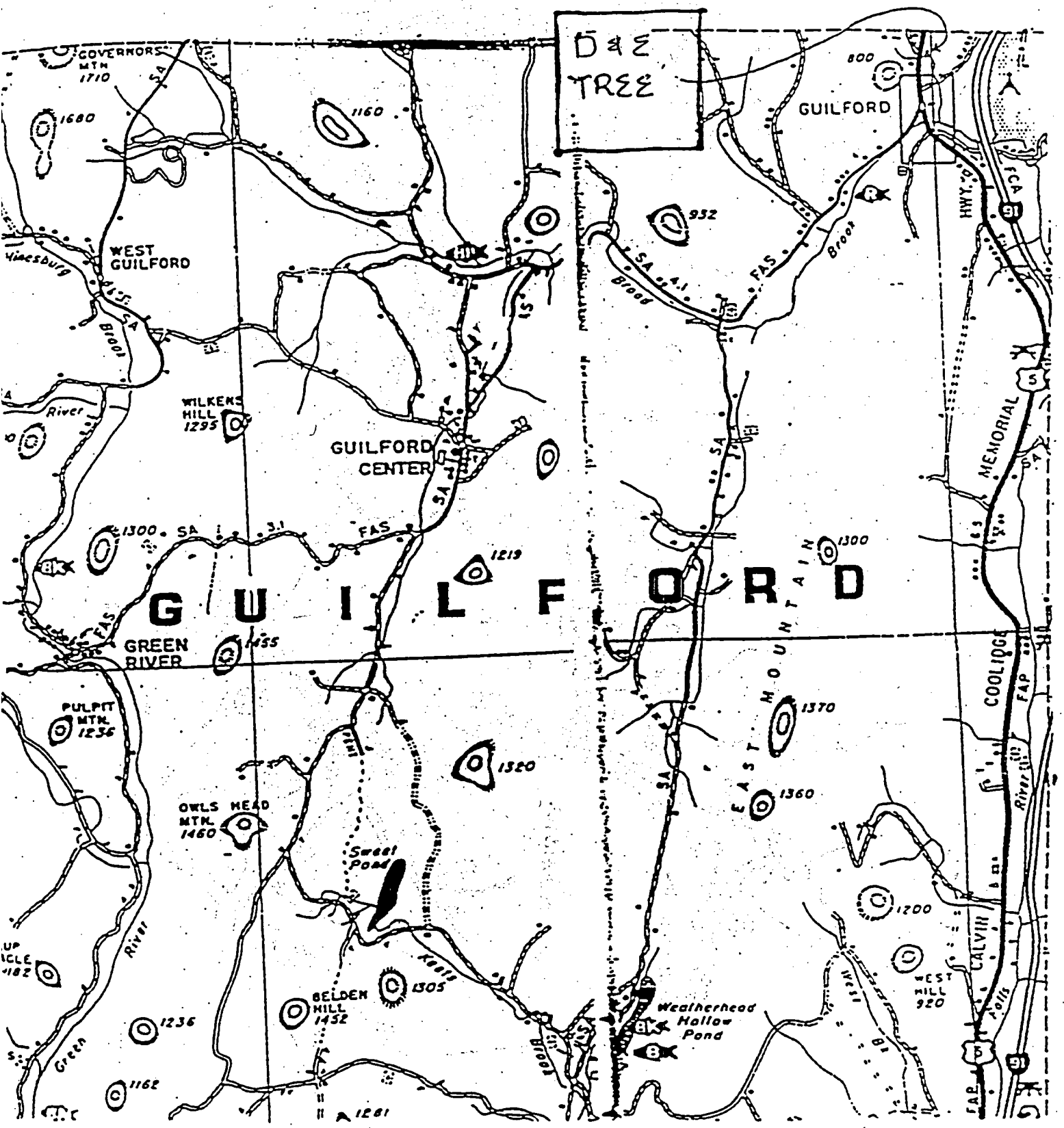
INDIAN POINT PARK
VT. YANKEE NORTH WEST FENCE
POWER LINE RIVER CROSSING
VERNON POWER DAM
CONNECTICUT
RIVER
FORT DUMMER STATE PARK
VERNON
Roaring Brook W.M.A.
CENTRAL PARK
420
VERNON
CHARLES HILL
837
FOX HILL
524
Lily Pond
SOUTH VERNON
Roaring Bk.
Newton Bk.
RAILWAY
FAS 3.7
SA

SOIL

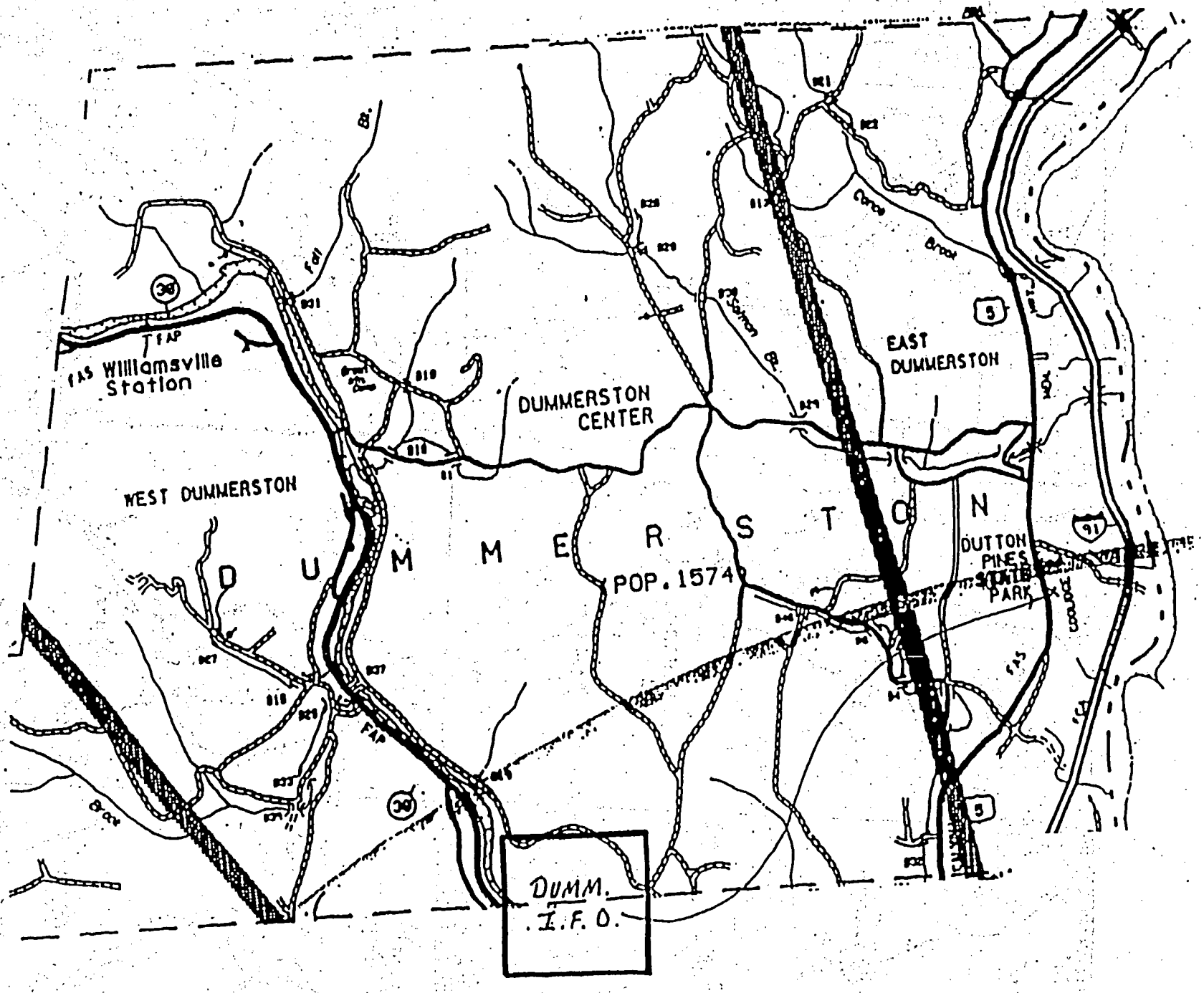


RENAUD BROTHERS
MILLER FARM
CONNECTICUT
RIVER
FORT DUMMER STATE PARK
CENTRAL
FAS
142
846
SA
VERNON
VERMONT
800
Roaring Brook W.M.A.
CENTRAL PARK
420
RAILWAY
FAS 3.7
1100
V E R N O N
CHARLES HILL
837
1027
Roaring
901
FOX HILL
524
400
Lily Pond
Newton
SOUTH VERNON

SOIL

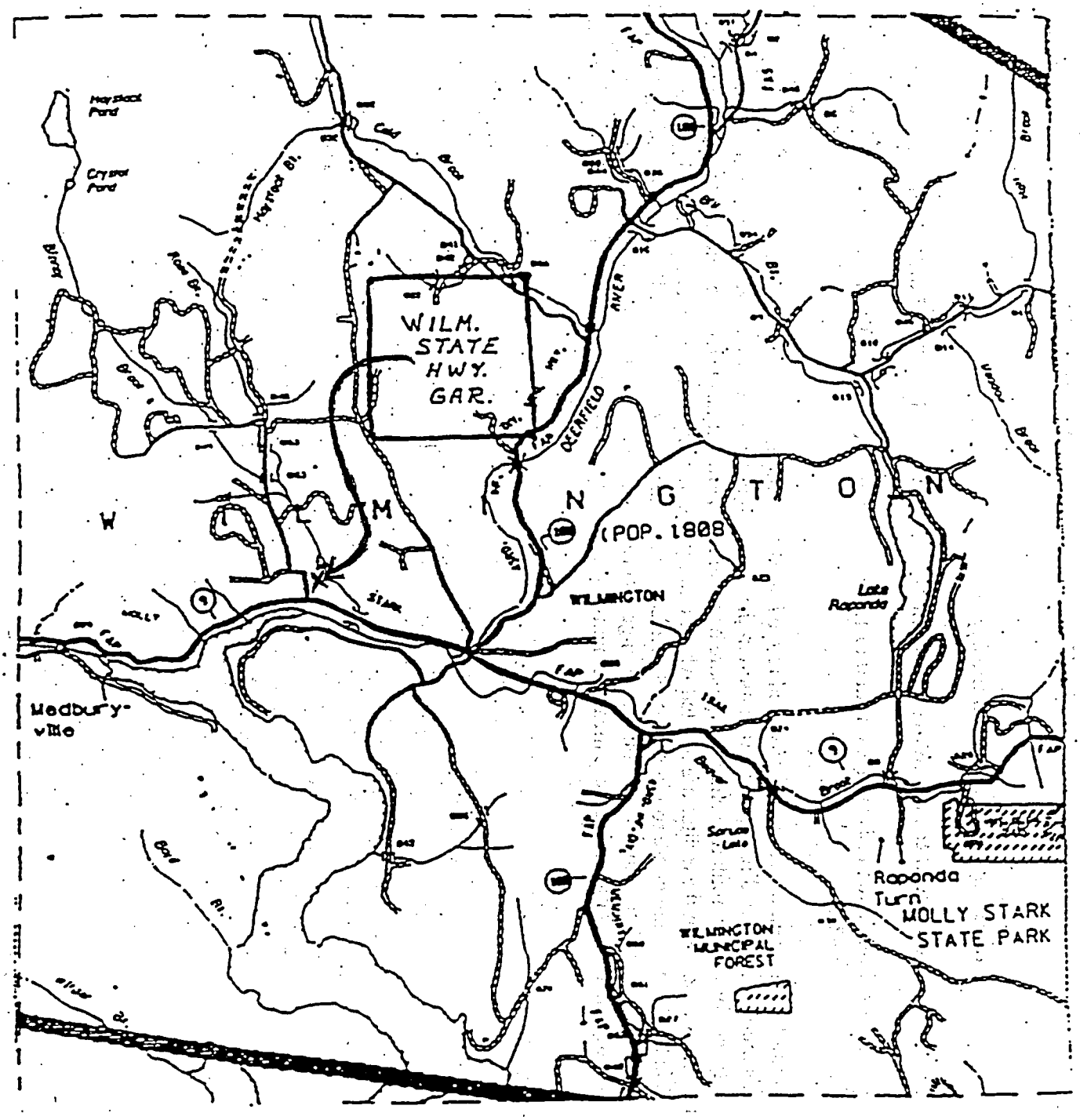


D & E TREE
GOVERNORS MTN 1710
1680
1160
800
GUILFORD
932
WEST GUILFORD
Hinesburg
Brook
SA
FAS
HWY.
FCA
91
WILKENS HILL 1295
GUILFORD CENTER
River
MEMORIAL
1300
1219
GUILFORD
GREEN RIVER
1455
EAST MOUNTAIN
COOLIDGE
FAP
PULPIT MTN. 1236
1370
1320
1360
OWLS HEAD MTN. 1460
Sweet Pond
1200
CALVIN
WEST HILL 920
BELDEN HILL 1452
1305
Weatherhead Hollow Pond
1236
1162
1281
Green
River
Falls


DUMMERSTON
POP. 1574
WEST DUMMERSTON
DUMMERSTON CENTER
EAST DUMMERSTON
DUTTON PINES
PARK
FAS Williamsville Station
FAP
DUMM. I.F.O.

SOIL

SOIL


WILM.
STATE
HWY.
GAR.
W
M
N
G
T
O
N
(POP. 1808)
WILMINGTON
Medbury-
ville
Lake
Raponda
Raponda
Turn
MOLLY STARK
STATE PARK
WILMINGTON
MUNICIPAL
FOREST

THERMOLUMINESCENT DOSIMETRY (TLD) DATA 2005

All TLDs for the Year 2005 are within the expected historical range.

The annual exposure at the boundary of Vermont Yankee is less than 20 ± 5 milliroentgen for 2005.

The historical range for TLDs ranges from 0 to 12.5 milliroentgen/quarter. The samples for 2005 range from less than the detection limit to 4.5 milliroentgen/quarter.

Thermoluminescent detectors are provided to the State of Vermont by Global Dosimetry. TLDs are deployed for a quarterly sampling interval. This method samples direct gamma radiation in the environment. Detectors utilize crystals, which store energy from gamma and x-rays until analyzed for their cumulative energy exposure experience. Vermont has forty one selected locations where direct radiation levels are measured. Some of these sites are located where other types of samples are taken (e.g. air, milk, water, etc.). Levels of direct radiation from the natural environment are routinely detected at each site. Reporting units are milliroentgen/quarter. The TLD exposures listed below exclude background. Background is based on the average of TLD measurements at the Putney Town Clerk, Putney and State Highway Garage, Wilmington TLD stations. In these measurements 1 milliroentgen is equal to 1 millirem according the Vermont Regulations, Part 5, Chapter 3.

THERMOLUMINESCENT DOSIMETRY (TLD) DATA 2005

EXPOSURE RATES 2005
(milliroentgen/quarter)

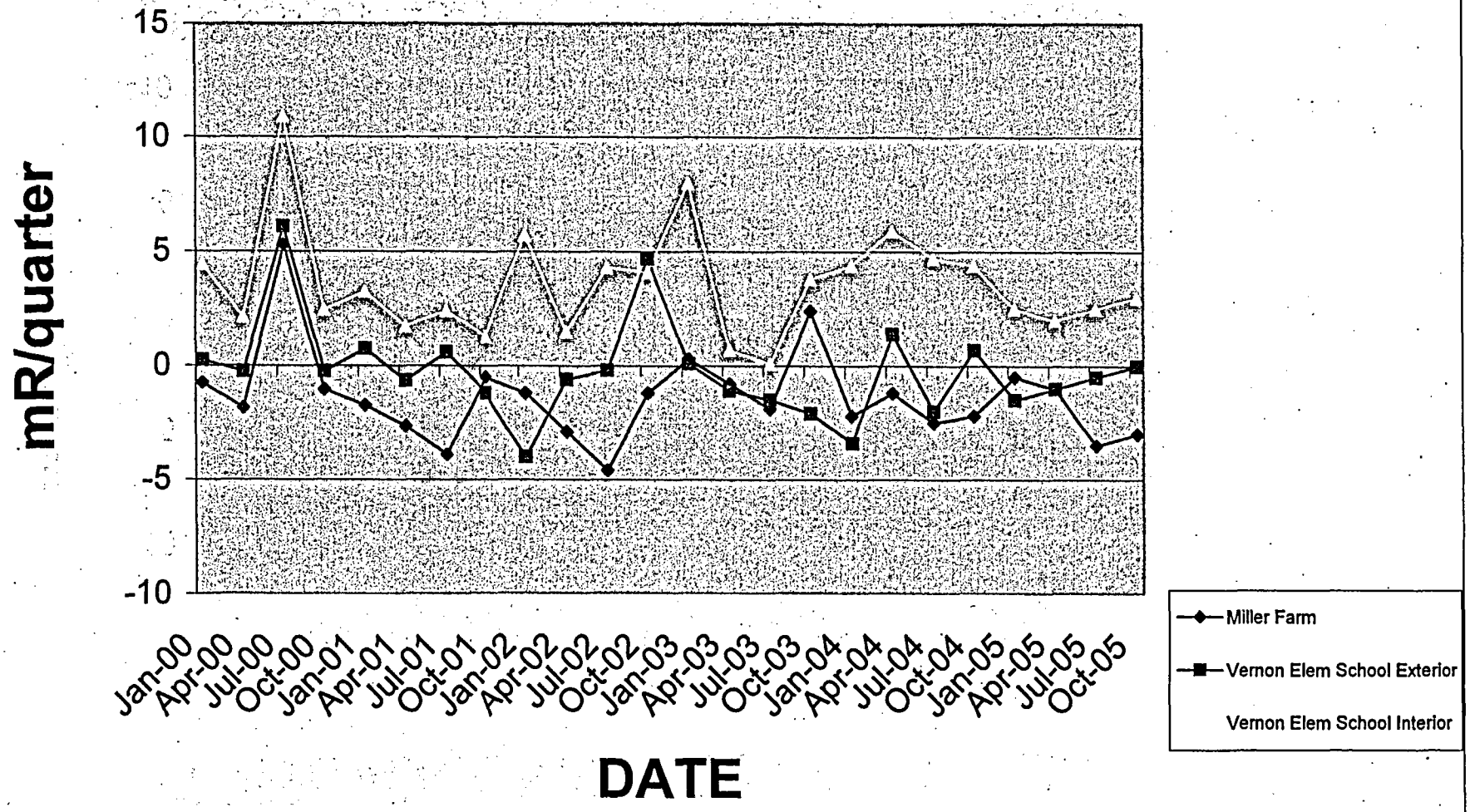
Location	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	YEAR
Miller Farm, Vernon	-0.5 ± 1.2	-1.0 ± 0.0	-3.5 ± 1.2	-3.0 ± 1.2	0.0 ± 2.0
Elementary School Exterior, Vernon *	-1.5 ± 1.2	-1.0 ± 2.3	-0.5 ± 1.2	0.0 ± 1.2	0.0 ± 3.1
Elementary School Interior, Vernon	2.5 ± 1.2	2.0 ± 0.0	2.5 ± 3.5	3.0 ± 0.0	10.0 ± 3.7
VY North Fence, Vernon	-2.5 ± 1.2	1.0 ± 0.0	0.5 ± 4.2	3.0 ± 8.7	4.5 ± 9.7
VY Parking Lot Fence, Vernon	1.5 ± 0.0	4.5 ± 1.1	4.3 ± 2.0	4.0 ± 2.0	14.3 ± 3.0
Dummerston State Highway Garage (IFO)*	0.5 ± 1.2	0.0 ± 0.0	-0.5 ± 1.2	0.0 ± 1.2	0.5 ± 2.0
VY Southwest Fence, Vernon	1.5 ± 7.6	0.0 ± 2.5	-0.5 ± 2.0	-1.0 ± 0.0	1.5 ± 8.2
Renaud Bros. (Puffers), Vernon*	0.5 ± 5.3	0.0 ± 0.0	-0.5 ± 2.0	-1.0 ± 0.0	0.5 ± 5.7
Tyler Hill & Franklin Road, Vernon	-0.5 ± 0.0	-1.0 ± 1.2	-2.5 ± 1.2	1.0 ± 1.2	1.0 ± 2.0
Power Line River Crossing, Vernon *	-1.5 ± 3.1	-1.0 ± 1.2	-1.5 ± 2.3	-2.0 ± 2.0	0.0 ± 4.5
Blodgett Farm, Vernon	-1.5 ± 1.2	0.0 ± 1.2	-1.5 ± 2.0	1.0 ± 1.2	1.0 ± 2.8
Henry Transportation/D&E Tree, Guilford *	-1.5 ± 0.0	-3.0 ± 0.0	-3.5 ± 2.0	-2.0 ± 1.2	0.0 ± 2.3
Guilford Town Highway Garage, Guilford *	0.5 ± 1.2	-1.0 ± 0.0	-1.5 ± 0.0	-1.0 ± 3.5	0.5 ± 3.7
Evans Farm, Guilford	-0.5 ± 0.0	-2.0 ± 1.2	-3.5 ± 0.0	-1.0 ± 1.2	0.0 ± 1.6
Putney Town Clerk, Putney	-0.5 ± 2.3	-2.0 ± 1.2	-1.5 ± 1.2	-1.0 ± 1.2	0.0 ± 3.1
State Highway Garage, Wilmington *	0.5 ± 1.2	2.0 ± 3.5	1.5 ± 0.0	1.0 ± 0.0	5.0 ± 3.7
West Brattleboro State Police*	-1.5 ± 2.3	0.0 ± 4.2	-3.5 ± 1.2	-3.0 ± 0.0	0.0 ± 4.9
Windham County Courthouse, Brattleboro*	-2.5 ± 1.4	-4.0 ± 0.0	-5.5 ± 2.3	-4.0 ± 1.2	0.0 ± 2.9
Smead Lumber, Vernon	-1.5 ± 1.2	-1.0 ± 1.2	-1.5 ± 2.3	-1.0 ± 1.2	0.0 ± 3.1
Rte. 142 N & Pond Rd., Vernon	-1.5 ± 2.0	-1.0 ± 5.0	0.5 ± 5.7	-2.0 ± 1.2	0.5 ± 7.9
Edgewood Dr. &West Rd., Vernon	-1.5 ± 3.1	1.0 ± 2.0	-1.5 ± 1.2	-1.0 ± 1.2	1.0 ± 4.0
Fairman Rd., Vernon	-1.5 ± 1.2	0.0 ± 2.3	-1.5 ± 1.2	-1.0 ± 1.2	0.0 ± 3.1
Pond Rd. & Houghton Hill Rd., Vernon	-2.5 ± 1.2	-2.0 ± 1.2	-1.5 ± 2.0	-2.0 ± 1.2	0.0 ± 2.8
Rte. 5, Wolosko, Guilford (10)	0.5 ± 3.1	0.0 ± 1.2	2.5 ± 4.6	1.0 ± 1.2	4.0 ± 5.8
Rte. 5, Andrews Cemetery, Guilford (40)	-1.5 ± 2.3	0.0 ± 2.8	-0.5 ± 2.0	-1.0 ± 0.0	0.0 ± 4.2

