

State of Vermont

Environmental Radiation Surveillance Report



2000 Summary



**Vermont Department of Health
Office of Occupational & Radiological Health**

2000 AIR SAMPLES

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 samples are sent to the Vermont State Department of Health Laboratory for gross Alpha and Beta analyses. Results are reported in picoCuries per cubic meter of air with 2 sigma (standard deviation) value. In June, Guilford Town Clerk Station was relocated to Guilford Town Highway Garage, a nominal one quarter mile distance north westerly from the Town Clerk's Office, at the request of the Town of Guilford.

Sample Period	Windham County Court		Brattleboro State Police	
	Alpha	Beta	Alpha	Beta
1/06 - 2/11/00	0.0033 + 0.0009	0.0232 + 0.0018	0.0026 + 0.0007	0.0168 + 0.0013
2/11 - 3/09/00	0.0029 + 0.0010	0.0201 ± 0.0019	0.0028 + 0.0008	0.0161 + 0.0015
3/09 - 4/03/00	< 0.0079	< 0.0014	0.0027 + 0.0009	0.0118 ± 0.0014
4/03 - 5/02/00	0.0030 + 0.0010	0.0110 + 0.0014	0.0017 + 0.0007	0.0105 + 0.0012
5/02 - 6/1/00	0.0017 + 0.0009	0.0108 + 0.0015	0.0014 + 0.0007	0.0103 + 0.0013
6/01 - 7/05/00	0.0021 + 0.0008	0.0105 + 0.0013	0.0017 + 0.0007	0.0124 + 0.0012
7/05 - 8/02/00	0.0018 + 0.0009	0.0087 ± 0.0014	0.0013 + 0.0007	0.0073 + 0.0011
8/02 - 9/06/00	0.0012 + 0.0006	0.0134 + 0.0014	0.0015 + 0.0006	0.0110 + 0.0012
9/06 - 10/04/00	0.0023 + 0.0009	0.0158 + 0.0017	0.0027 + 0.0008	0.0155 + 0.0015
10/04 - 11/02/00	0.0041 + 0.0011	0.0199 + 0.0018	0.0034 + 0.0009	0.0171 + 0.0015
11/02 - 12/06/00	0.0025 + 0.0008	0.0134 + 0.0014	0.0022 + 0.0006	0.0095 + 0.0011
12/06 - 1/3/01	0.0040 + 0.0012	0.0198 + 0.0021	0.0020 + 0.0008	0.0111 + 0.0013

**2000 AIR SAMPLES
(picoCuries/Cubic Meter)**

Sample Period	Guilford Town Garage		Henry Transportation, Vernon	
	Alpha	Beta	Alpha	Beta
1/06 – 02/11/00	0.0048 ± 0.0010	0.0241 ± 0.0018	0.0042 ± 0.0011	0.0256 ± 0.0020
2/11 – 3/09/00	0.0038 ± 0.0011	0.0194 ± 0.0018	0.0026 ± 0.0010	0.0218 ± 0.0020
3/09 – 4/03/00	0.0022 ± 0.0009	0.0142 ± 0.0017	0.0031 ± 0.0011	0.0170 ± 0.0019
4/03 – 5/02/00	0.0018 ± 0.0008	0.0107 ± 0.0014	0.0032 ± 0.0010	0.0118 ± 0.0015
5/02 – 6/01/00	Meter Not Operating	Meter Not Operating	Meter Not Operating	Meter Not Operating
6/01 – 7/05/00	0.0015 ± 0.0007	0.0133 ± 0.0014	0.0019 ± 0.0012	0.0166 ± 0.0022
7/05 – 8/02/00	< 0.0009	0.0078 ± 0.0013	0.0025 ± 0.0010	0.0079 ± 0.0013
8/02 – 9/06/00	0.0020 ± 0.0007	0.0114 ± 0.0013	0.0023 ± 0.0008	0.0117 ± 0.0014
9/06 – 10/04/00	0.0027 ± 0.0009	0.0178 ± 0.0017	0.0029 ± 0.0010	0.0213 ± 0.0020
10/04 – 11/02/00	0.0044 ± 0.0011	0.0189 ± 0.0018	0.0044 ± 0.0011	0.0190 ± 0.0017
11/02 – 12/06/00	0.0029 ± 0.0008	0.0115 ± 0.0013	0.0021 ± 0.0006	0.0108 ± 0.0011
12/06 – 1/3/01	0.0030 ± 0.0009	0.0138 ± 0.0016	0.0028 ± 0.0008	0.0131 ± 0.0014

**2000 AIR SAMPLES
(picoCuries/Cubic Meter)**

Sample Period	Power Line River Crossing		Renaud Brothers (Puffers)	
	Alpha	Beta	Alpha	Beta
1/06 – 02/11/00	0.0050 ± 0.0010	0.0184 ± 0.0014	0.0042 ± 0.0009	0.0199 ± 0.0015
2/11 – 3/09/00	0.0033 ± 0.0010	0.0173 ± 0.0015	0.0031 ± 0.0009	0.0169 ± 0.0015
3/09 – 4/03/00	0.0021 ± 0.0008	0.0125 ± 0.0015	0.0022 ± 0.0009	0.0107 ± 0.0014
4/03 – 5/02/00	0.0019 ± 0.0008	0.0093 ± 0.0012	0.0028 ± 0.0008	0.0104 ± 0.0013
5/02 – 6/01/00	0.0027 ± 0.0009	0.0102 ± 0.0013	0.0019 ± 0.0008	0.0098 ± 0.0013
6/01 – 7/05/00	0.0022 ± 0.0008	0.0124 ± 0.0013	0.0017 ± 0.0007	0.0079 ± 0.0010
7/05 – 8/02/00	0.0011 ± 0.0007	0.0069 ± 0.0012	< 0.0008	0.0062 ± 0.0011
8/02 – 9/06/00	0.0018 ± 0.0007	0.0108 ± 0.0012	0.0016 ± 0.0006	0.0099 ± 0.0012
9/06 – 10/04/00	0.0029 ± 0.0009	0.0147 ± 0.0015	0.0023 ± 0.0008	0.0163 ± 0.0016
10/04 – 11/02/00	0.0037 ± 0.0010	0.0181 ± 0.0016	0.0038 ± 0.0010	0.0158 ± 0.0015
11/02 – 12/06/00	0.0022 ± 0.0007	0.0114 ± 0.0012	0.0015 ± 0.0006	0.0090 ± 0.0010
12/06 – 1/3/01	0.0029 ± 0.0009	0.0142 ± 0.0015	0.0025 ± 0.0008	0.0114 ± 0.0013

2000 AIR SAMPLES
(picoCuries/Cubic Meter)

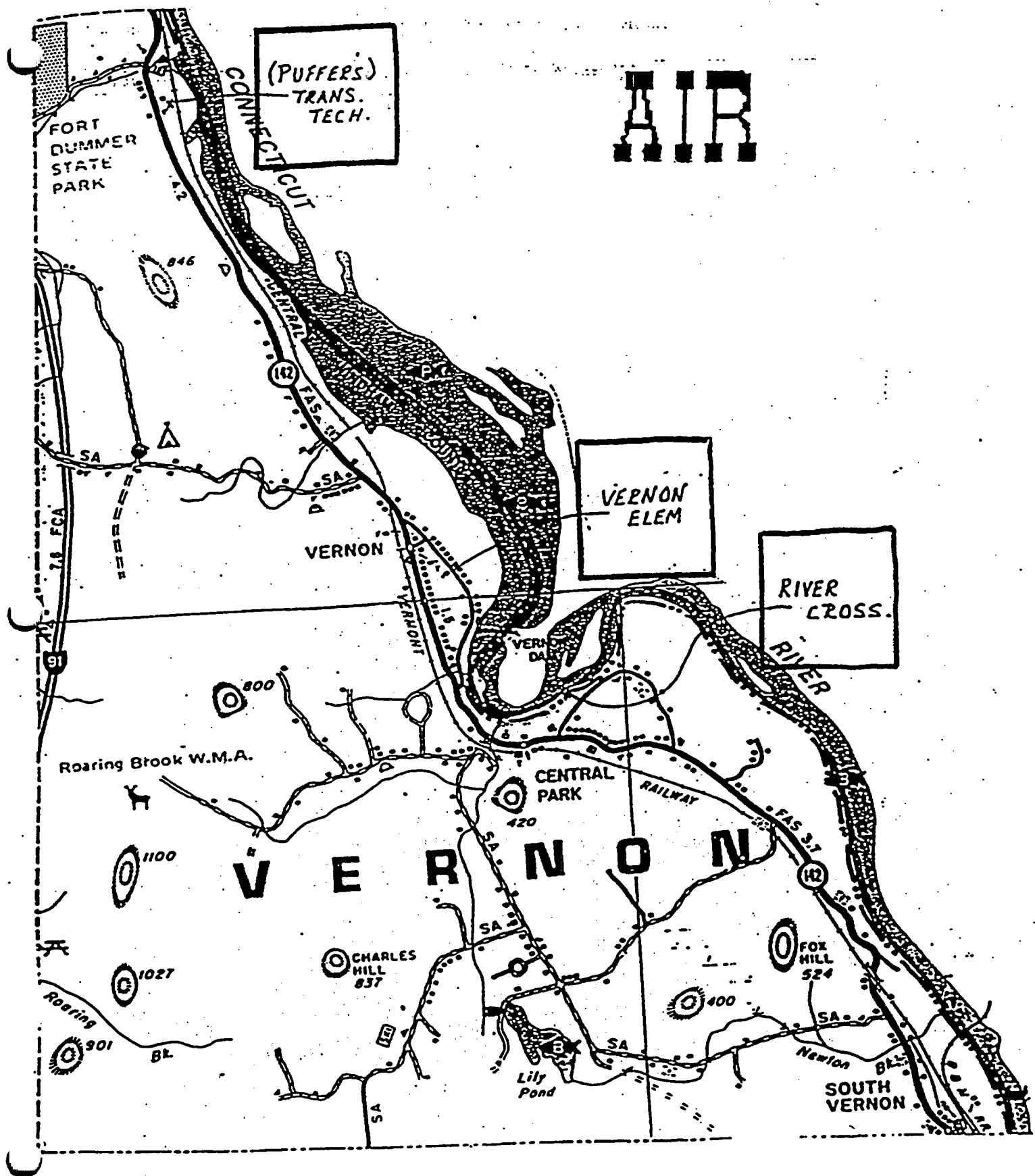
Sample Period	Wilmington State Highway Garage	
	Alpha	Beta
1/06 - 02/11/00	0.0025 ± 0.0007	0.0175 ± 0.0013
2/11 - 3/09/00	0.0026 ± 0.0008	0.0140 ± 0.0014
3/09 - 4/03/00	< 0.0006	< 0.0011
4/03 - 5/02/00	0.0024 ± 0.0008	0.0083 ± 0.0011
5/02 - 6/01/00	0.0011 ± 0.0007	0.0088 ± 0.0012
6/01 - 7/05/00	0.0016 ± 0.0006	0.0110 ± 0.0011
7/05 - 8/02/00	0.0012 ± 0.0007	0.0062 ± 0.0011
8/02 - 9/06/00	0.0019 ± 0.0006	0.0106 ± 0.0011
9/06 - 10/04/00	0.0020 ± 0.0007	0.0154 ± 0.0015
10/04 - 11/02/00	0.0037 ± 0.0009	0.0148 ± 0.0014
11/02 - 12/06/00	0.0013 ± 0.0005	0.0090 ± 0.0010
12/06 - 1/3/01	0.0018 ± 0.0007	0.0104 ± 0.0012