EXPOSURE RATES 2005
(milliroentgen/quarter)

Location	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	YEAR
Rte. 5 & Tkaczyk Farm Rd., Guilford (11)	-1.5 ± 2.0	0.0 ± 1.2	-1.5 ± 1.2	-1.0 ± 1.2	0.0 ± 2.8
Tyler Hill Rd., Vernon	-2.5 ± 1.2	0.0 ± 1.2	-1.5 ± 1.2	-1.0 ± 0.0	0.0 ± 2.0
Rte. 142 N of Transmission Line, Vernon	-2.5 ± 1.2	0.0 ± 2.0	-0.5 ± 1.2	-1.0 ± 2.0	0.0 ± 3.3
Rte. 5 & Guilford Ctr. Rd., Guilford (14)	-0.5 ± 1.2	-1.0 ± 1.2	-1.5 ± 0.0	-2.0 ± 2.0	0.0 ± 2.6
Guilford Ctr Rd. & Tater Rd., Guilford	0.5 ± 6.4	0.0 ± 1.2	-2.5 ± 1.2	-1.0 ± 1.2	0.5 ± 6.7
Weatherhead Hollow & Stony Hill Rds, Gfd	-1.5 ± 0.0	-2.0 ± 1.2	-4.5 ± 1.2	-2.0 ± 2.0	0.0 ± 2.6
Huckle Hill Rd. N of VT/MA Border, Vernon	0.5 ± 1.2	1.0 ± 1.2	0.5 ± 1.2	1.0 ± 2.0	3.0 ± 2.8
Dummerston School, Dummerston, Rte. 5	-1.5 ± 1.2	-2.0 ± 0.0	-2.5 ± 1.2	-1.0 ± 0.0	0.0 ± 1.6
Pond Rd., Vernon Rec. Area, Vernon	-1.5 ± 2.0	-2.0 ± 2.0	-2.5 ± 0.0	-3.0 ± 0.0	0.0 ± 2.8
Vernon Fire Dept., Vernon, Rte. 142	-1.5 ± 1.2	0.0 ± 1.2	-2.5 ± 0.0	-2.0 ± 0.0	0.0 ± 1.6
Rte. 142 S & Pond Rd., Vernon	-1.5 ± 0.0	-1.0 ± 1.2	-1.5 ± 1.2	-1.0 ± 2.0	0.0 ± 2.6
Rte. 142 & Newton Rd., Vernon	-1.5 ± 0.0	-2.0 ± 1.2	-2.5 ± 1.2	-2.0 ± 3.1	0.0 ± 3.5
Rte. 142 & Depot St., VT/MA Line, Vernon	-0.5 ± 1.2	-1.0 ± 1.2	2.5 ± 1.2	-2.0 ± 1.2	2.5 ± 2.3
Gov. Hunt Rd. at Vernon Elem. School	0.5 ± 0.0	0.0 ± 1.2	0.5 ± 0.0	0.0 ± 1.2	1.0 ± 1.6
Putney Utility Pole	**	1.0 ± 0.0	-1.5 ± 1.4	2.0 ± 5.8	3.0 ± 5.9
Wilmington Utility Pole*	**	**	-1.5 ± 0.0	-2.0 ± 1.2	0.0 ± 1.2

* Collocated with Air Sampling Station
** Stations established in the second and third quarters of 2005.

THERMOLUMINESCENT DOSIMETRY



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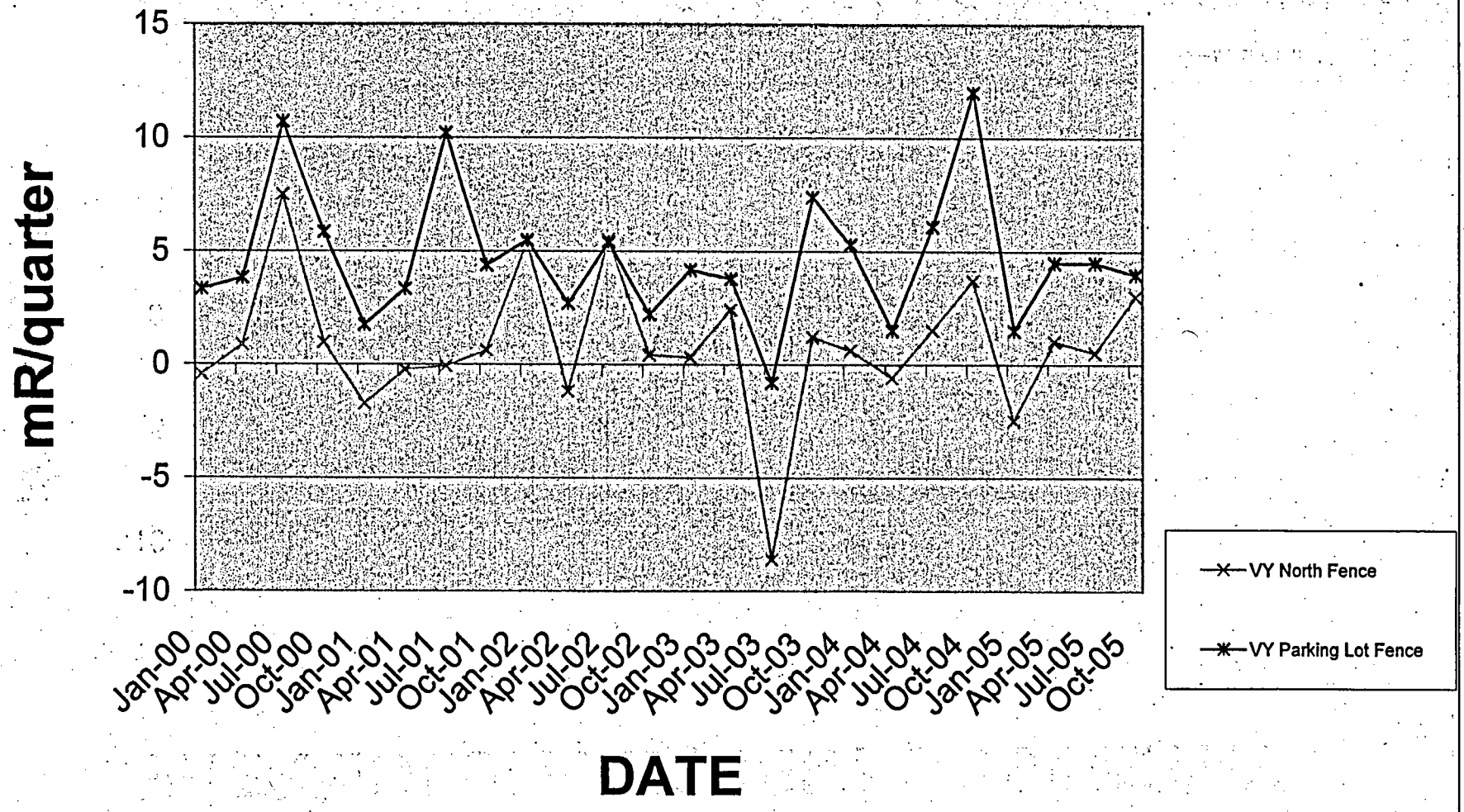
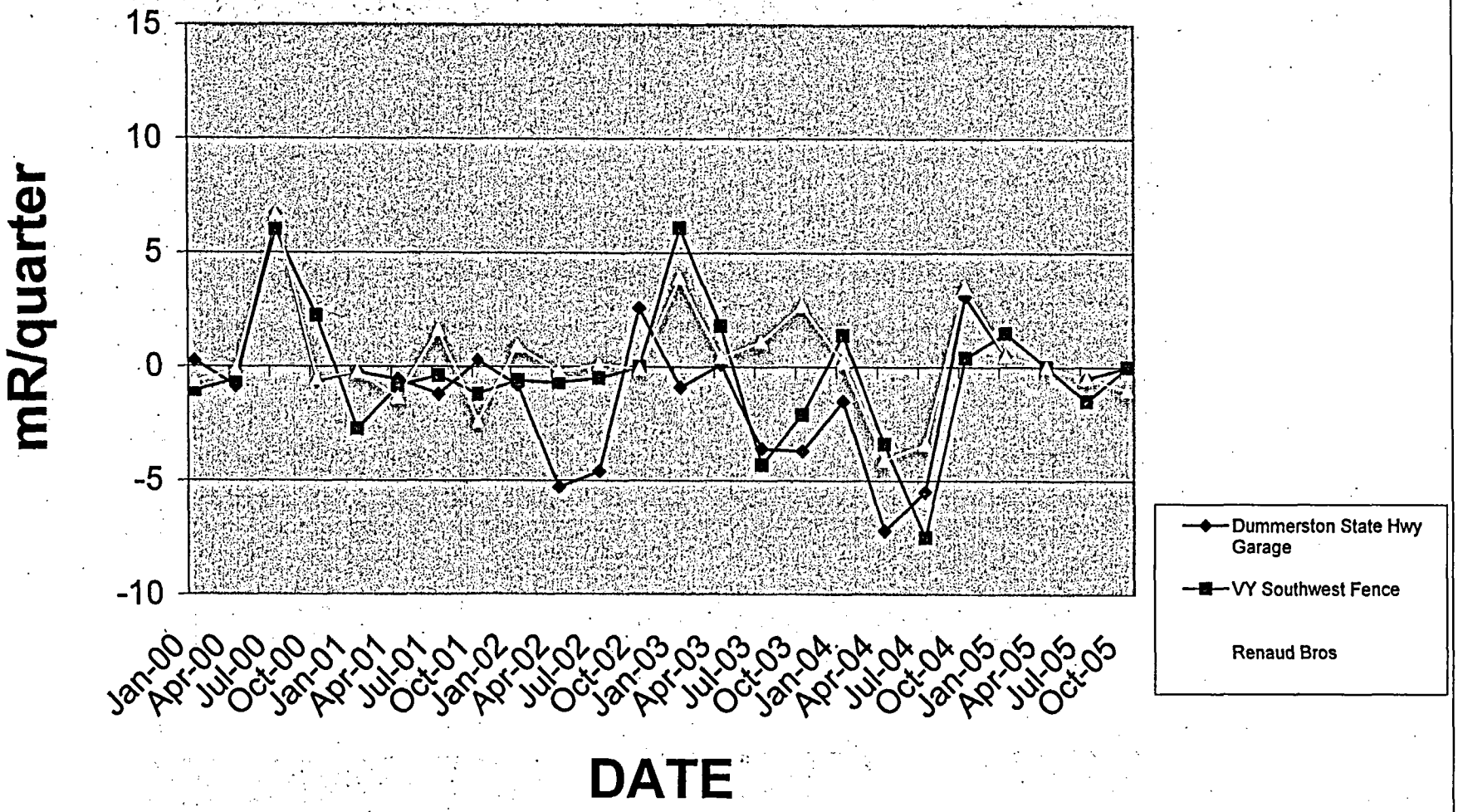
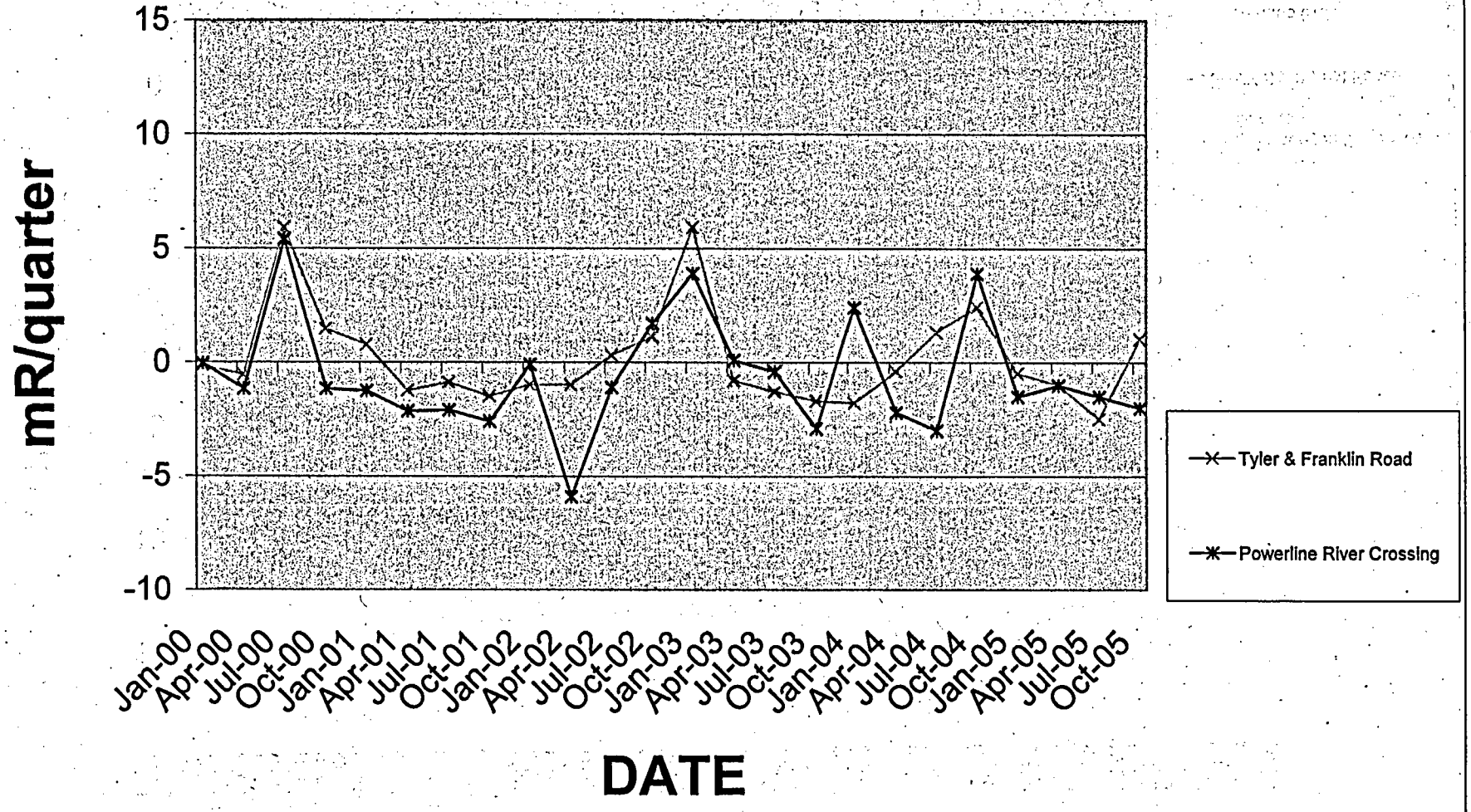
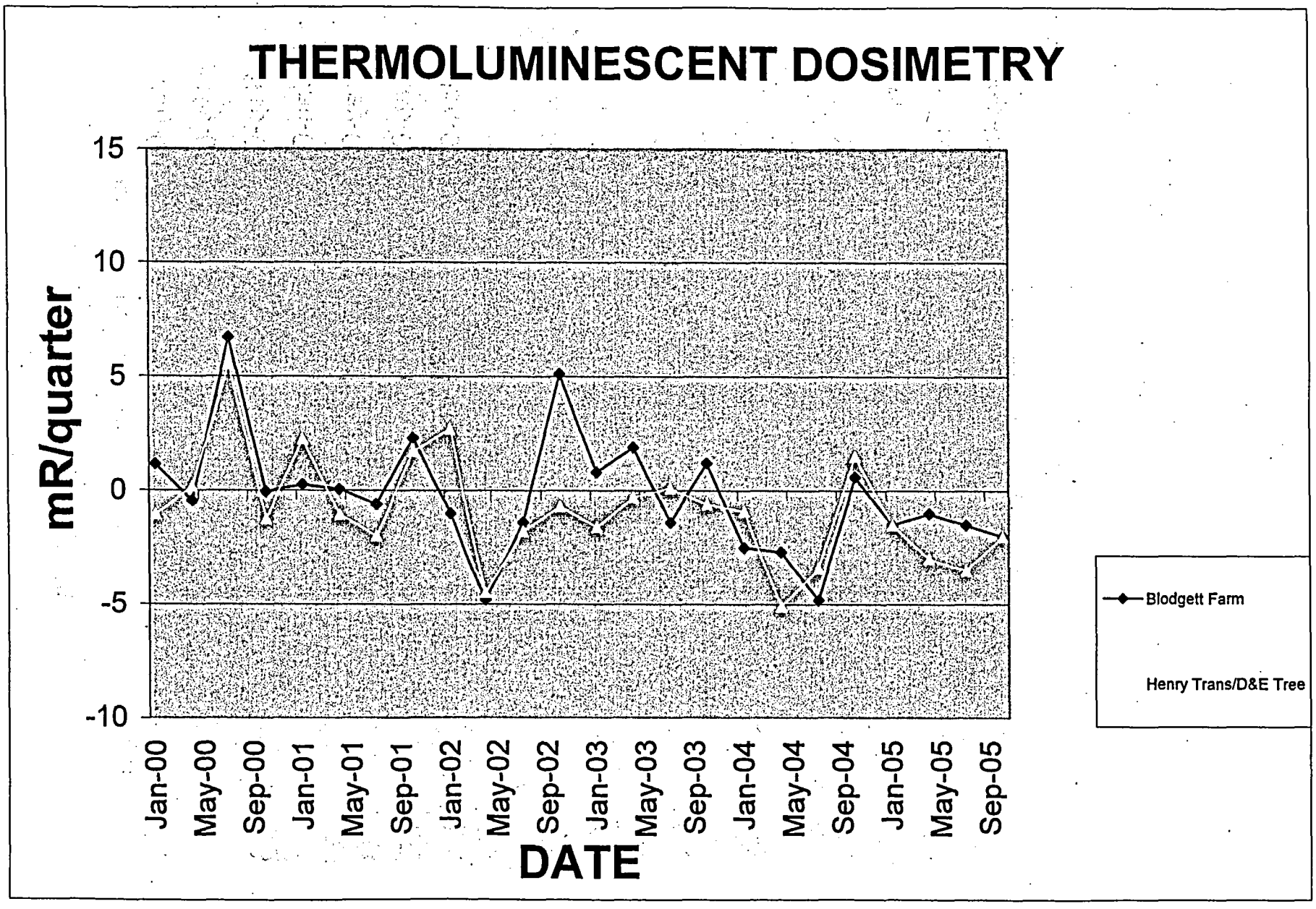