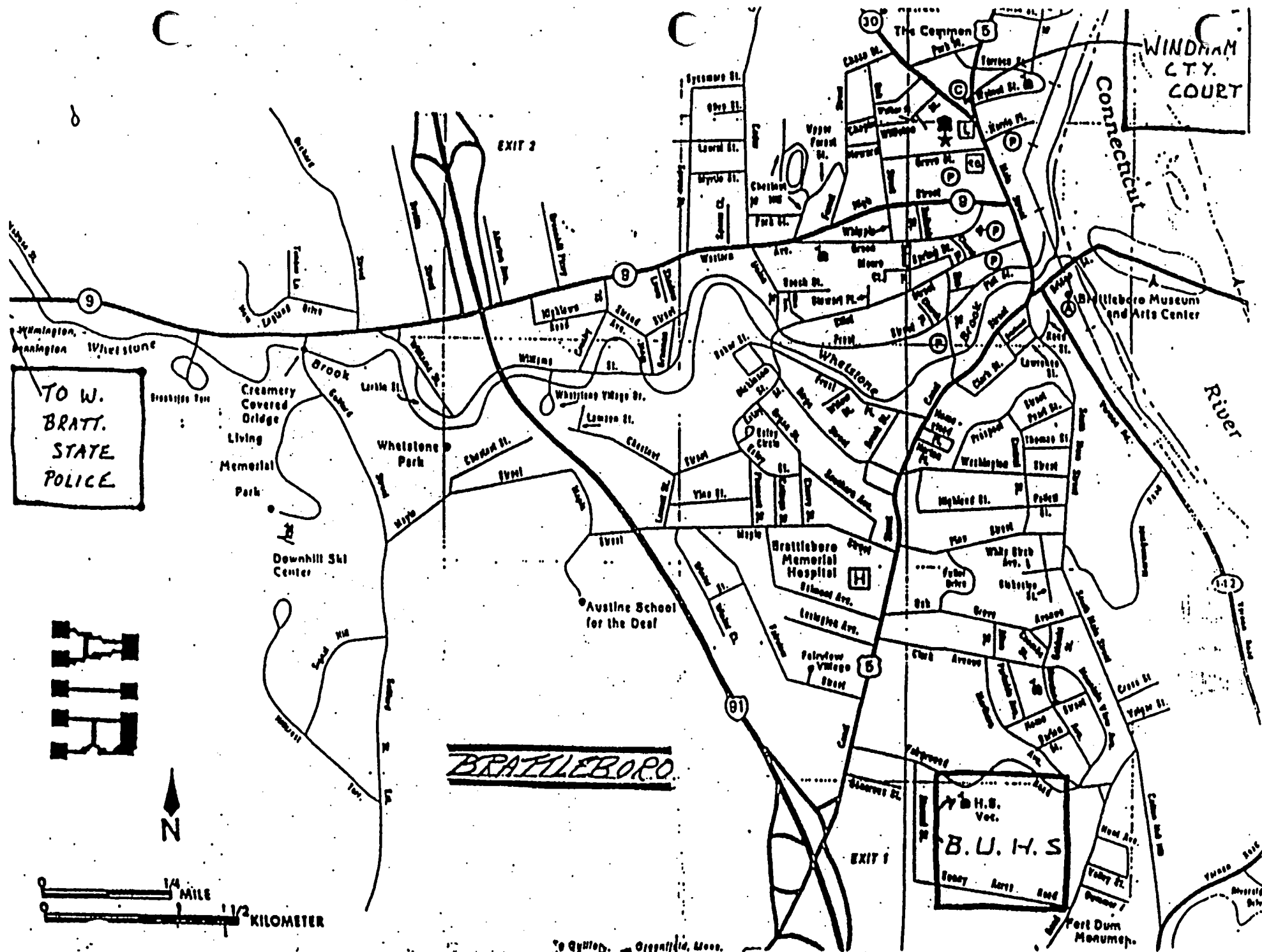
2000 AIR SAMPLES
(picoCuries/Cubic Meter)

Sample Period	Vernon Elementary School		Brattleboro Union High School	
	Alpha	Beta	Alpha	Beta
1/06 – 2/11/00	0.0036 ± 0.0009	0.0193 ± 0.0015	0.0030 ± 0.0008	0.0198 ± 0.0015
2/11 – 3/09/00	0.0030 ± 0.0009	0.0175 ± 0.0016	0.0035 ± 0.0011	0.0179 ± 0.0019
3/09 – 4/03/00	0.0023 ± 0.0009	0.0120 ± 0.0015	< 0.0007	< 0.0012
4/03 – 5/02/00	0.0016 ± 0.0007	0.0098 ± 0.0013	0.0019 ± 0.0007	0.0110 ± 0.0013
5/02 – 6/01/00	0.0015 ± 0.0008	0.0108 ± 0.0014	0.0010 ± 0.0007	0.0057 ± 0.0010
6/01 – 7/05/00	0.0012 ± 0.0007	0.0089 ± 0.0011	0.0017 ± 0.0007	0.0117 ± 0.0012
7/05 – 8/02/00	0.0015 ± 0.0008	0.0087 ± 0.0013	0.0009 ± 0.0007	0.0071 ± 0.0011
8/02 – 9/06/00	0.0018 ± 0.0007	0.0115 ± 0.0013	0.0018 ± 0.0006	0.0118 ± 0.0012
9/06 – 10/04/00	0.0017 ± 0.0008	0.0163 ± 0.0016	< 0.0006	0.0037 ± 0.0009
10/04 – 11/02/00	0.0038 ± 0.0010	0.0155 ± 0.0015	0.0043 ± 0.0010	0.0184 ± 0.0016
11/02 – 12/06/00	0.0023 ± 0.0007	0.0108 ± 0.0012	< 0.0004	0.0172 ± 0.0006
12/06 – 1/3/01	0.0032 ± 0.0009	0.0140 ± 0.0015	0.0028 ± 0.0008	0.0134 ± 0.0014

2000 AIR SAMPLES
(picoCuries/Cubic Meter)

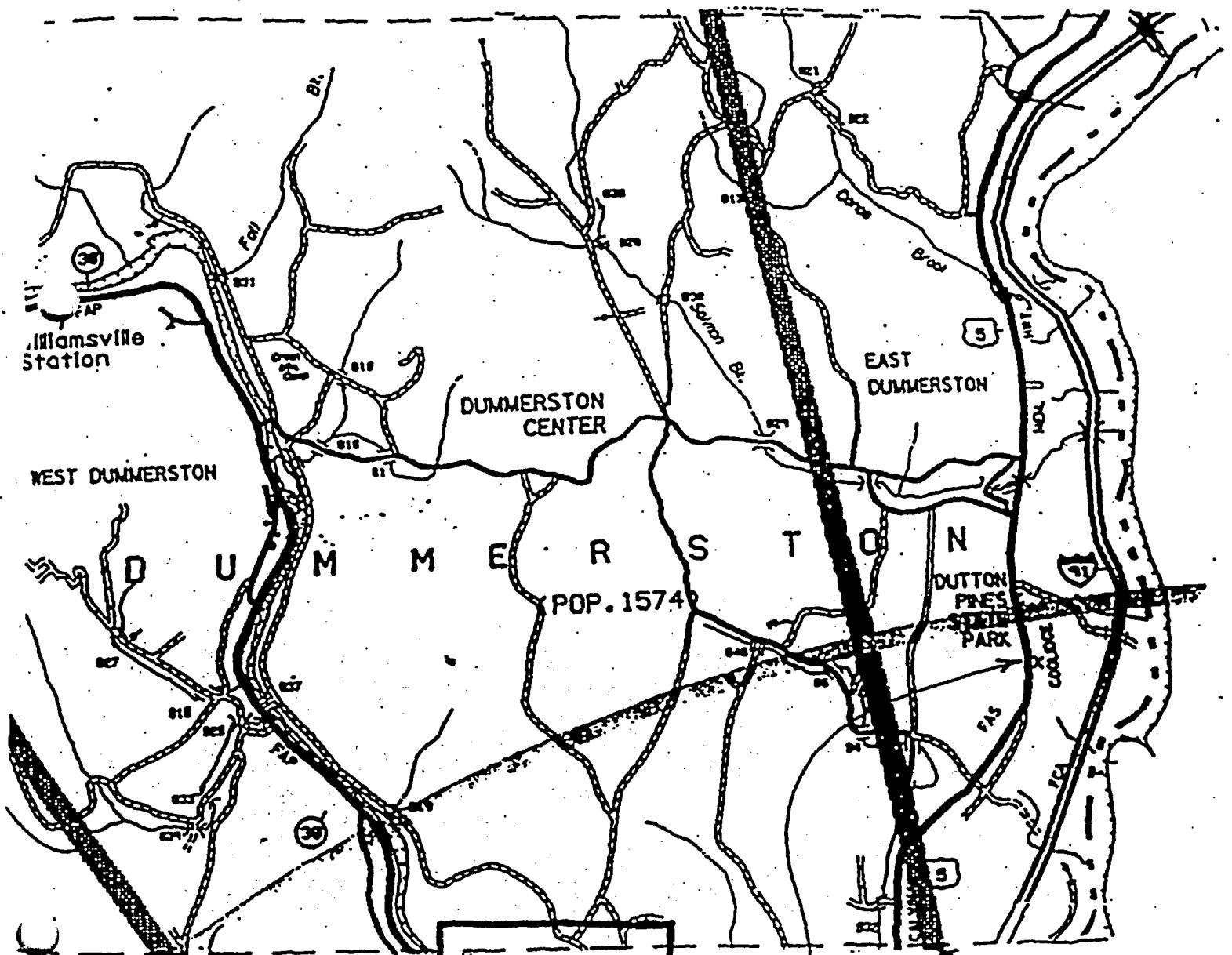
Sample Period	Dummerston State Highway Garage	
	Alpha	Beta
1/06 – 2/11/00	0.0038 + 0.0008	0.0197 + 0.0015
2/11 – 3/09/00	0.0029 + 0.0009	0.0159 + 0.0015
3/09 – 4/03/00	0.0020 + 0.0008	0.0119 + 0.0015
4/03 – 5/02/00	0.0021 + 0.0008	0.0101 + 0.0012
5/02 – 6/01/00	0.0013 + 0.0008	0.0089 + 0.0013
6/01 – 7/05/00	0.0014 + 0.0007	0.0117 + 0.0013
7/05 – 8/02/00	0.0016 ± 0.0008	0.0086 ± 0.0013
8/02 – 9/06/00	0.0020 + 0.0007	0.0121 + 0.0013
9/06 – 10/04/00	0.0028 + 0.0009	0.0169 + 0.0016
10/04 – 11/02/00	0.0037 + 0.0010	0.0170 + 0.0016
11/02 – 12/06/00	0.0026 + 0.0007	0.0116 + 0.0012
12/06 – 1/3/01	0.0026 + 0.0008	0.0143 + 0.0015





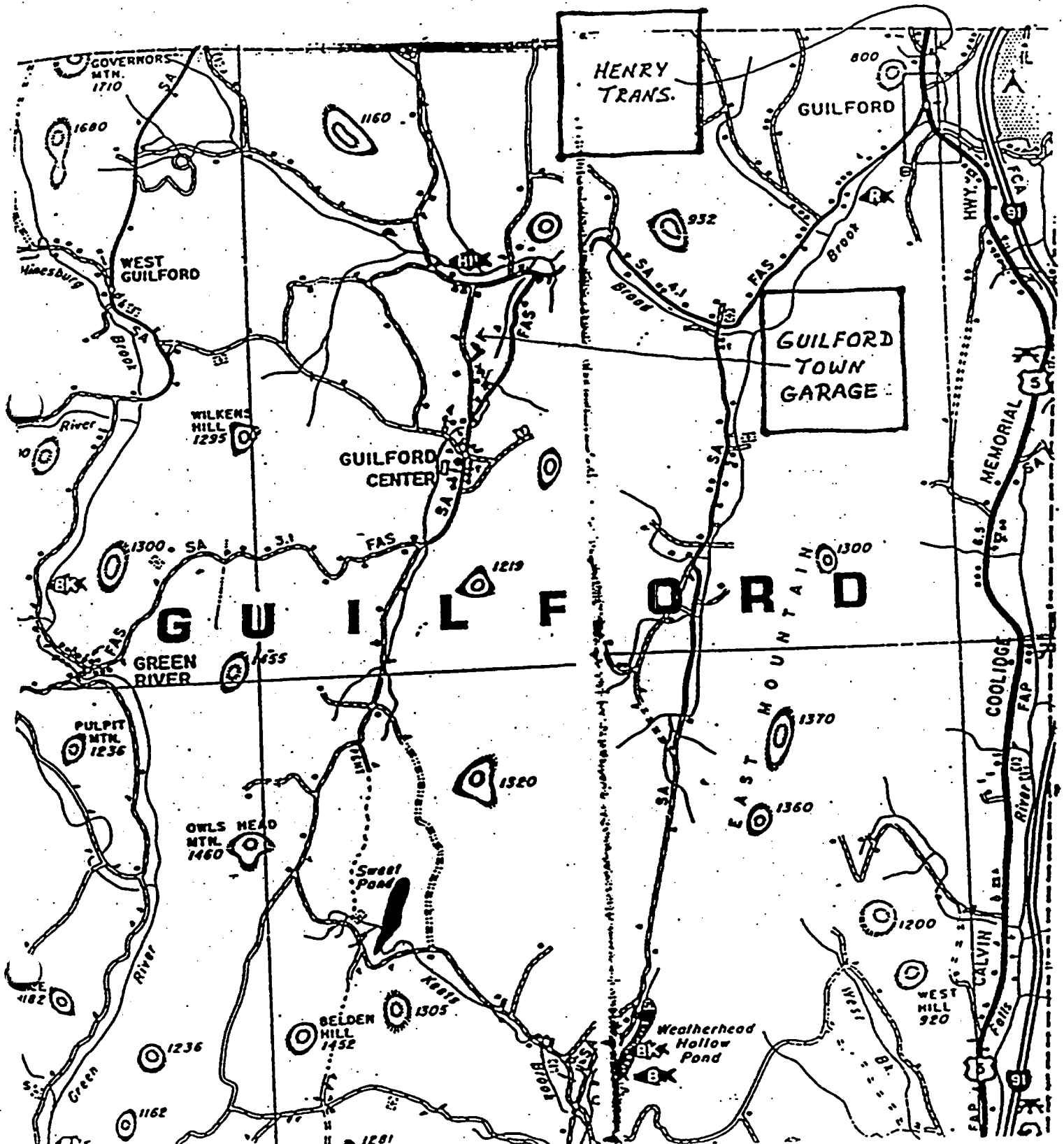
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AIR