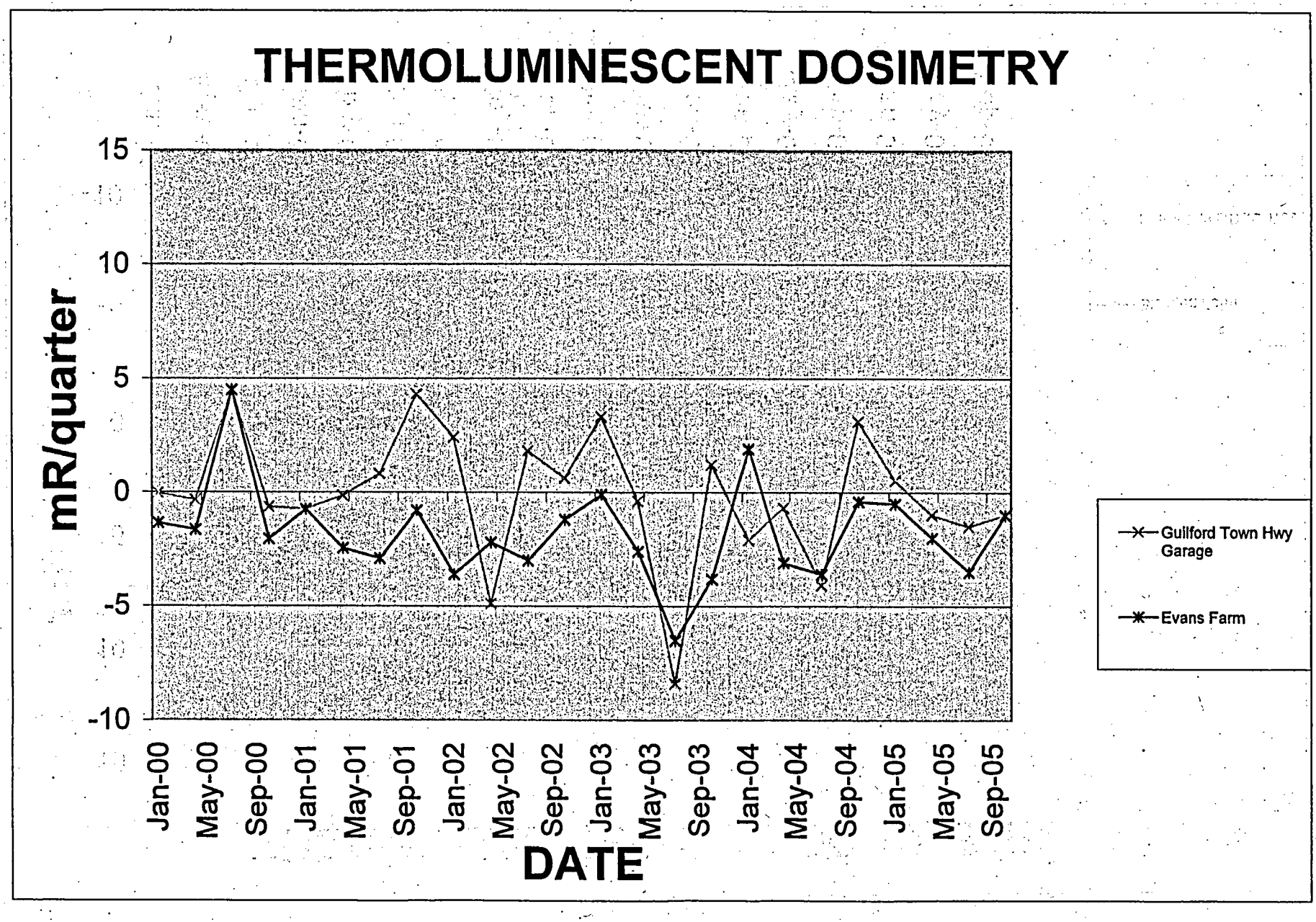
THERMOLUMINESCENT DOSIMETRY



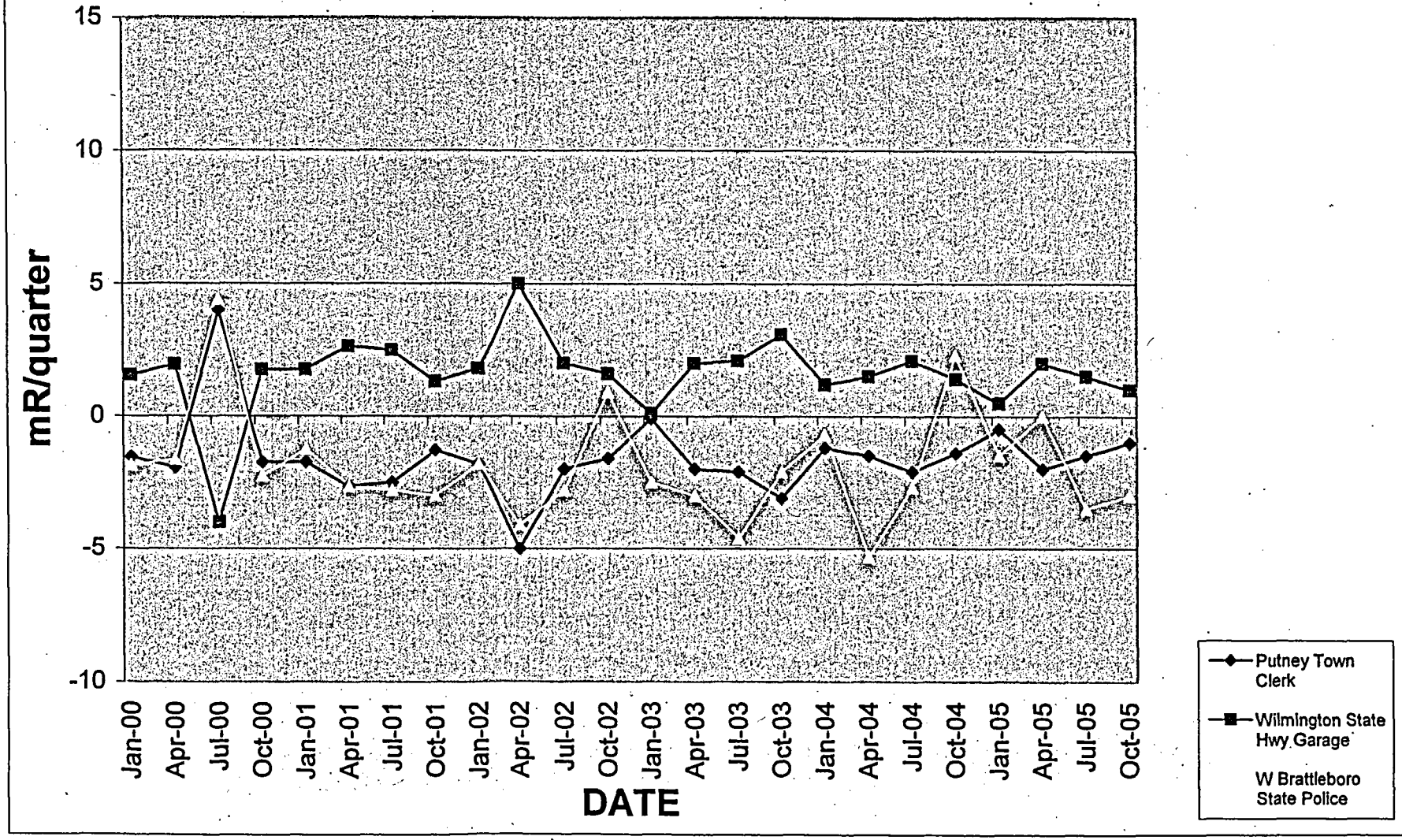
THERMOLUMINESCENT DOSIMETRY



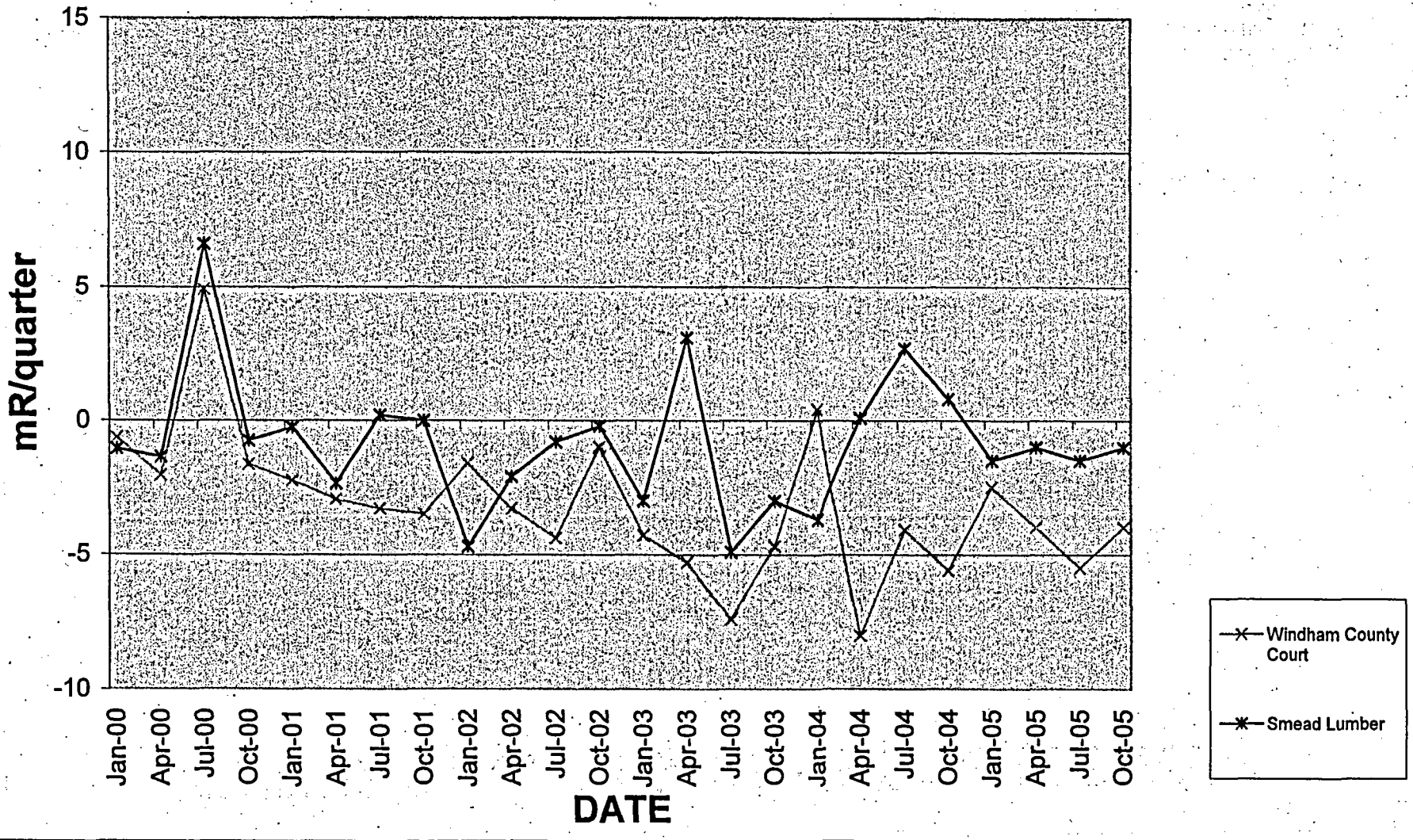

THERMOLUMINESCENT DOSIMETRY
mR/quarter
15
10
5
0
-5
-10
Jan-00
May-00
Sep-00
Jan-01
May-01
Sep-01
Jan-02
May-02
Sep-02
Jan-03
May-03
Sep-03
Jan-04
May-04
Sep-04
Jan-05
May-05
Sep-05
DATE
Blodgett Farm
Henry Trans/D&E Tree

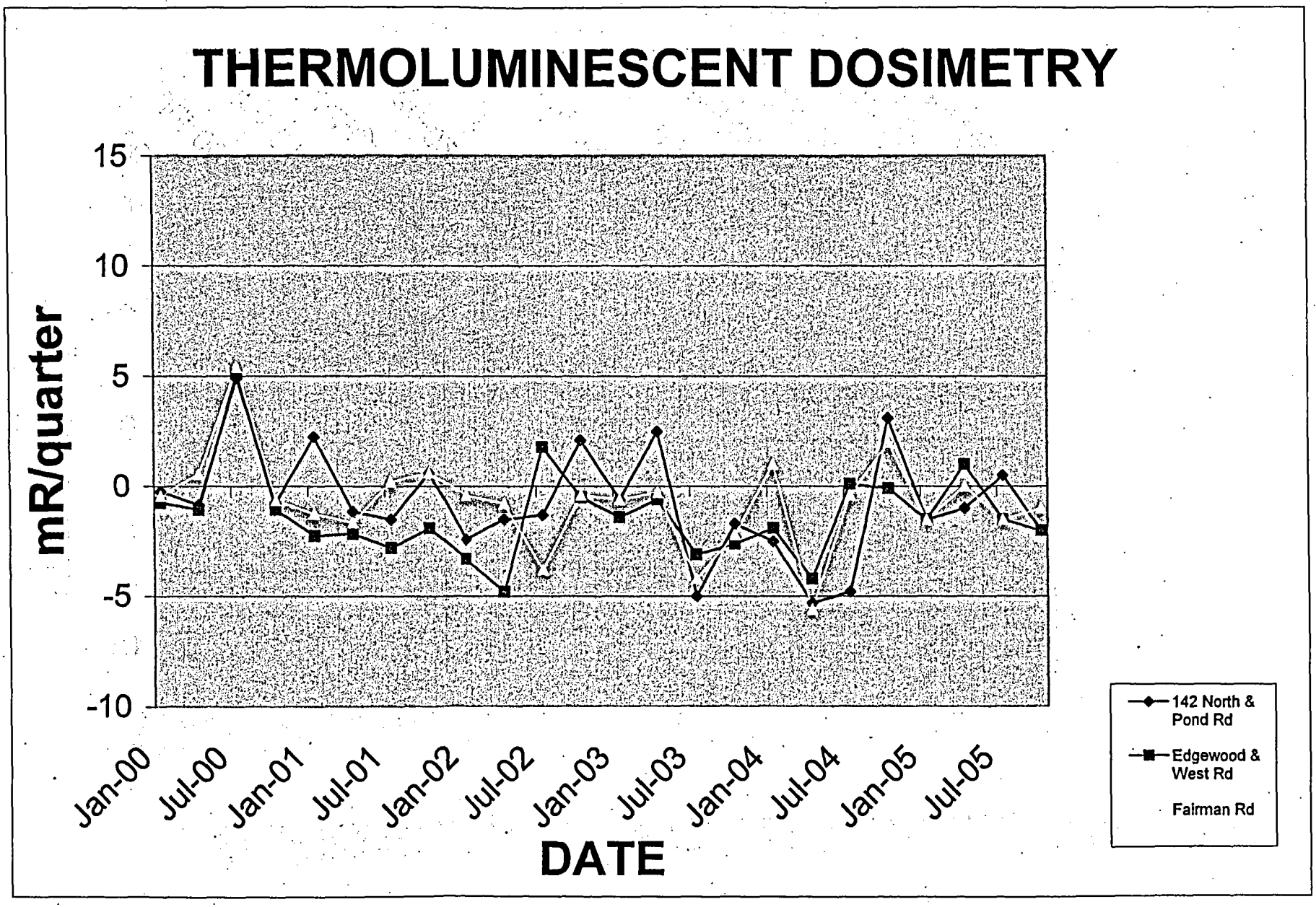

THERMOLUMINESCENT DOSIMETRY
mR/quarter
15
10
5
0
-5
-10
Jan-00
May-00
Sep-00
Jan-01
May-01
Sep-01
Jan-02
May-02
Sep-02
Jan-03
May-03
Sep-03
Jan-04
May-04
Sep-04
Jan-05
May-05
Sep-05
DATE
Guilford Town Hwy Garage
Evans Farm