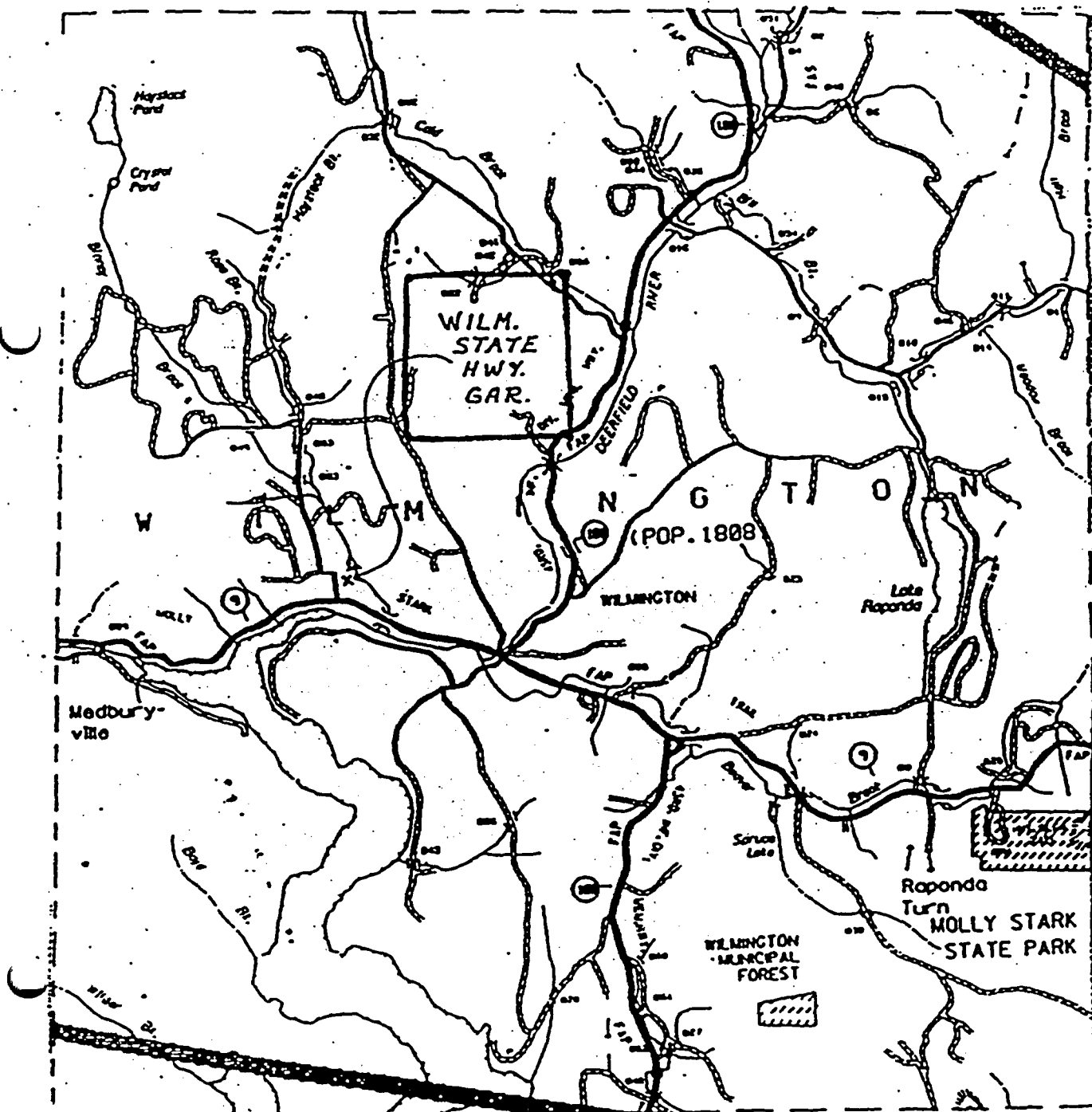


DUMM. I.F.O.

AIR



AIR



BIOTA 2000

Occasional sampling, most often once a year, is done on other biologicals and 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 reentrant beakers and analyzed in the laboratory gamma spectrometer. Usual spectra include primordial radionuclides, archival Cesium-137 and occasional cosmogenic Beryllium-7. Reporting units are picoCuries per Kilogram.

Vernon Rte 142 Indian Point

Season	Biota	Cesium-137 *	Potassium-40	Beryllium-7 **
Summer 7/5/00	Russlae Fungi	1430 \pm 110	4640 \pm 500	ND

Vernon - Stebbins Rd., Fire Pond

Season	Biota	Cesium-137 *	Potassium-40	Beryllium-7 **
Spring 5/9/00	Plant	ND	3850 \pm 390	ND

Vernon Dam Rte 142

Season	Biota	Cesium-137 *	Potassium-40	Beryllium-7 **
Spring 5/9/00	Plant	ND	3600 \pm 310	ND

Vernon - Broad Brook Rd.