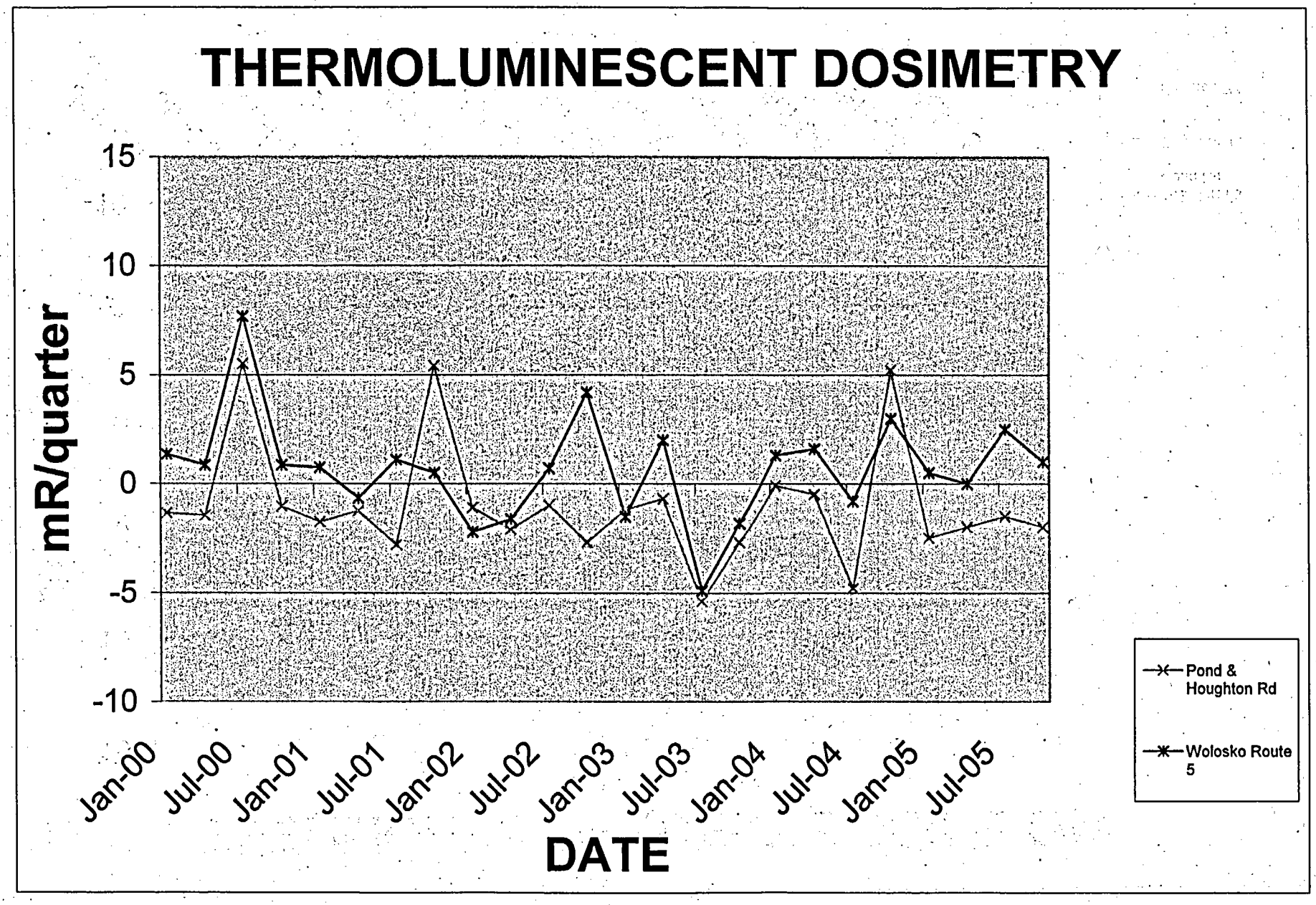
THERMOLUMINESCENT DOSIMETRY



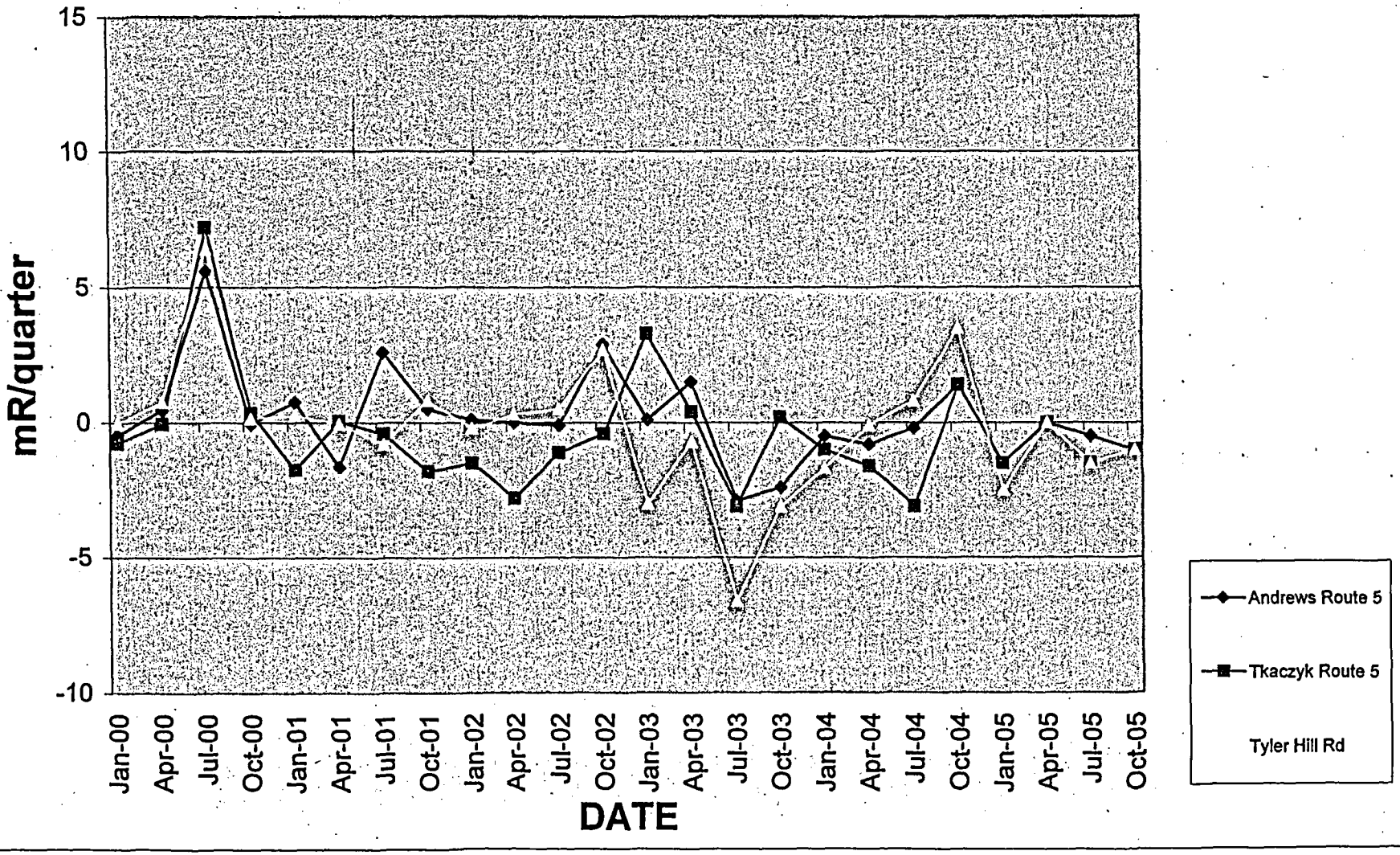
THERMOLUMINESCENT DOSIMETRY



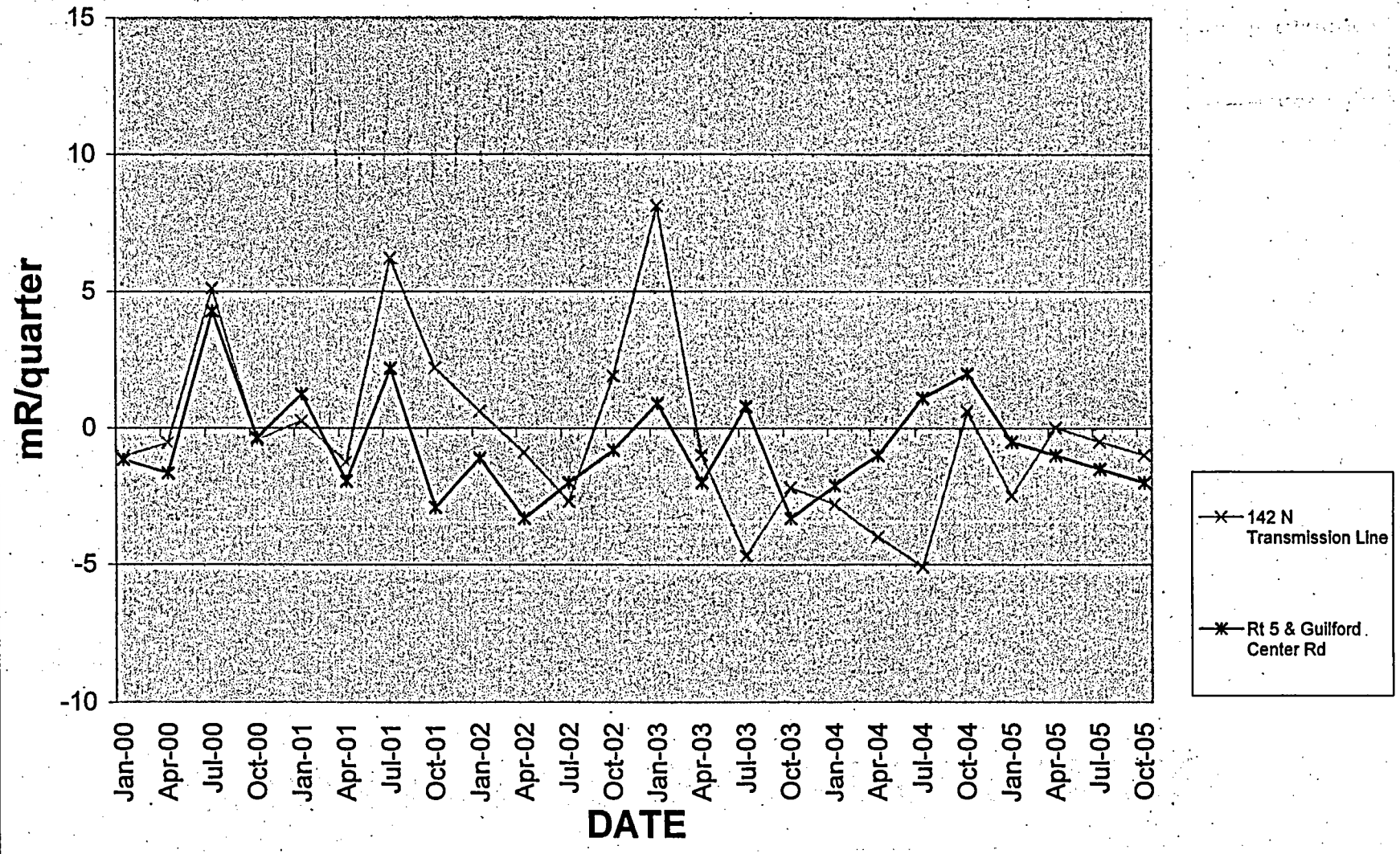

THERMOLUMINESCENT DOSIMETRY
mR/quarter
15
10
5
0
-5
-10
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
DATE
142 North & Pond Rd
Edgewood & West Rd
Fairman Rd

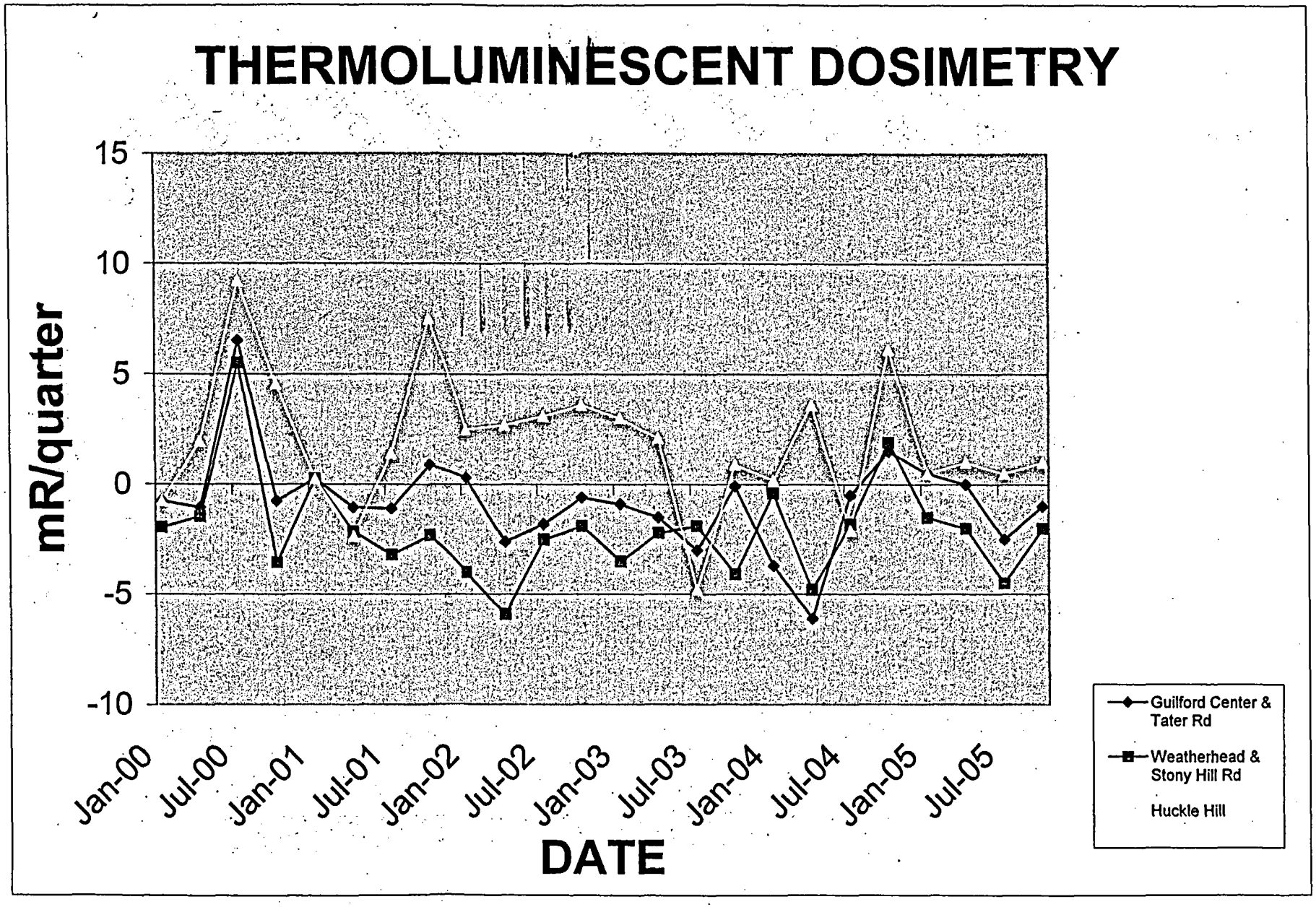

THERMOLUMINESCENT DOSIMETRY
mR/quarter
15
10
5
0
-5
-10
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
DATE
Pond & Houghton Rd
Wolosko Route 5

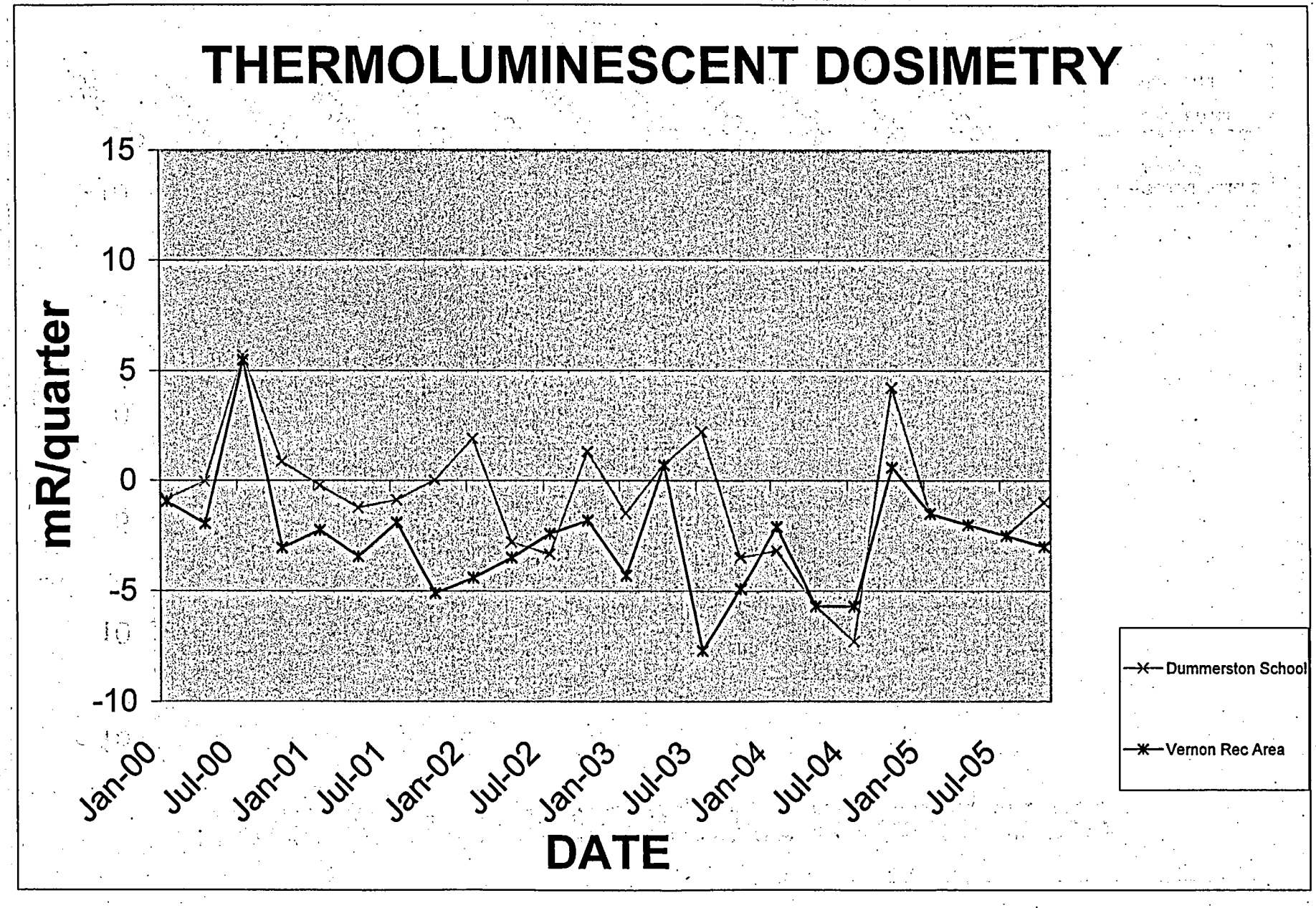
THERMOLUMINESCENT DOSIMETRY



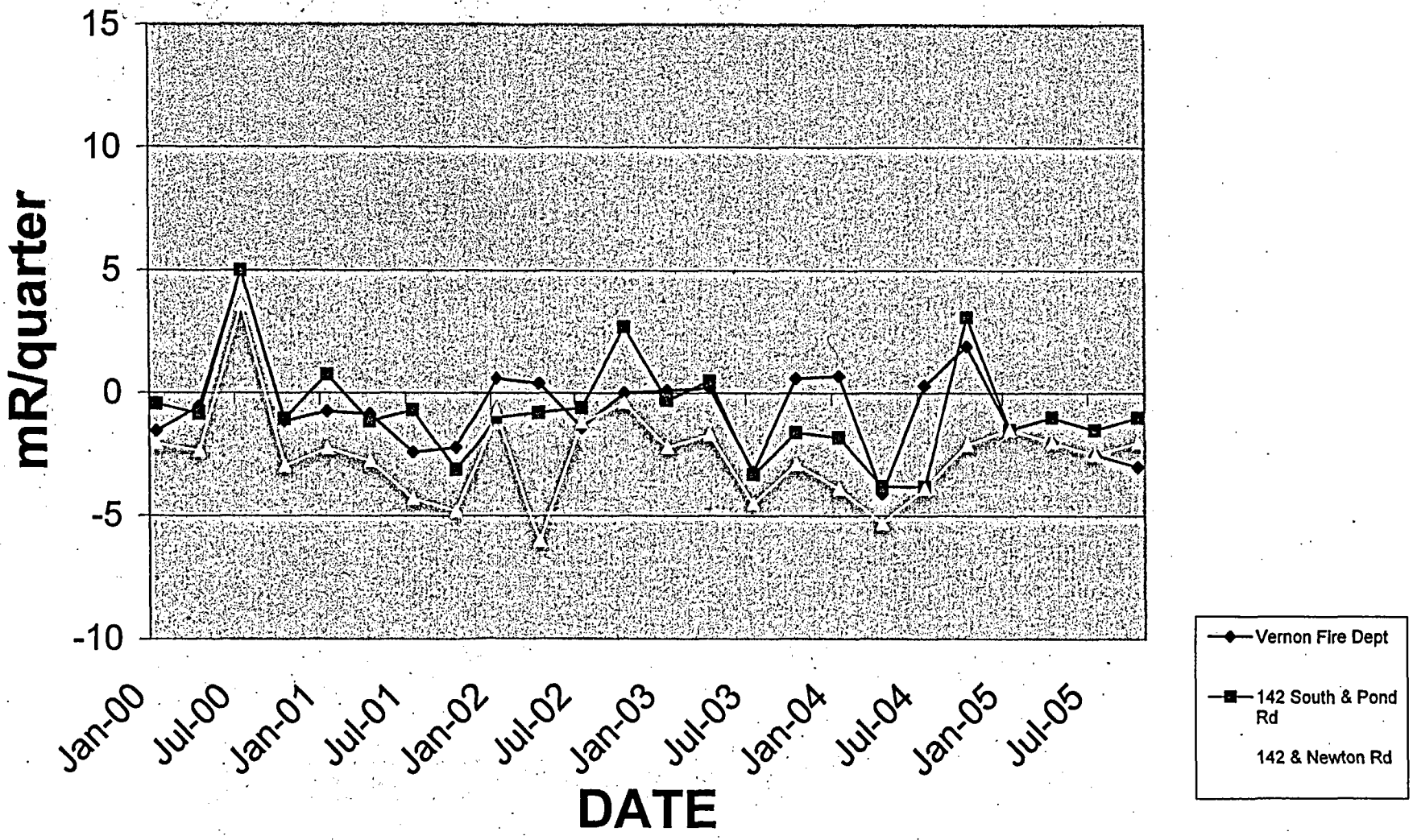
THERMOLUMINESCENT DOSIMETRY

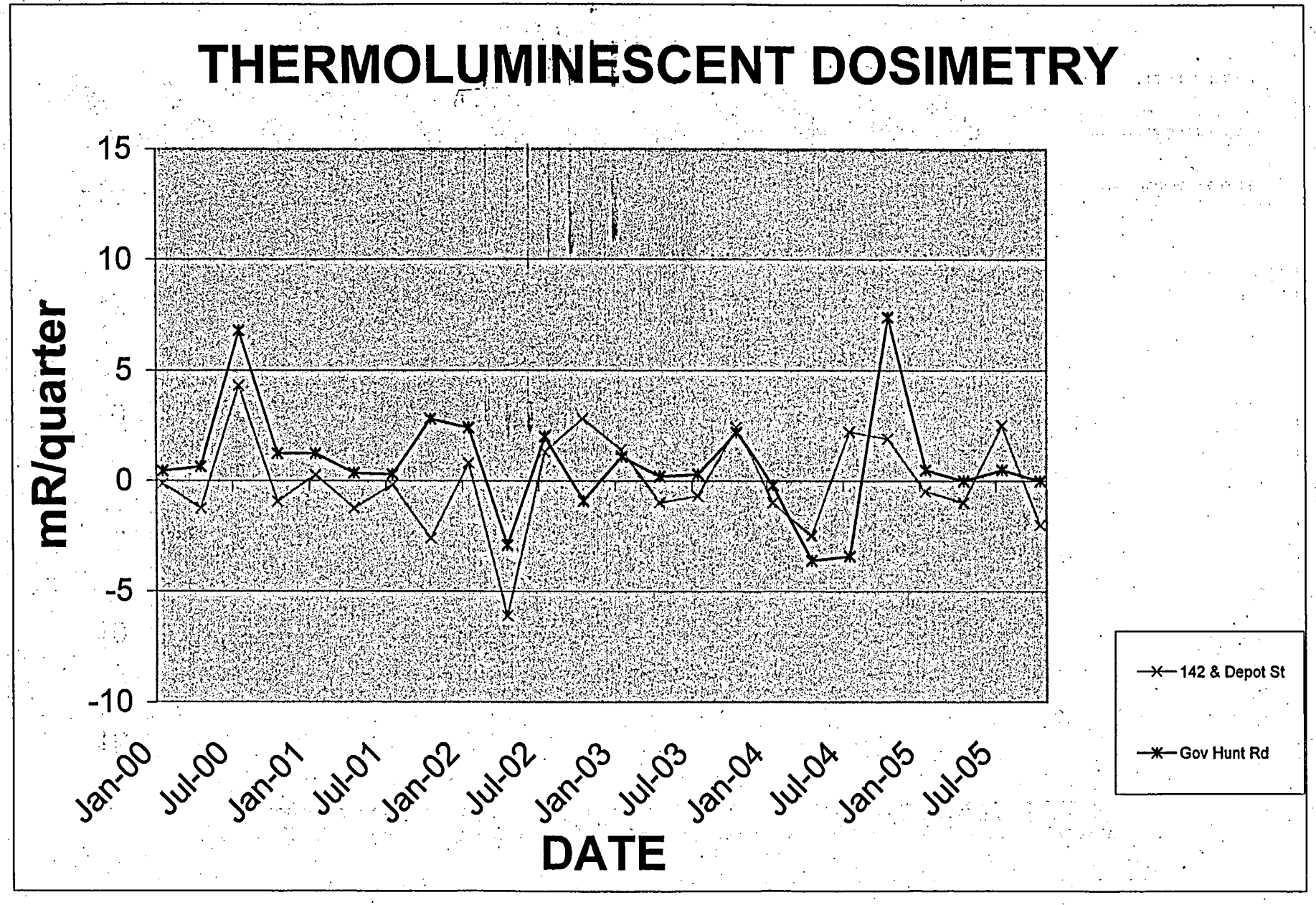



THERMOLUMINESCENT DOSIMETRY
mR/quarter
15
10
5
0
-5
-10
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
DATE
Guilford Center & Tater Rd
Weatherhead & Stony Hill Rd
Huckle Hill

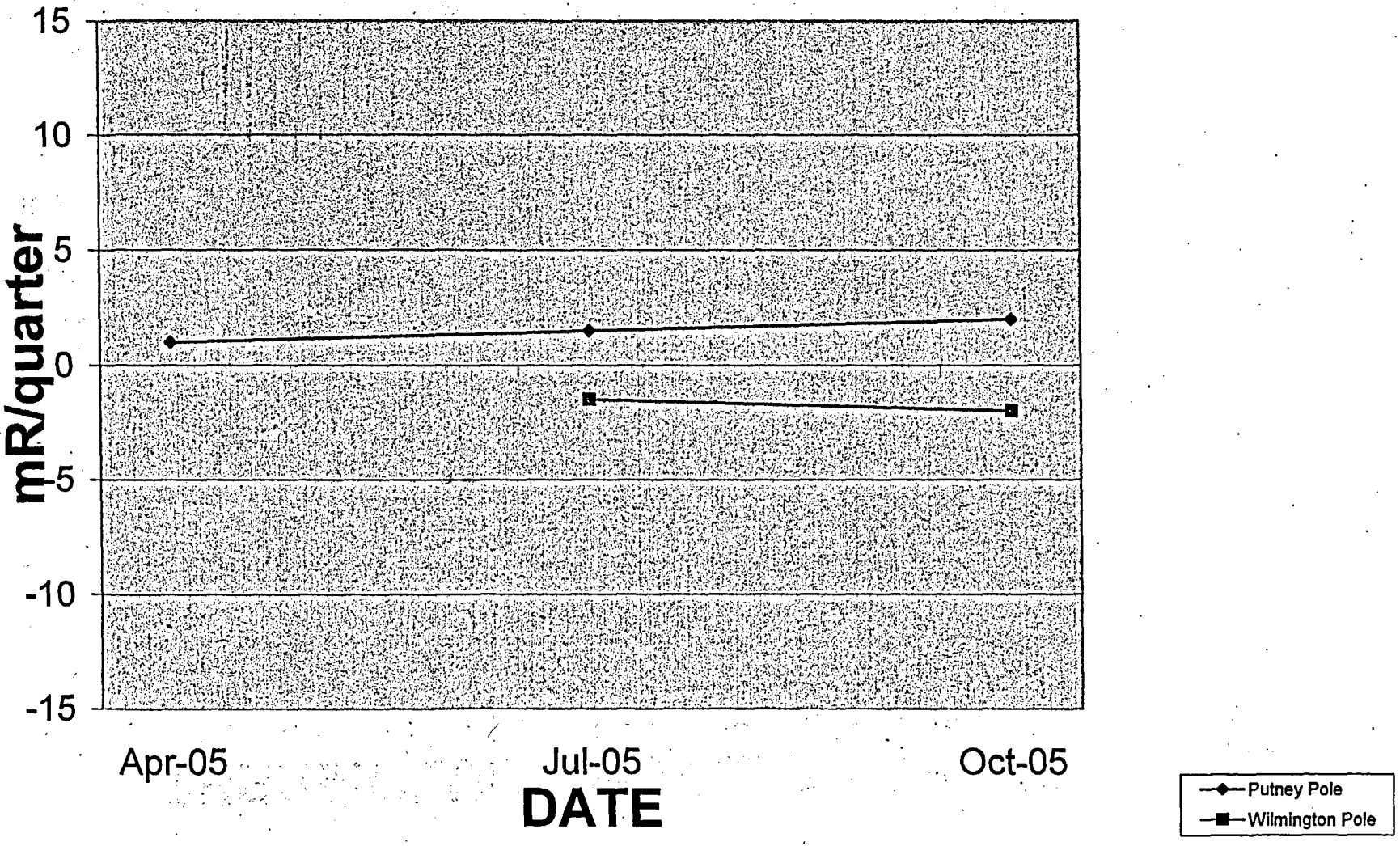

THERMOLUMINESCENT DOSIMETRY
mR/quarter
15
10
5
0
-5
-10
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
DATE
Dummerston School
Vernon Rec Area

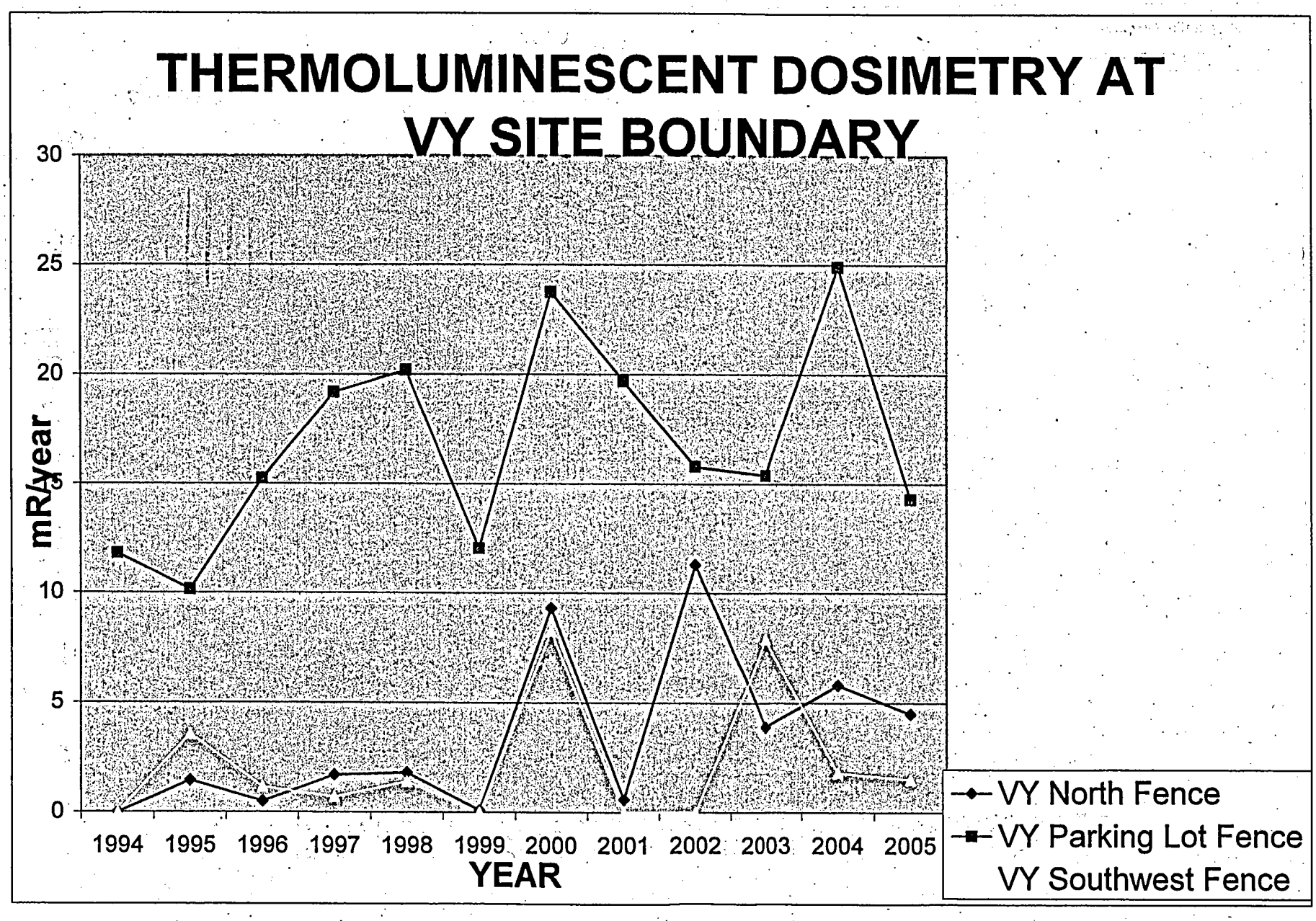
THERMOLUMINESCENT DOSIMETRY



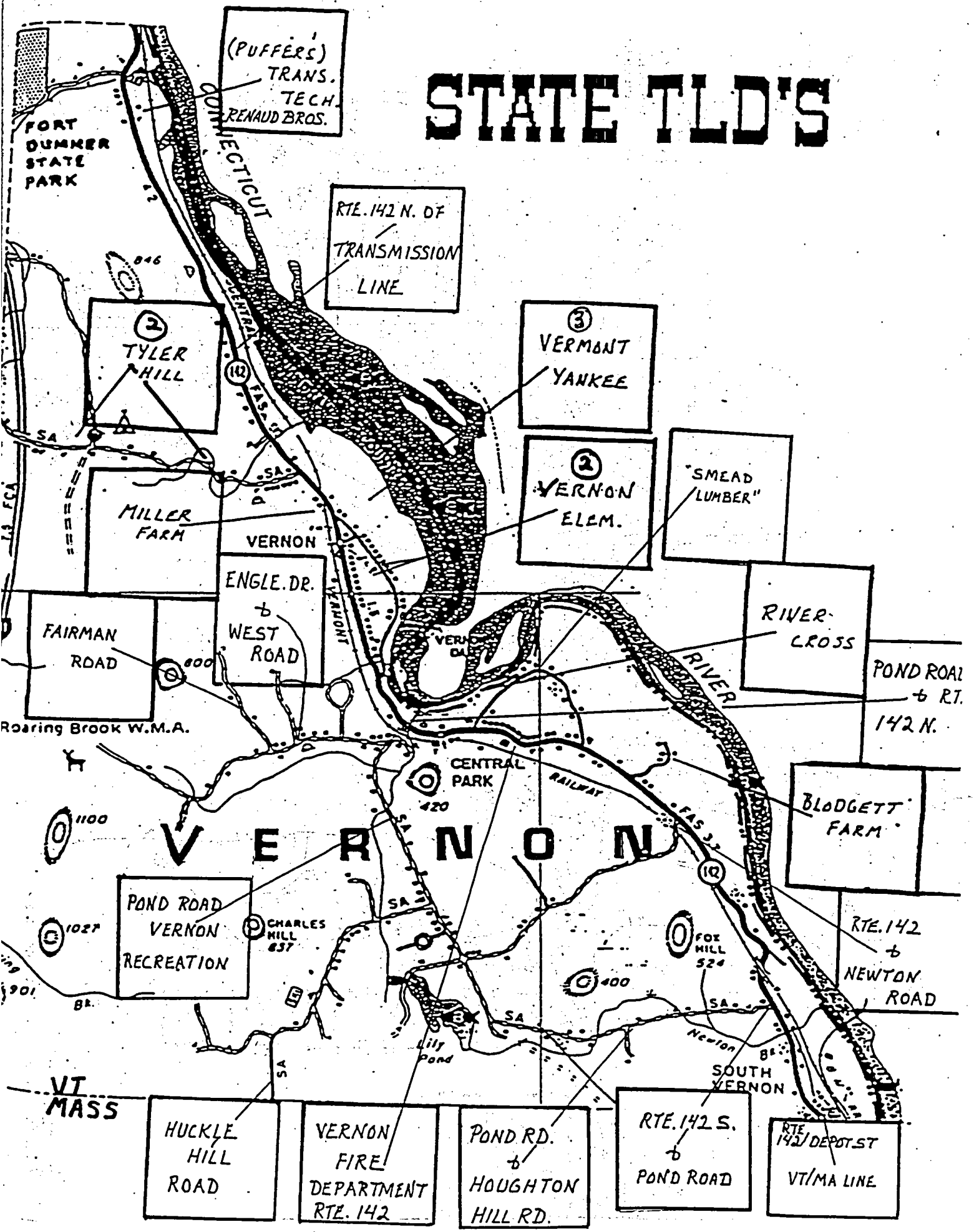

THERMOLUMINESCENT DOSIMETRY
mR/quarter
15
10
5
0
-5
-10
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
DATE
142 & Depot St
Gov Hunt Rd

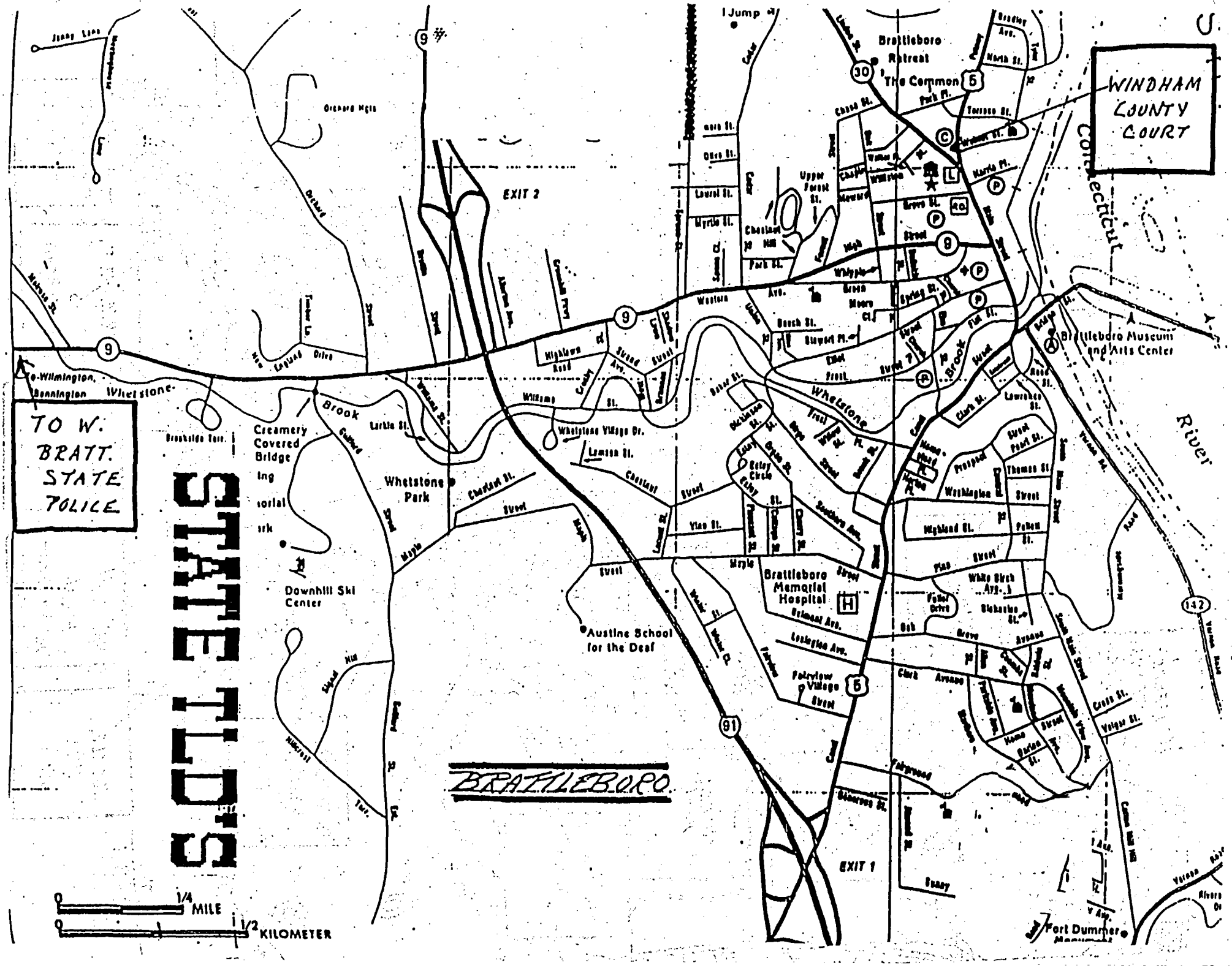
THERMOLUMINESCENT DOSIMETRY




THERMOLUMINESCENT DOSIMETRY AT VY SITE BOUNDARY
mR/year
30
25
20
15
10
5
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
YEAR
VY North Fence
VY Parking Lot Fence
VY Southwest Fence