Season	Biota	Cesium-137 *	Potassium-40	Beryllium-7 **
Spring 5/9/00	Plant	ND	4810 \pm 390	153 \pm 62

Vernon - Northwest Fence of Vt. Yankee

Season	Biota	Cesium-137 *	Potassium-40	Beryllium-7 **
Fall 10/4/00	Alfalfa	ND	11800 \pm 1200	939 \pm 417

Danville ++ (Baseline)

Season	Biota	Cesium-137 *	Potassium-40	Beryllium-7 **
Spring	+	+	+	+
Fall	+	+	+	+
Spring	+	+	+	+
Fall	+	+	+	+

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

Radionuclide	L.L.D.	Radionuclide	L.L.D.
Cr-51	69	Sb-126	18
Mn-54	15	I-131	27
Co-56	15	Cs-134	58
Co-60	21	Cs-136	18
Zn-65	18	Cs-137	5
Sr-85	86	Ce-139	93
Ru/Rh-103	32	Ce-141	98
Sb-124	18	Ce-144	98

* = Chernobyl event and archival atmospheric testing

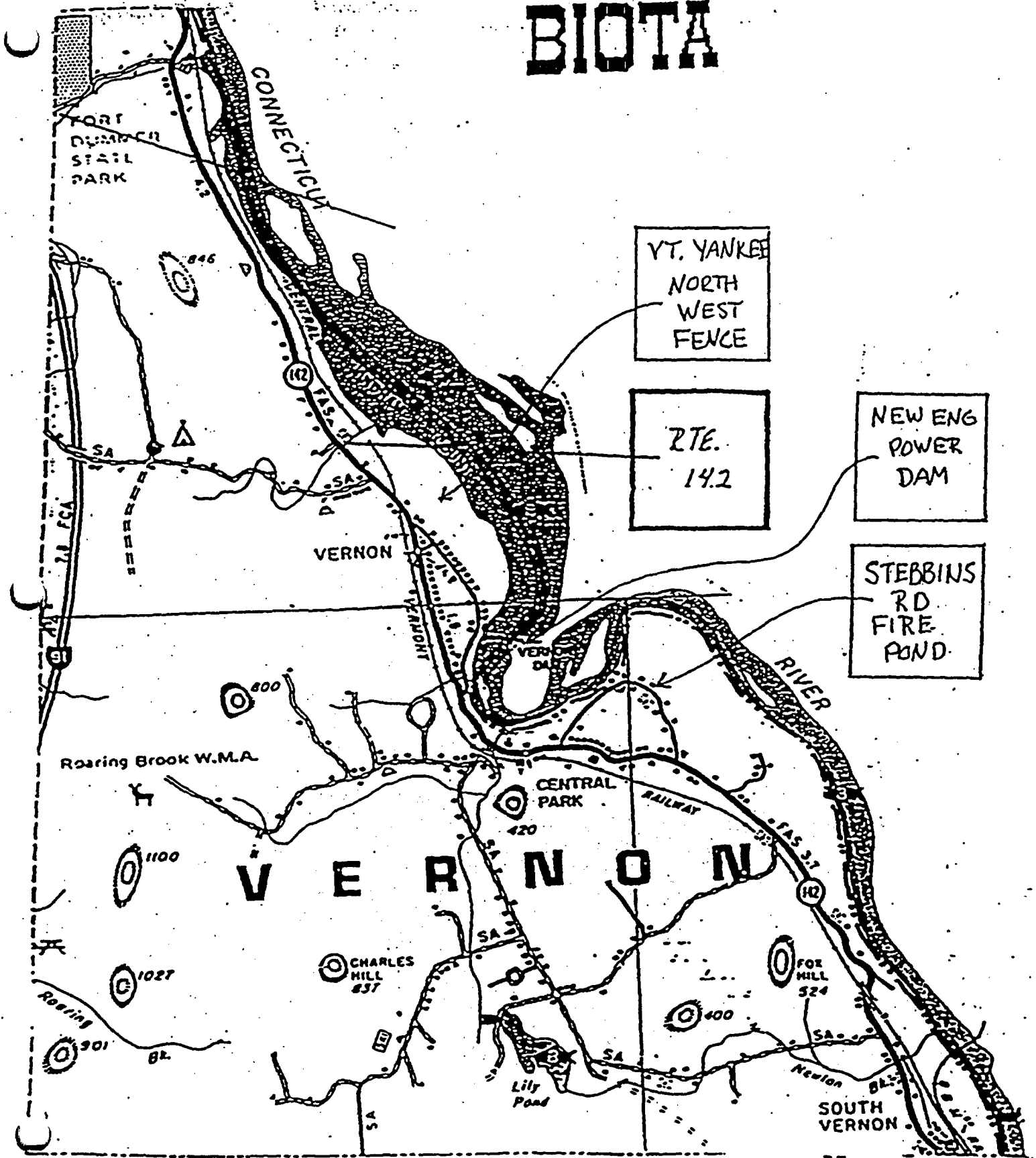
** = Cosmogenic

+ = No Samples This Period

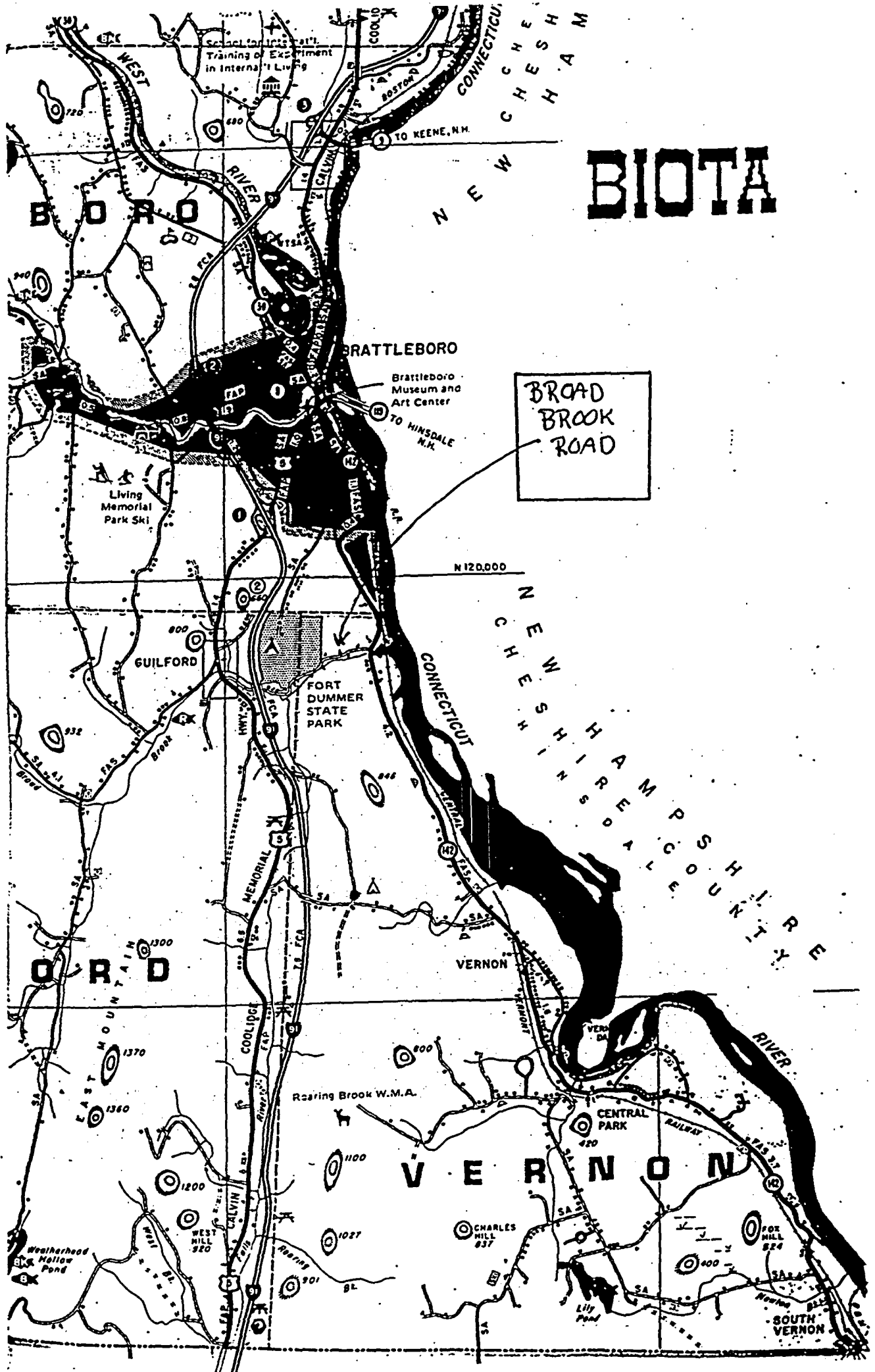
++ = Comparison Sample

ND = Below Detection Limits

BIOTA



BIOTA



FISH 2000