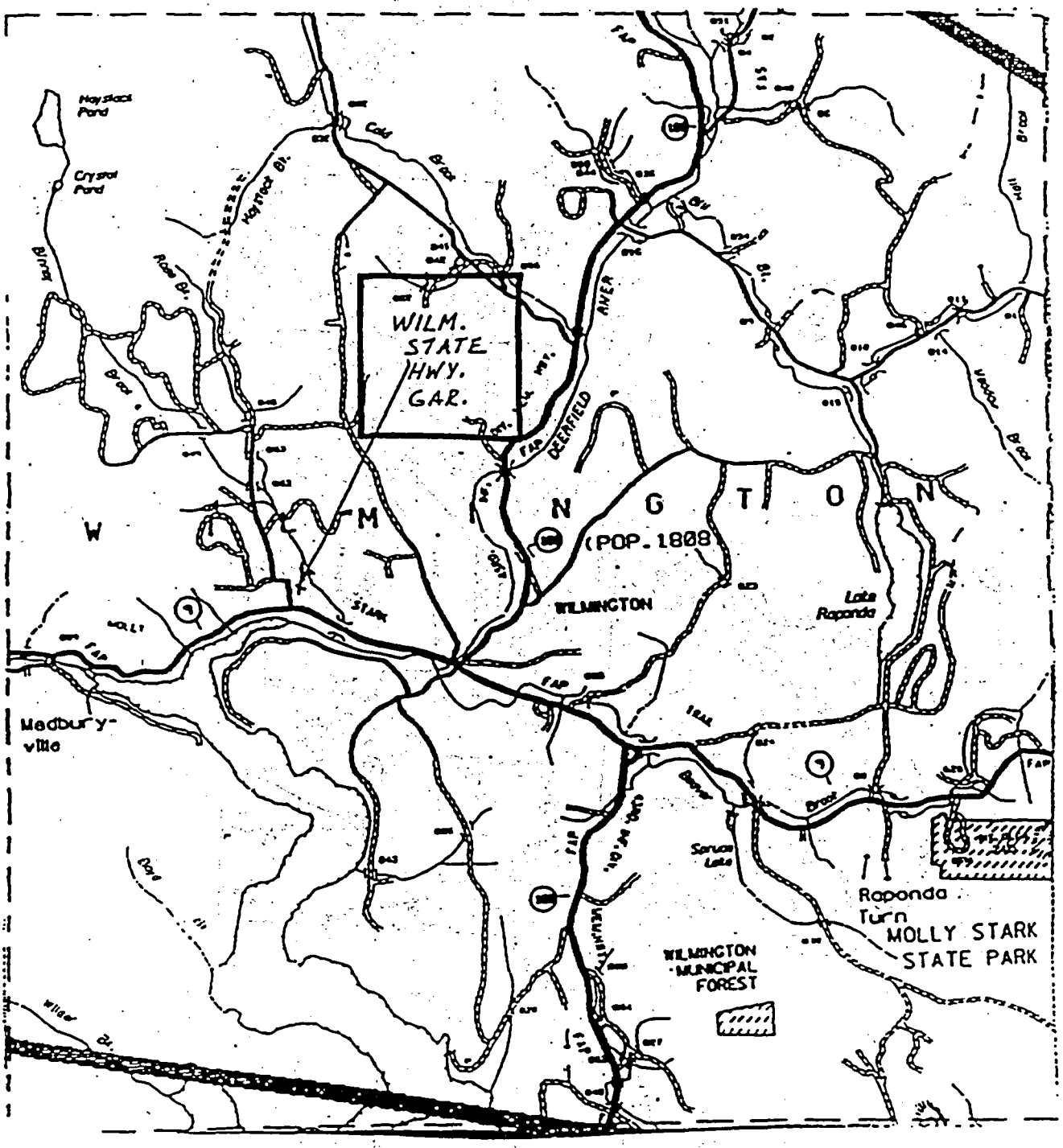
STATE TLD'S


(PUFFER'S) TRANS. TECH. RENAUD BROS.
FORT DUMMER STATE PARK
CONNECTICUT
RTE. 142 N. OF TRANSMISSION LINE
② TYLER HILL
③ VERMONT YANKEE
② VERNON ELEM.
"SMEAD LUMBER"
MILLER FARM
VERNON
ENGLE. DR. & WEST ROAD
FAIRMAN ROAD
RIVER CROSS
POND ROAD & RT. 142 N.
Roaring Brook W.M.A.
CENTRAL PARK
RAILWAY
BLODGETT FARM
V E R N O N
POND ROAD VERNON RECREATION
CHARLES HILL 837
FOX HILL 524
RTE. 142 & NEWTON ROAD
Lily Pond
Newton Br.
SOUTH VERNON
VT
MASS
HUCKLE HILL ROAD
VERNON FIRE DEPARTMENT RTE. 142
POND RD. & HOUGHTON HILL RD.
RTE. 142 S. & POND ROAD
RTE 142/DEPOT ST
VT/MA LINE

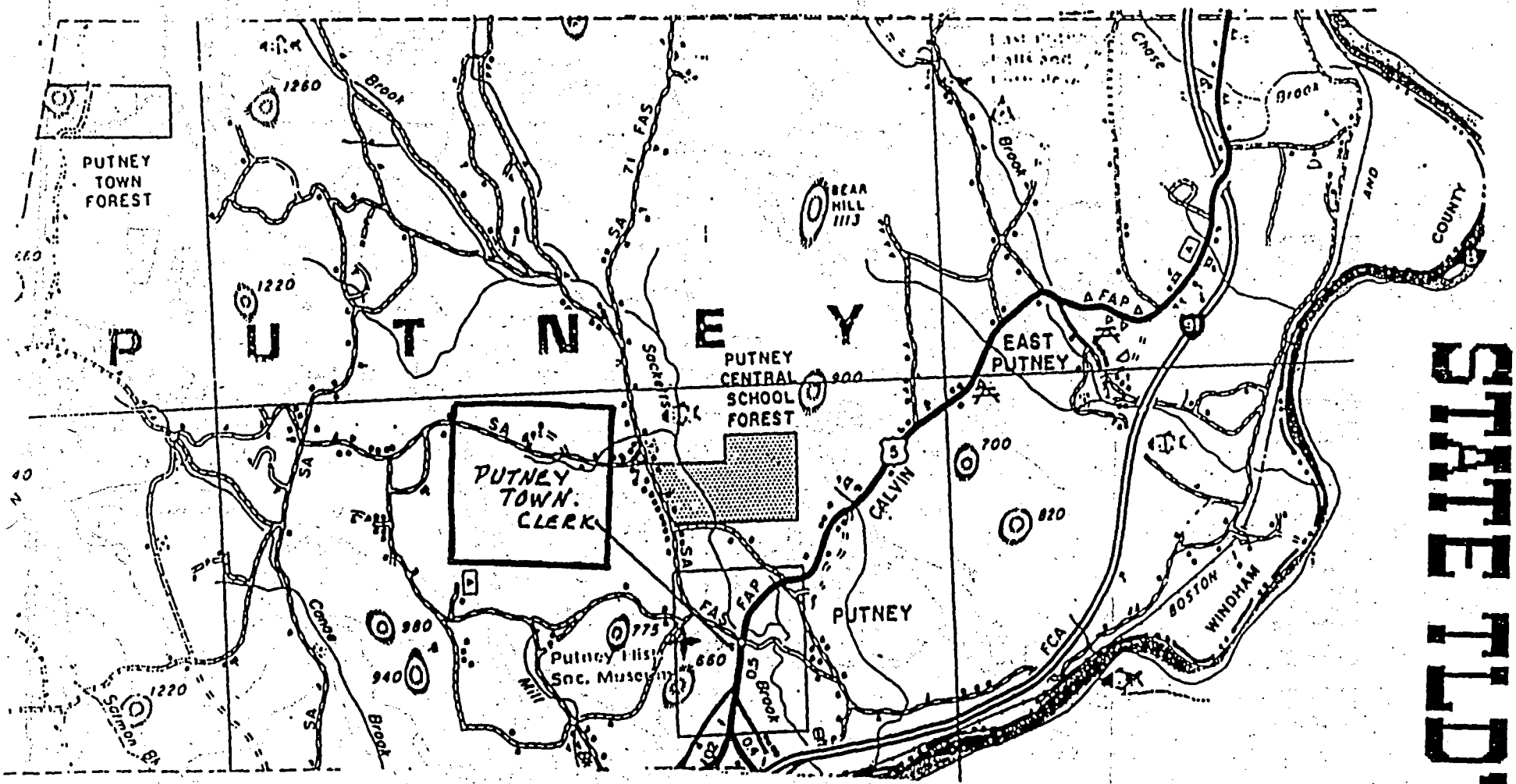


WINDHAM COUNTY COURT
TO W. BRATT. STATE POLICE
STATE TLD'S
BRATTLEBORO
Brattleboro Retreat
The Common
Brattleboro Museum and Arts Center
Whetstone Park
Creamery Covered Bridge
Downhill Ski Center
Austine School for the Deaf
Brattleboro Memorial Hospital
Fairview Village
Fort Dummer
EXIT 1
EXIT 2
Connecticut River
Whetstone Brook
To Wilmington, Bennington
0 1/4 MILE
0 1/2 KILOMETER

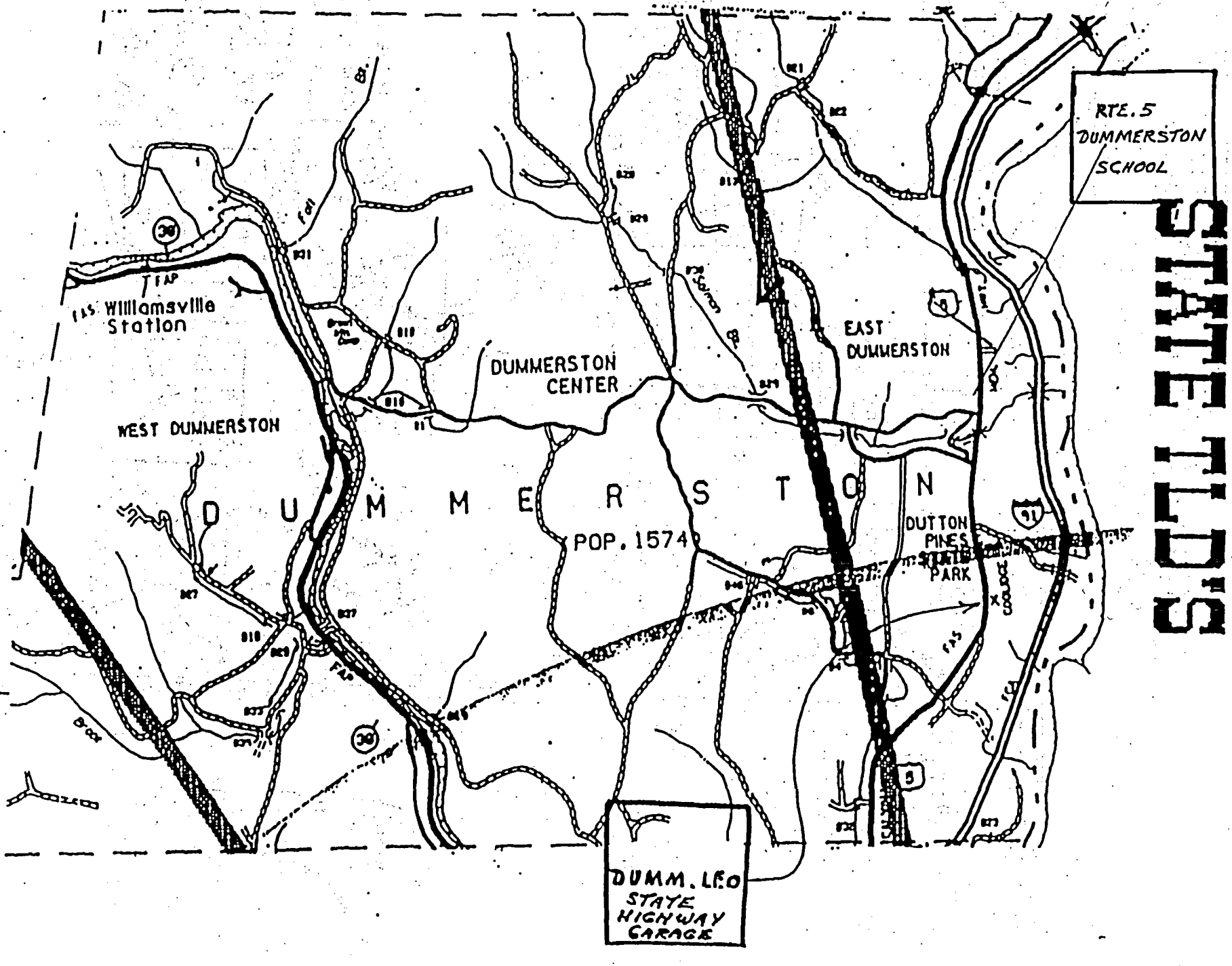
STATE TLD'S



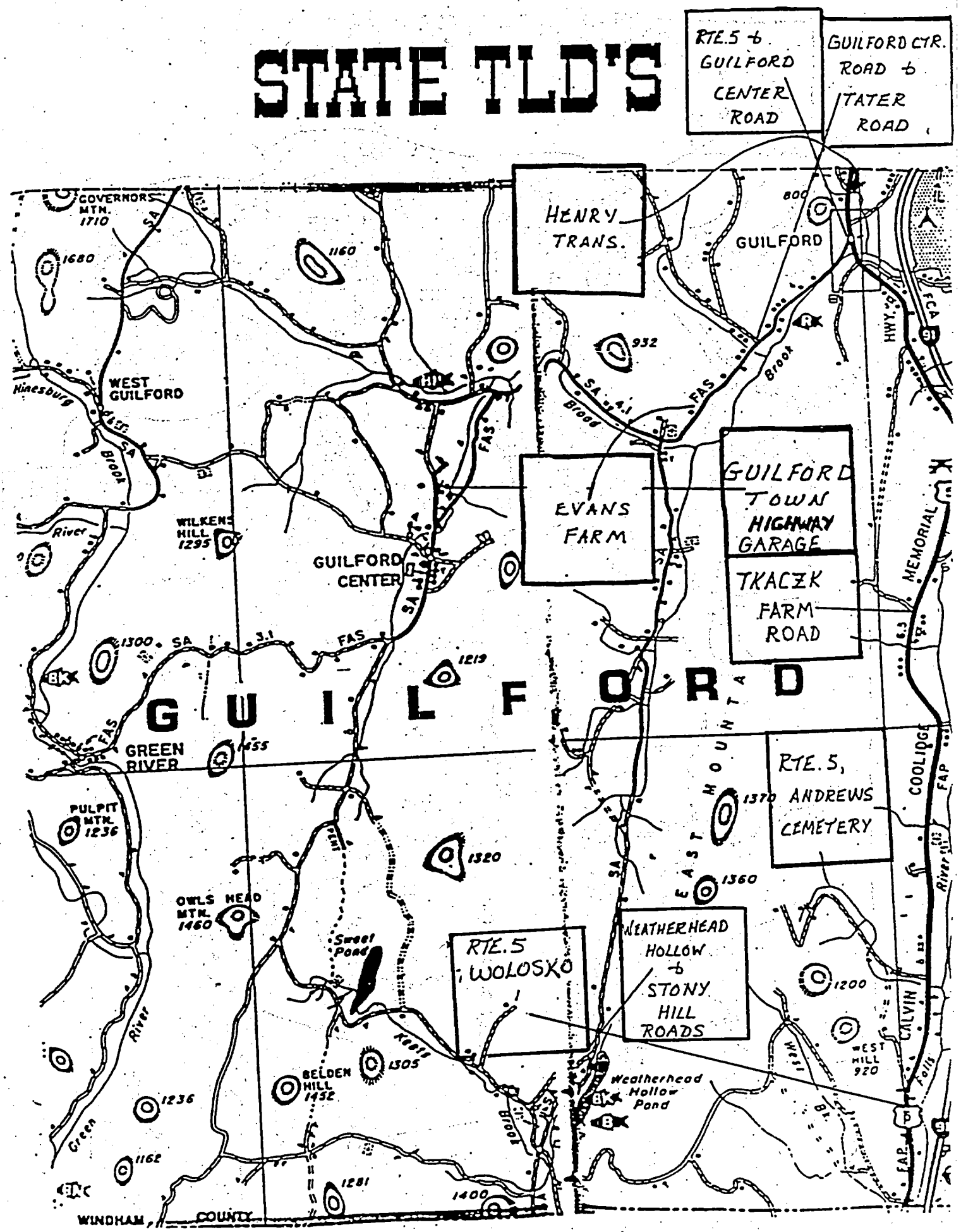
Haystack Pond
Crystal Pond
Cold Brook
Haystack Bl.
Rose Bl.
Brook
WILM. STATE HWY. GAR.
DEERFIELD RIVER
W I L M I N G T O N
(POP. 1808)
WILMINGTON
STARK
MOLLY
FAP
Lake Raponda
Medbury-ville
Spruce Lake
Raponda Turn
MOLLY STARK STATE PARK
WILMINGTON MUNICIPAL FOREST
Wilder Bl.


PUTNEY TOWN FOREST
P U T N E Y
PUTNEY CENTRAL SCHOOL FOREST
PUTNEY TOWN. CLERK
BEAR HILL 1113
EAST PUTNEY
PUTNEY
Putney Hist. Soc. Museum
CALVIN
FAP
FCA
SA
FAS
Brook
Chase
Sackets
Mill
Canoe
Salmon Bk
BOSTON
WINDHAM
COUNTY
AND
1260
1220
900
700
820
980
940
775
660

STATE TLD'S


STATE TLD'S
RTE. 5
DUMMERSTON
SCHOOL
EAST
DUMMERSTON
DUMMERSTON
CENTER
WEST DUMMERSTON
D U M M E R S T O N
POP. 1574
DUTTON
PINES
STATE
PARK
Williamsville
Station
DUMM. LFO
STATE
HIGHWAY
GARAGE

STATE TLD'S



RTE.5 & GUILFORD CENTER ROAD
GUILFORD CTR. ROAD & TATER ROAD
HENRY TRANS.
GUILFORD
EVANS FARM
GUILFORD TOWN HIGHWAY GARAGE
TKACZK FARM ROAD
RTE.5, ANDREWS CEMETERY
RTE.5 WOLOSKO
WEATHERHEAD HOLLOW & STONY HILL ROADS
GOVERNORS MTN. 1710
1680
1160
800
932
WEST GUILFORD
Hinesburg
Brook
River
WILKENS HILL 1295
GUILFORD CENTER
1300
1219
GUILFORD
GREEN RIVER
1455
PULPIT MTN. 1236
1320
1370
1360
OWLS HEAD MTN. 1460
Sweet Pond
BELDEN HILL 1452
1305
1236
1162
1281
1400
Weatherhead Hollow Pond
1200
WEST HILL 920
EAST MOUNTAIN
MEMORIAL
COOLIDGE
CALVIN
HWY.
FCA
FAP
FAS
SA
Broad
Keats
Green
WINDHAM COUNTY

TRITIUM IN WATER 2005
VERMONT YANKEE (CONNECTICUT RIVER)

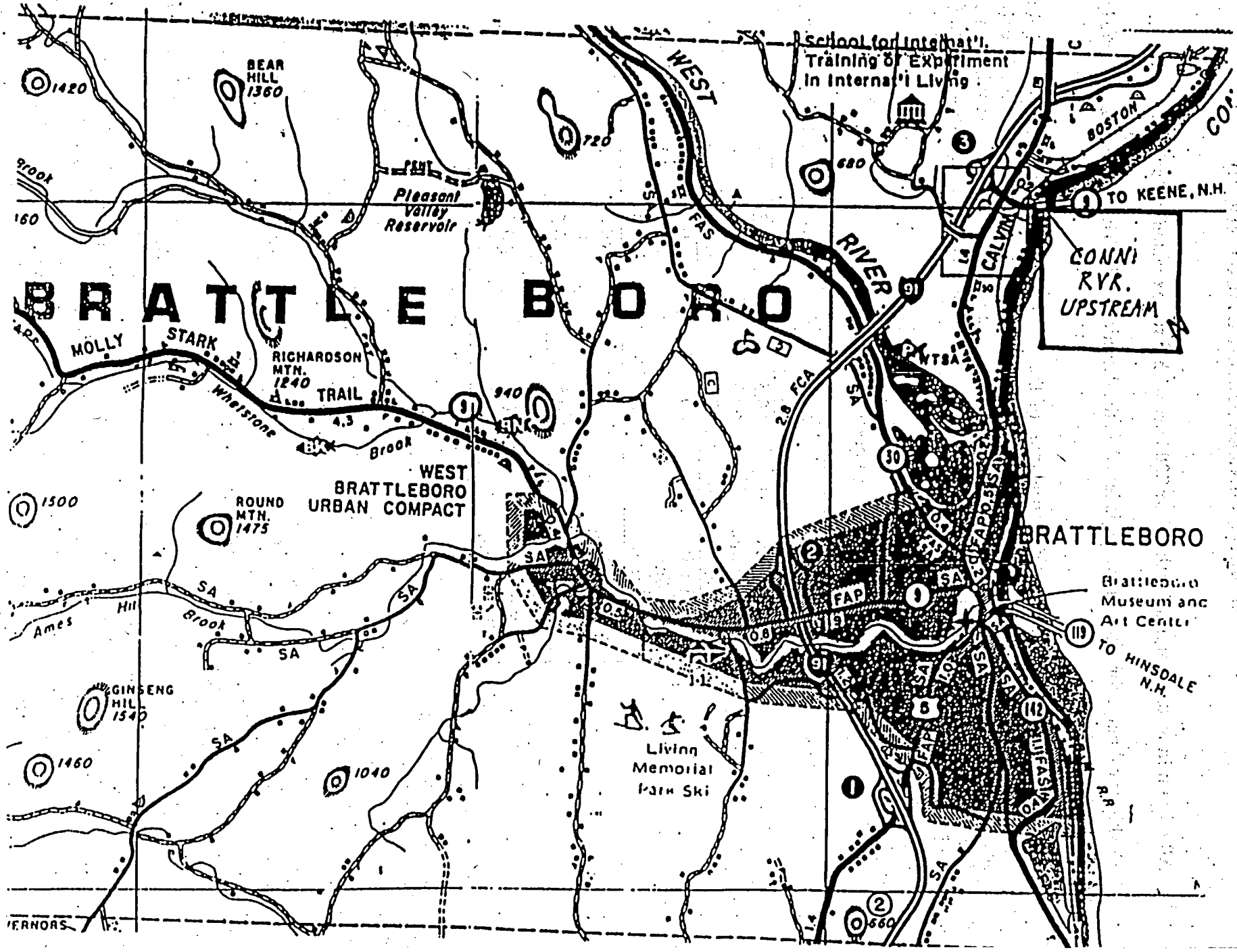
All tritium in water samples for the Year 2005 are within the expected historical range.

The historical range for tritium in water is less than the detection limit. The samples for 2005 are less than the detection limit.

As part of the water sampling effort, an aliquot of the monthly water samples is analyzed for tritium (hydrogen-3). Two locations are reported monthly for tritium content from the Connecticut River (upstream and downstream of the nuclear power station). The samples are analyzed by liquid scintillation counting. The detection limit for tritium is 0.5 nCi/l. Reporting units are nanocuries/liter with 2 sigma (standard deviation) value.

WATER
(nanocuries/liter)

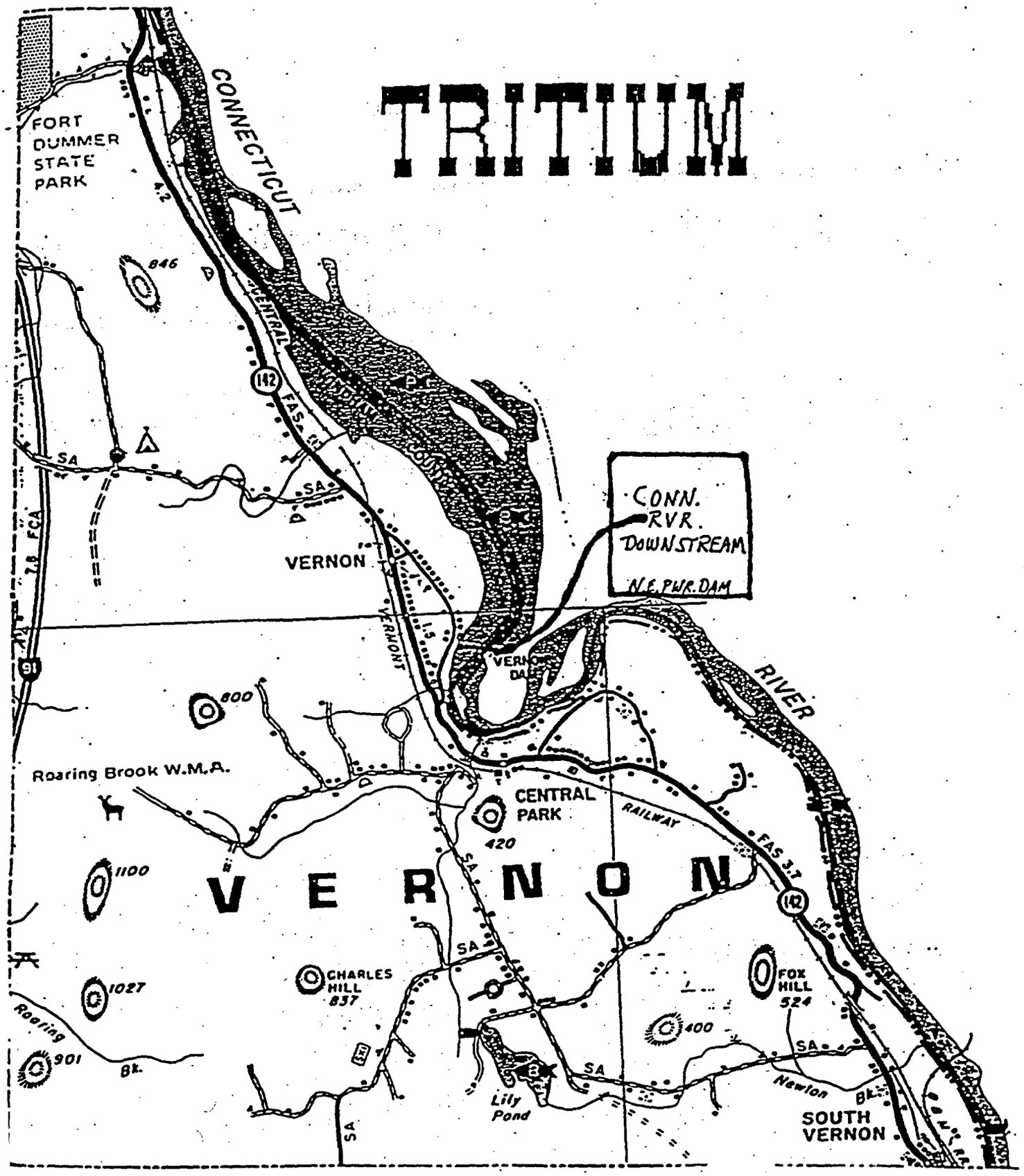
Month	Downstream (3-4)	Upstream (3-8)
January	< 0.5	< 0.5
February	< 0.5	< 0.5
March	< 0.5	< 0.5
April	< 0.5	< 0.5
May	< 0.5	< 0.5
June	< 0.5	< 0.5
July	< 0.5	< 0.5
August	< 0.5	< 0.5
September	< 0.5	< 0.5
October	< 0.5	< 0.5
November	< 0.5	< 0.5
December	< 0.5	< 0.5



BRATTLE BORO
School for Internat'l. Training of Experiment in Internat'l Living
BEAR HILL 1360
1420
720
680
Pleasant Valley Reservoir
WEST
RIVER
BOSTON
TO KEENE, N.H.
CONN. RVR. UPSTREAM
CALVIN
MOLLY STARK TRAIL
RICHARDSON MTN. 1240
Whetstone Brook
940
WEST BRATTLEBORO URBAN COMPACT
1500
ROUND MTN. 1475
Ames Hill Brook
GINSENG HILL 1540
1460
1040
Living Memorial Park Ski
BRATTLEBORO
Brattleboro Museum and Art Center
TO HINSDALE N.H.
660

TRITIUM

TRITIUM



FORT DUMMER STATE PARK
CONNECTICUT
RIVER
CONN. RVR. DOWNSTREAM
N.E. PWR. DAM
VERNON
VERNON DAM
CENTRAL PARK
420
RAILWAY
FAS 3.7
VERNON
CHARLES HILL 837
FOX HILL 524
400
Lily Pond
SOUTH VERNON
Newton Bk.
Roaring Brook W.M.A.
Roaring Bk.
846
800
1100
1027
901
142
91
SA

WATER SAMPLES 2005

All water samples for the Year 2005 are within the expected historical range.

The historical range for alpha is from less than the detection limit to 15 pCi/l. The samples for 2005 range from less than the detection limit to 8.4 pCi/l.

The historical range for beta is from less than the detection limit to 15 pCi/l. The samples for 2005 range from less than the detection limit to 5.8 pCi/l.

Water samples are collected monthly from 8 sites. One gallon of water is placed in a re-entrant beaker and analyzed on the gamma spectrometer system using a reverse germanium detector. Usual spectra include primordial radionuclides. *A priori* detection limits are 3 pCi/l for alpha and 4 pCi/l for beta. Reporting units are picocuries per liter with 2 sigma (standard deviation) value.

WATER 2005
(picocuries/liter)

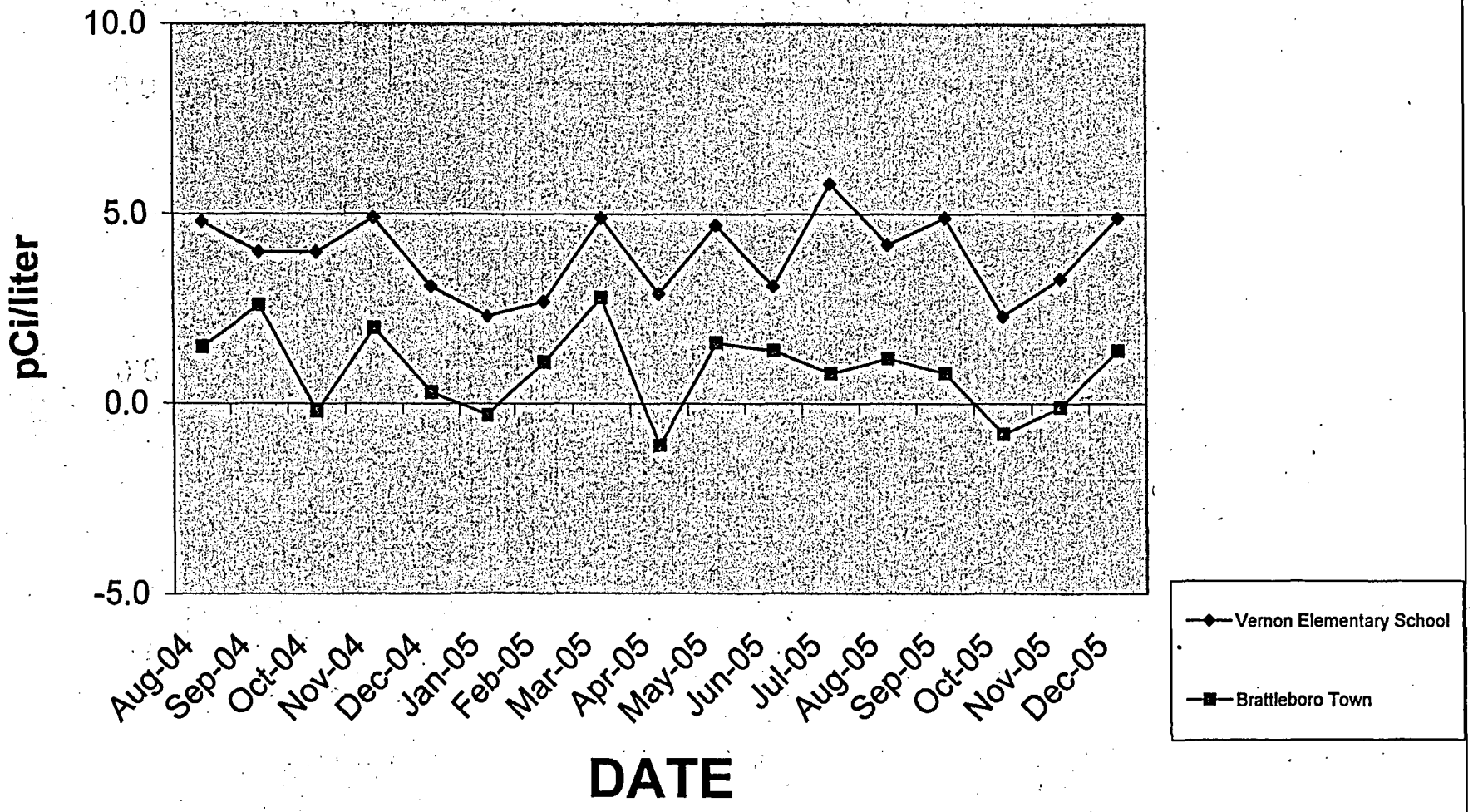
Month	Test	Vernon School Well	NE Power Dam	VY Discharge	Brattleboro Town
January	Alpha	6.2 ± 1.1	-0.5 ± 1.6	0.0 ± 1.6	0.0 ± 1.6
	Beta	2.3 ± 1.8	0.3 ± 1.8	2.9 ± 1.8	-0.3 ± 1.7
	Gamma	*	< LLD	< LLD	< LLD
February	Alpha	7.5 ± 1.2	1.1 ± 1.4	1.8 ± 1.6	1.1 ± 1.4
	Beta	2.7 ± 1.8	2.1 ± 1.8	0.5 ± 1.8	1.1 ± 1.8
	Gamma	*	< LLD	< LLD	< LLD
March	Alpha	6.7 ± 1.2	0.8 ± 1.4	3.1 ± 1.6	0.5 ± 1.4
	Beta	4.9 ± 1.9	1.8 ± 1.8	1.8 ± 1.8	2.8 ± 1.9
	Gamma	*	< LLD	< LLD	< LLD
April	Alpha	7.2 ± 1.2	1.2 ± 0.9	0.6 ± 0.8	0.8 ± 1.5
	Beta	2.9 ± 1.9	0.2 ± 0.9	0.4 ± 0.9	-1.1 ± 1.8
	Gamma	*	< LLD	< LLD	< LLD
May	Alpha	6.1 ± 1.1	-0.8 ± 1.4	1.4 ± 1.5	-0.2 ± 0.8
	Beta	4.7 ± 1.8	2.8 ± 1.7	2.2 ± 1.7	1.6 ± 0.9
	Gamma	*	< LLD	< LLD	< LLD
June	Alpha	6.1 ± 1.2	0.8 ± 1.4	0.5 ± 1.3	0.5 ± 1.4
	Beta	3.1 ± 1.9	1.7 ± 1.8	1.4 ± 1.8	1.4 ± 1.8
	Gamma	*	< LLD	< LLD	< LLD
July	Alpha	4.7 ± 1.0	0.6 ± 1.5	1.1 ± 1.5	1.6 ± 1.5
	Beta	5.8 ± 1.9	2.3 ± 1.8	3.1 ± 1.8	0.8 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD
August	Alpha	6.2 ± 1.1	-0.6 ± 1.4	0.6 ± 1.5	0.2 ± 0.8
	Beta	4.2 ± 1.8	2.5 ± 1.8	3.1 ± 1.8	1.2 ± 0.9
	Gamma	< LLD	< LLD	< LLD	< LLD
September	Alpha	6.4 ± 1.1	0 ± 1.4	1.1 ± 1.5	0.6 ± 0.8
	Beta	4.9 ± 1.9	0.6 ± 1.8	1.7 ± 1.8	0.8 ± 0.9
	Gamma	*	< LLD	< LLD	< LLD
October	Alpha	7.0 ± 1.2	2.5 ± 0.9	2.1 ± 1.3	0.9 ± 0.7
	Beta	2.3 ± 2.0	2.5 ± 1.0	4.3 ± 2.0	-0.8 ± 0.9
	Gamma	*	< LLD	< LLD	< LLD
November	Alpha	5.3 ± 1.0	0.5 ± 1.0	0.9 ± 1.0	0.4 ± 1.0
	Beta	3.3 ± 2.3	-0.1 ± 1.1	0.2 ± 1.1	-0.1 ± 1.1
	Gamma	*	< LLD	< LLD	< LLD
December	Alpha	8.4 ± 1.2	1.9 ± 1.4	1.4 ± 1.3	0.3 ± 1.4
	Beta	4.9 ± 1.9	2.3 ± 1.8	1.5 ± 1.8	1.4 ± 1.8
	Gamma	*	< LLD	< LLD	< LLD

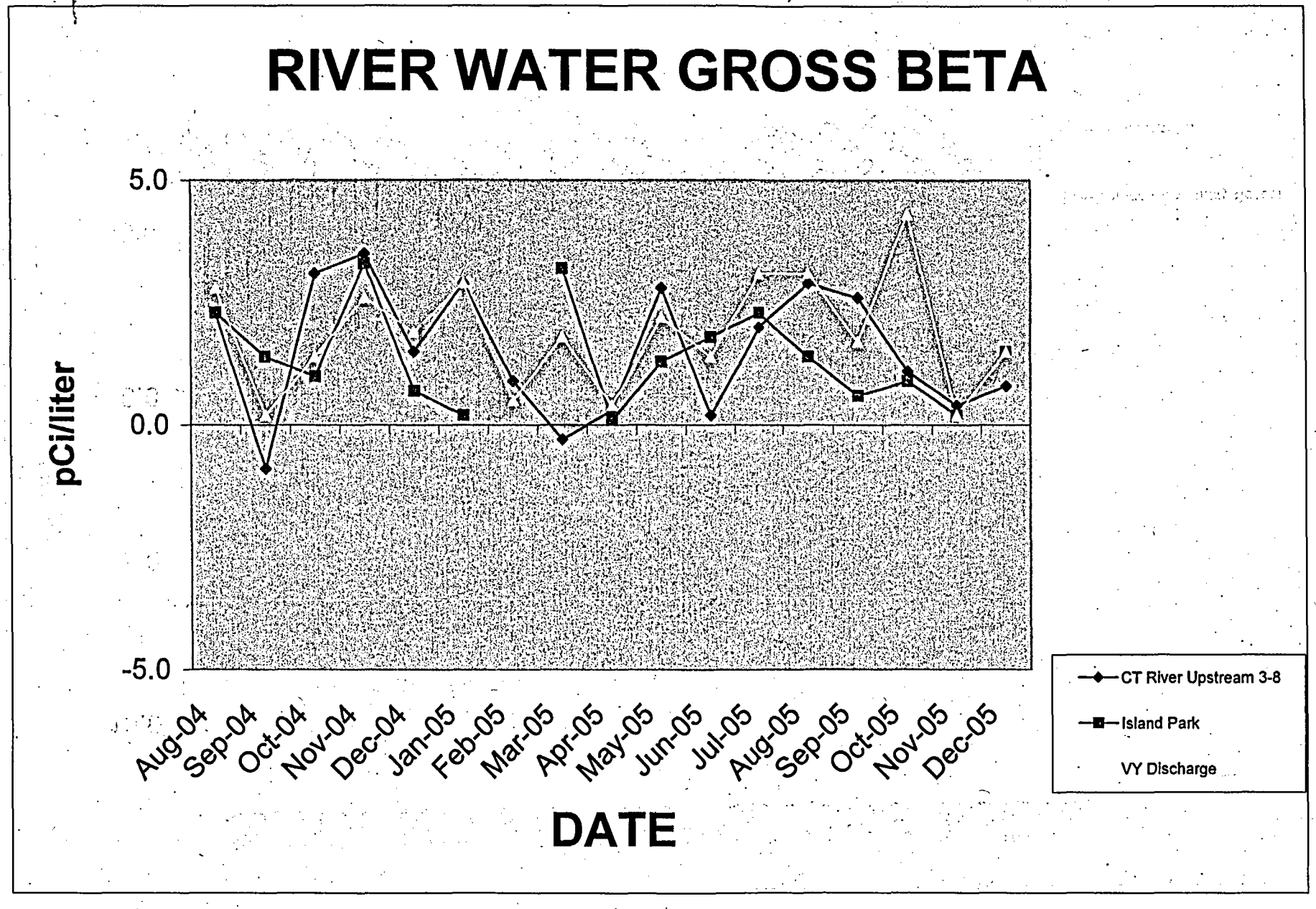
WATER 2005
(picocuries/liter)