Two locations (3-4 Vernon Pond and 3-8 Route 9 Highway bridge) provide fish samples in Spring and Fall of about one kilogram each sample lot for a total of two sample lots each year. Fish are captured via an electroshock method with those having game or commercial value chosen for a total of four sample lots each year. Fish are captured via an electroshock method with those having game or commercial value chosen for samples. The fish are frozen whole, weighed, and chopped (entire) for loading into a reentrant beaker and subsequent analysis in a ReGe detector equipped Gamma Spectrometer System. Radionuclides detected usually include naturally occurring Potassium 40, Thorium and Uranium with daughters, archival 137 due to former open atmospheric nuclear testing, and occasional traces of cosmogenic Beryllium-7. Reporting units are picoCuries per Kilogram.

Spring

Site	Cesium-137 Wet Weight	Natural Potassium-40 Wet Weight
3-4	ND	2160 ± 670
3-8	ND	1910 ± 600

Fall

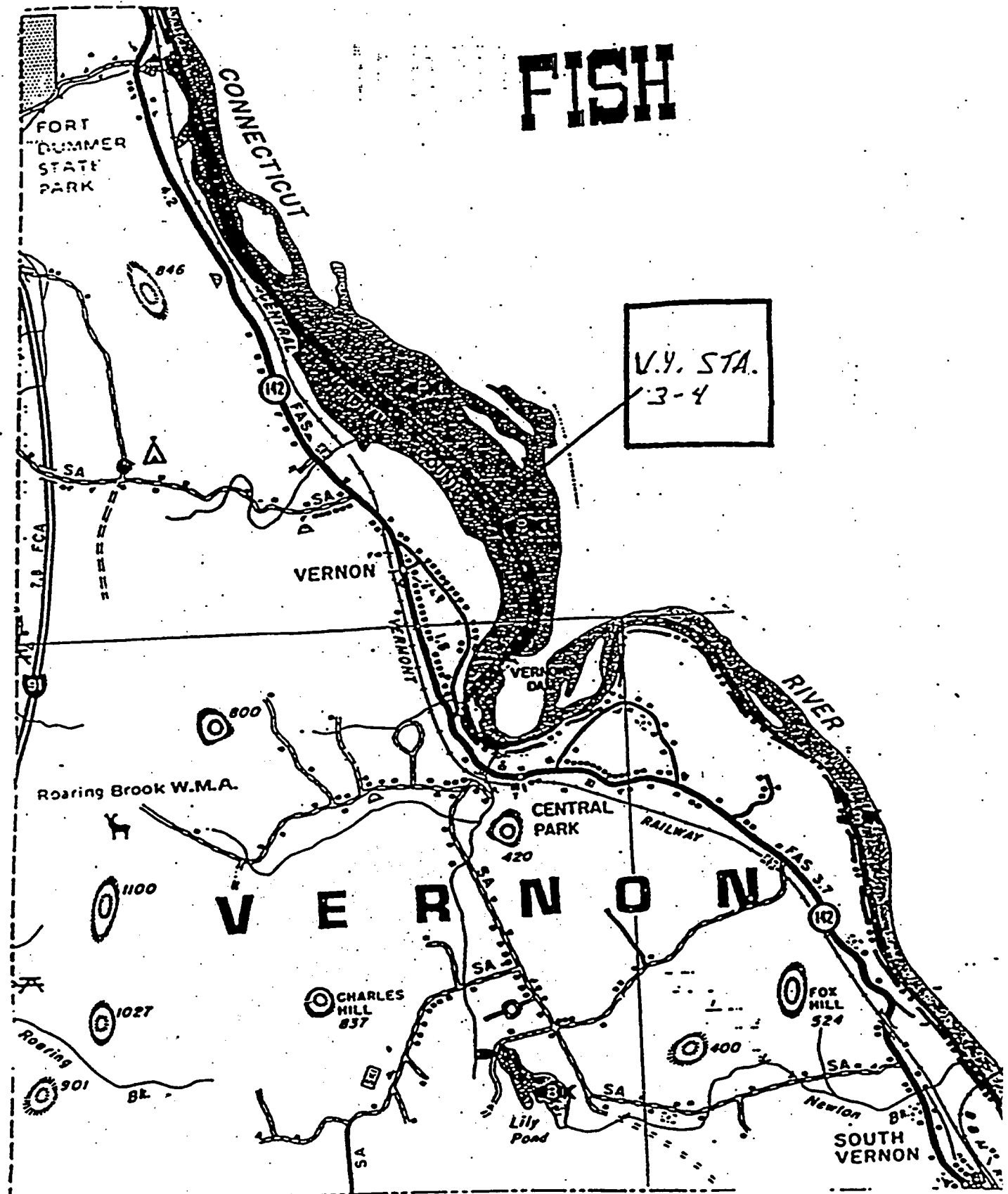
Site	Cesium-137 Wet Weight	Natural Potassium-40 Wet Weight
3-4	ND	2570 ± 800
3-8	ND	2440 ± 760