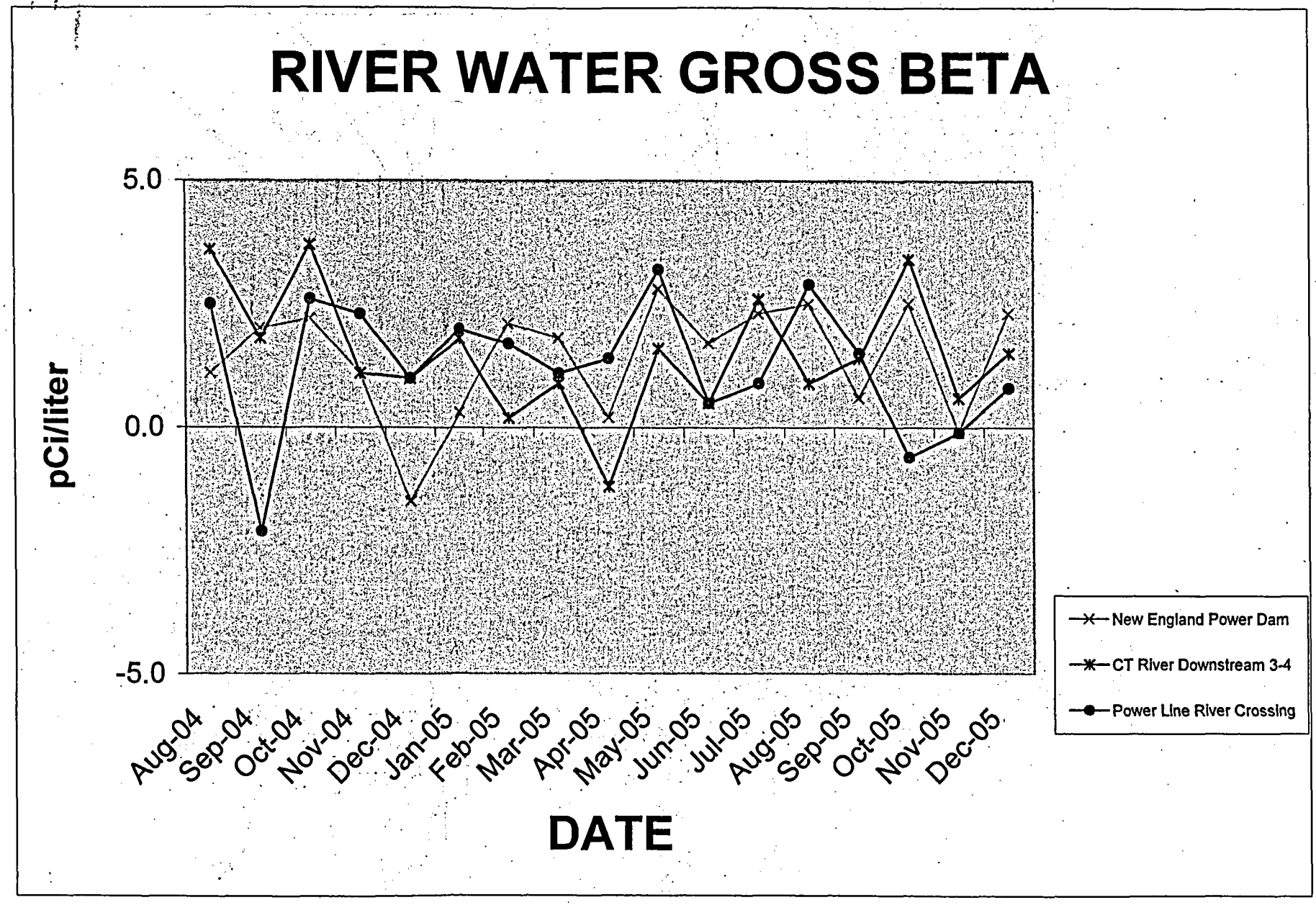
Month	Test	Powerline River Crossing (3-3)	Island Park	Conn. River Upstream (3-8)	Conn. River Downstream (3-4)
January	Alpha	1.4 ± 1.7	-0.3 ± 1.6	0.9 ± 1.7	-0.5 ± 1.6
	Beta	1.8 ± 1.8	0.2 ± 1.8	2.9 ± 1.8	2.0 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD
February	Alpha	0.6 ± 1.4		1.6 ± 1.4	2.1 ± 1.6
	Beta	0.2 ± 1.7	**	0.9 ± 1.8	1.7 ± 1.8
	Gamma	< LLD		< LLD	< LLD
March	Alpha	0.9 ± 1.5	1.4 ± 1.5	0.5 ± 1.3	1.1 ± 1.4
	Beta	0.9 ± 1.8	3.2 ± 1.9	-0.3 ± 1.8	1.1 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD
April	Alpha	2.6 ± 1.6	0.5 ± 0.8	0.5 ± 0.6	1.1 ± 0.9
	Beta	-1.2 ± 1.8	0.1 ± 0.9	0.3 ± 0.6	1.4 ± 0.9
	Gamma	< LLD	< LLD	< LLD	< LLD
May	Alpha	0.0 ± 0.8	0.0 ± 1.4	-0.6 ± 1.4	0.6 ± 1.5
	Beta	1.6 ± 0.9	1.3 ± 1.7	2.8 ± 1.7	3.2 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD
June	Alpha	0.8 ± 1.4	0.8 ± 1.4	1.6 ± 1.4	0.3 ± 1.3
	Beta	0.5 ± 1.8	1.8 ± 1.8	0.2 ± 1.8	0.5 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD
July	Alpha	0.5 ± 1.4	0.6 ± 1.5	0.8 ± 1.5	0.3 ± 1.4
	Beta	2.6 ± 1.8	2.3 ± 1.8	2.0 ± 1.8	0.9 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD
August	Alpha	0.0 ± 1.4	0.0 ± 1.4	0.3 ± 1.4	-0.6 ± 1.4
	Beta	0.9 ± 1.8	1.4 ± 1.8	2.9 ± 1.8	2.9 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD
September	Alpha	2.0 ± 1.5	0.8 ± 1.5	1.5 ± 1.6	0.8 ± 1.5
	Beta	1.4 ± 1.8	0.6 ± 1.8	2.6 ± 1.8	1.5 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD
October	Alpha	1.1 ± 1.3	0.6 ± 0.7	0.5 ± 0.6	0.8 ± 1.2
	Beta	3.4 ± 2.0	0.9 ± 1.0	1.1 ± 1.0	-0.6 ± 1.9
	Gamma	< LLD	< LLD	< LLD	< LLD
November	Alpha	0.3 ± 0.9	0.6 ± 1.0	0.9 ± 1.0	0.3 ± 1.0
	Beta	0.6 ± 1.1	0.2 ± 1.1	0.4 ± 1.1	-0.1 ± 1.1
	Gamma	< LLD	< LLD	< LLD	< LLD
December	Alpha	1.4 ± 0.8	0.5 ± 1.3	0.3 ± 0.4	1.1 ± 1.3
	Beta	1.5 ± 0.9	1.5 ± 1.8	0.8 ± 0.5	0.8 ± 1.8
	Gamma	< LLD	< LLD	< LLD	< LLD

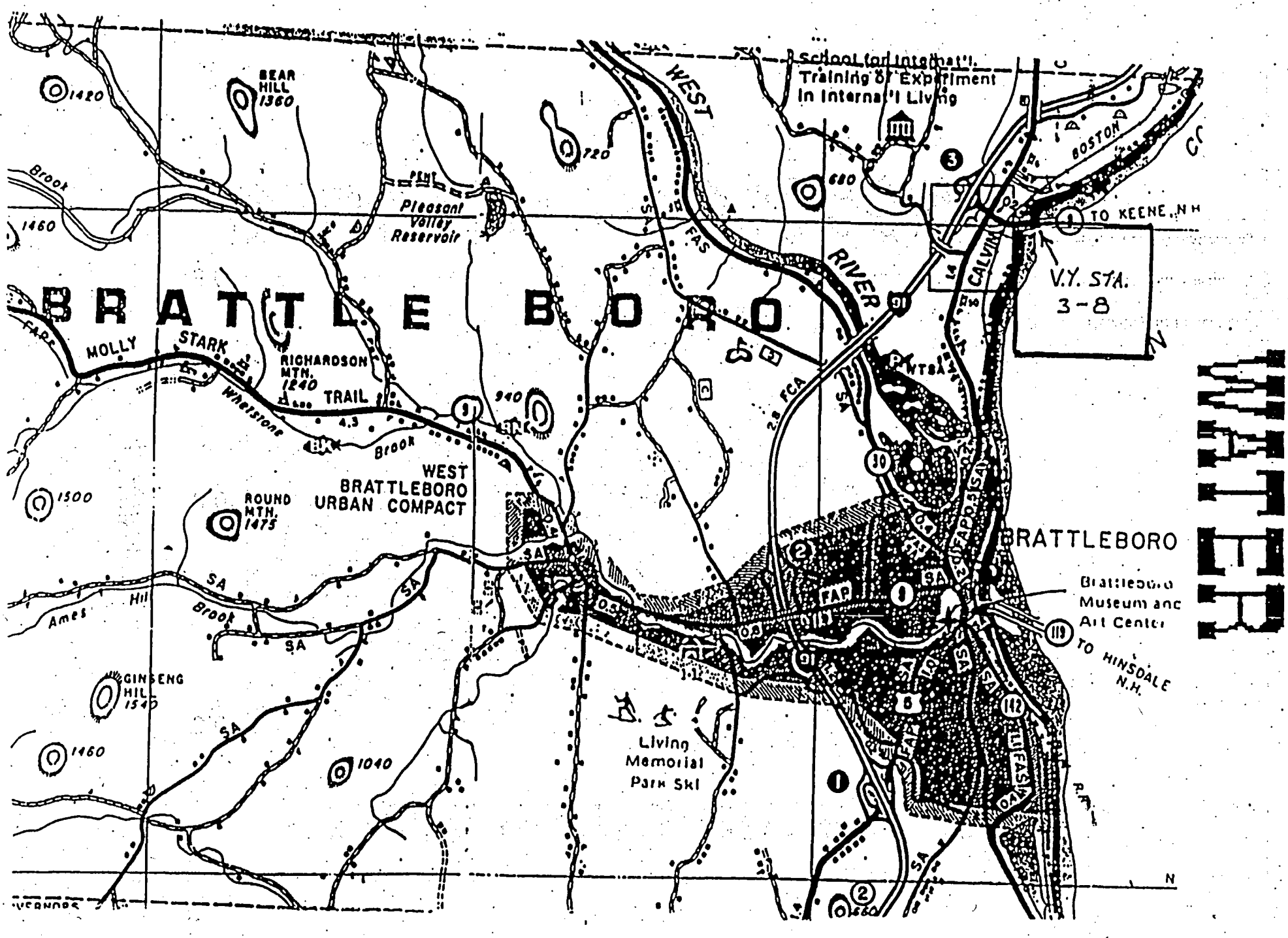
* Naturally Occurring Radionuclides
** River was frozen at this location in February.
LLD = Lower Limit of Detection

GROUND WATER GROSS BETA



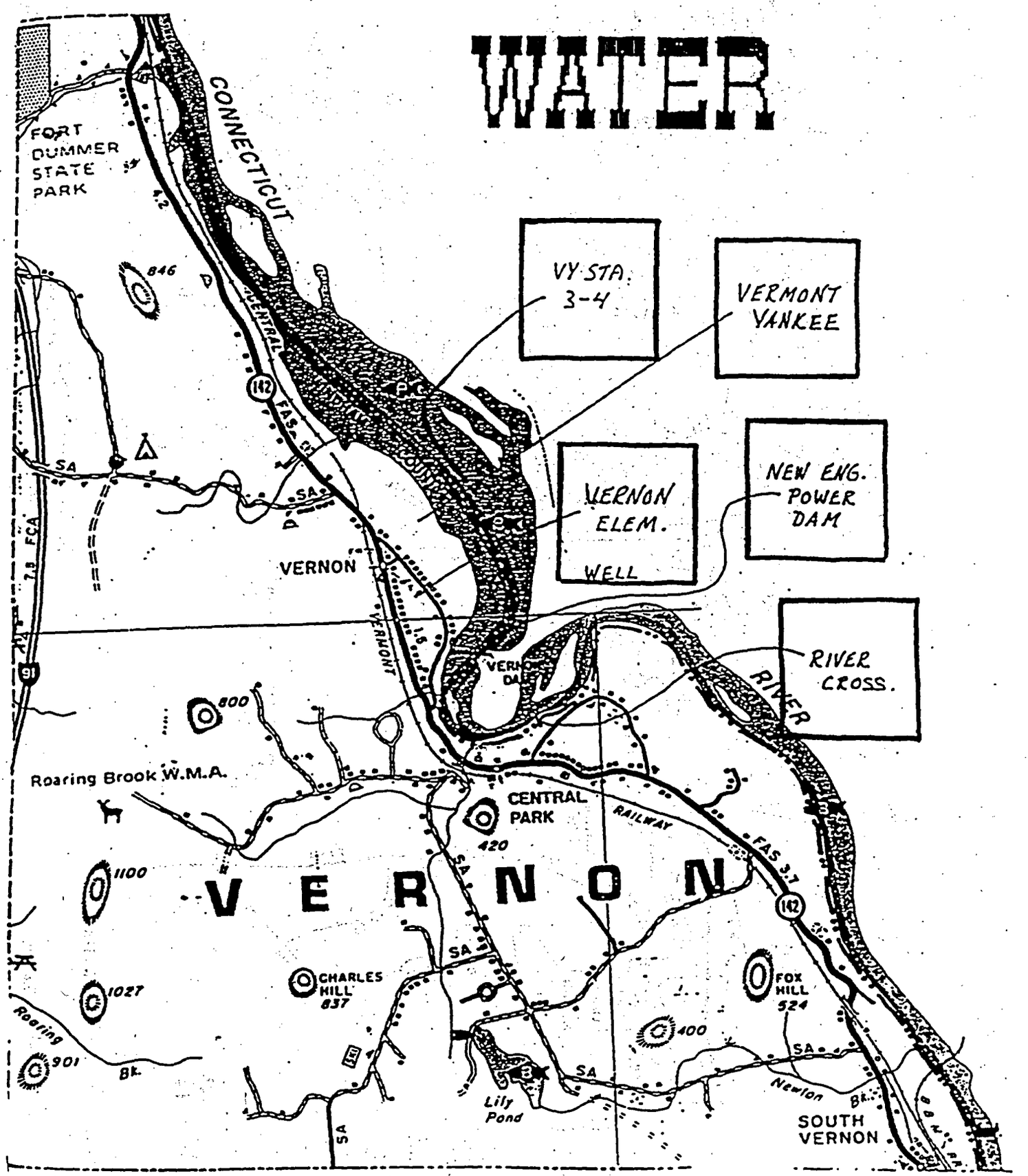

RIVER WATER GROSS BETA
5.0
0.0
-5.0
pCi/liter
Aug-04
Sep-04
Oct-04
Nov-04
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05
DATE
CT River Upstream 3-8
Island Park
VY Discharge

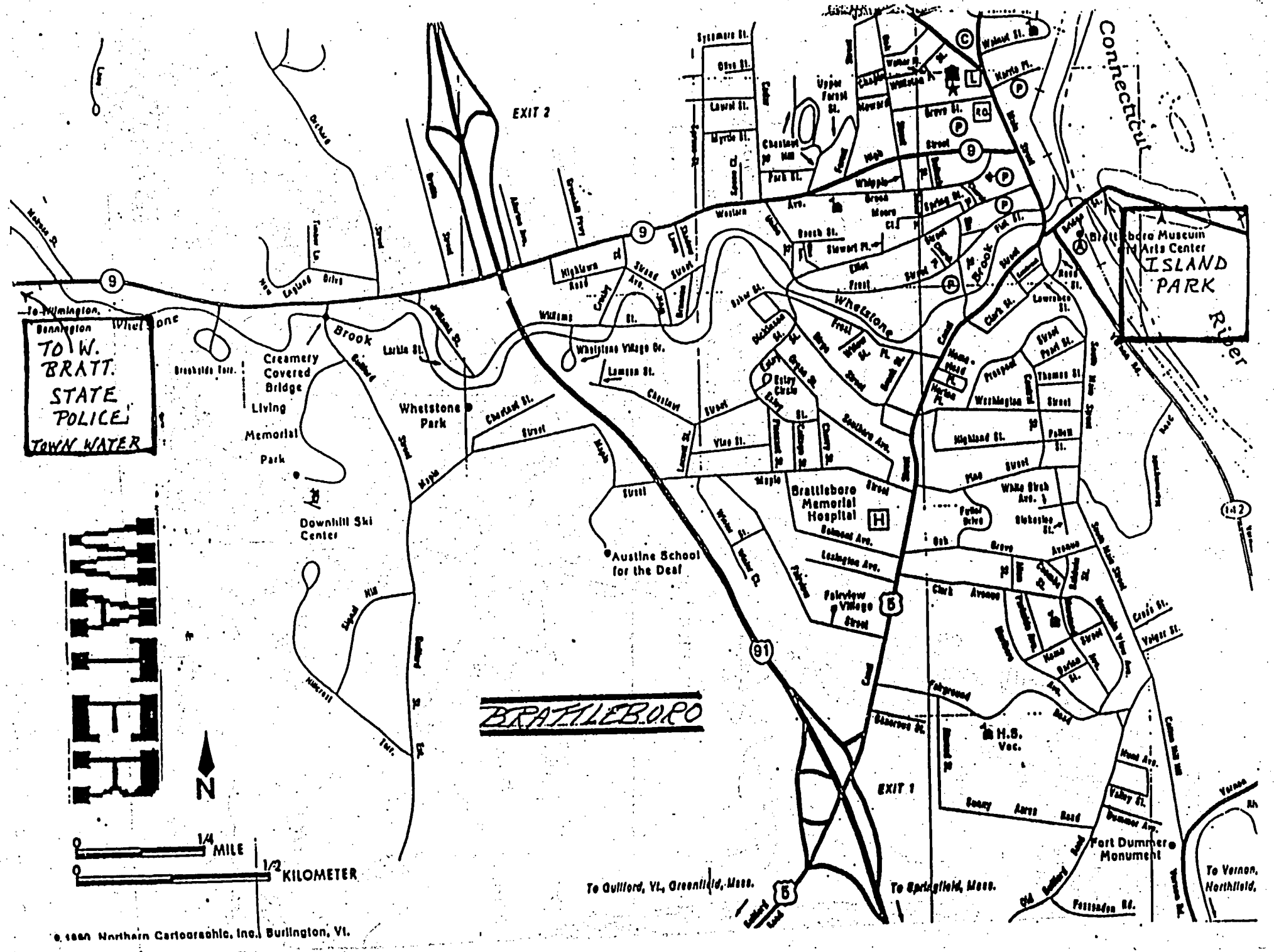

RIVER WATER GROSS BETA
5.0
0.0
-5.0
pCi/liter
Aug-04
Sep-04
Oct-04
Nov-04
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05
DATE
New England Power Dam
CT River Downstream 3-4
Power Line River Crossing



BRATTLE BORO
BEAR HILL 1360
1420
720
680
1460
Brook
Pleasant Valley Reservoir
WEST
RIVER
School for Internat'l. Training or Experiment in Internat'l Living
BOSTON
TO KEENE, N.H.
V.Y. STA. 3-8
CALVIN
MOLLY STARK TRAIL
RICHARDSON MTN. 1240
Whetstone Brook
940
WEST BRATTLEBORO URBAN COMPACT
1500
ROUND MTN. 1475
Ames Hill Brook
GINSENG HILL 1540
1460
1040
Living Memorial Park Ski
BRATTLEBORO
Brattleboro Museum and Art Center
TO HINSDALE N.H.
FAP
SA
FCA
N

WATER


WATER
CONNECTICUT
FORT DUMMER STATE PARK
VY STA. 3-4
VERMONT YANKEE
VERNON ELEM. WELL
NEW ENG. POWER DAM
RIVER CROSS.
RIVER
VERNON
VERMONT
CENTRAL PARK
420
RAILWAY
FAS 3.7
VERNON
Roaring Brook W.M.A.
CHARLES HILL 837
FOX HILL 524
Lily Pond
Newton Bk.
SOUTH VERNON
Roaring Bk.
846
800
1100
1027
901
400
142
91
SA


TO W. BRATT. STATE POLICE TOWN WATER
Bennington
To Wilmington
Creamery Covered Bridge
Living Memorial Park
Downhill Ski Center
Whetstone Park
Austine School for the Deaf
Brattleboro Memorial Hospital
Fairview Village
Upper Forest St.
Chestnut Hill
Highlawn Road
Whetstone Village Dr.
Estey Circle
Fairgrounds
H.S. Voc.
Fort Dummer Monument
ISLAND PARK
Brattleboro Museum and Arts Center
Connecticut River
EXIT 2
EXIT 1
BRATTLEBORO
N
1/4 MILE
1/2 KILOMETER
To Guilford, Vt., Greenfield, Mass.
To Springfield, Mass.
To Vernon, Northfield.
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