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

Radionuclide	L.L.D.	Radionuclide	L.L.D.
Cr-51	69	Sb-126	18
Mn-54	15	I-131	27
Co-56	15	Cs-134	58
Co-60	21	Cs-136	18
Zn-65	18	Cs-137	5
Sr-85	86	Ce-139	93
Ru/Rh-103	32	Ce-141	98
Sb-124	18	Ce-144	98

* = Chernobyl event and archival atmospheric testing
 ND = Below Detection Limit

FISH



2000 IODINE CARTRIDGES

Charcoal cartridges loaded with TEDA for facilitative iodine collection are part of the air sampling train at selected air filter sampling stations. The sample rate and sampling times coincide with those used for air filters. Response to ChōnobyI iodine release was marked, proving the sensitivity to environmental trace levels of iodine of this system. The Health Department Radiation Laboratory analyzes the cartridges for iodine by gamma spectroscopy. Nominal Minimum Detectable Activity is 2×10^{-5} pCi/l of air.

Sample Period	Dummerston Highway Garage	Vernon School	Renaud Bros Vernon	Brattleboro Union High School
January	X	X	X	X
February	X	X	X	X
March	X	X	X	X
April	X	X	X	X
May	X	X	X	X
June	X	X	X	X
July	X	X	X	X
August	X	X	X	X
September	X	X	X	X
October	X	X	X	X
November	X	X	X	X
December	X	X	X	X

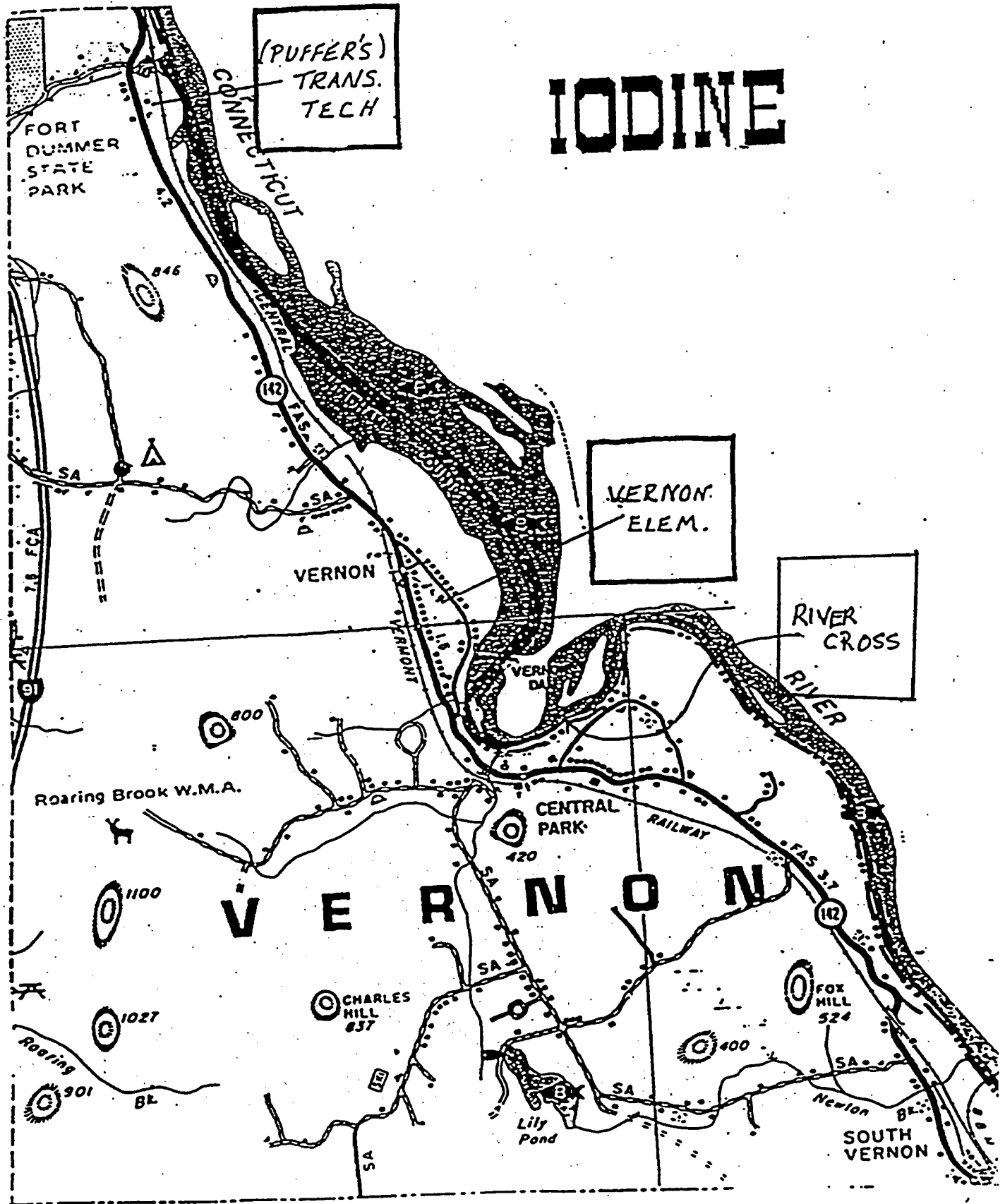
X = No Evidence of Iodine 131

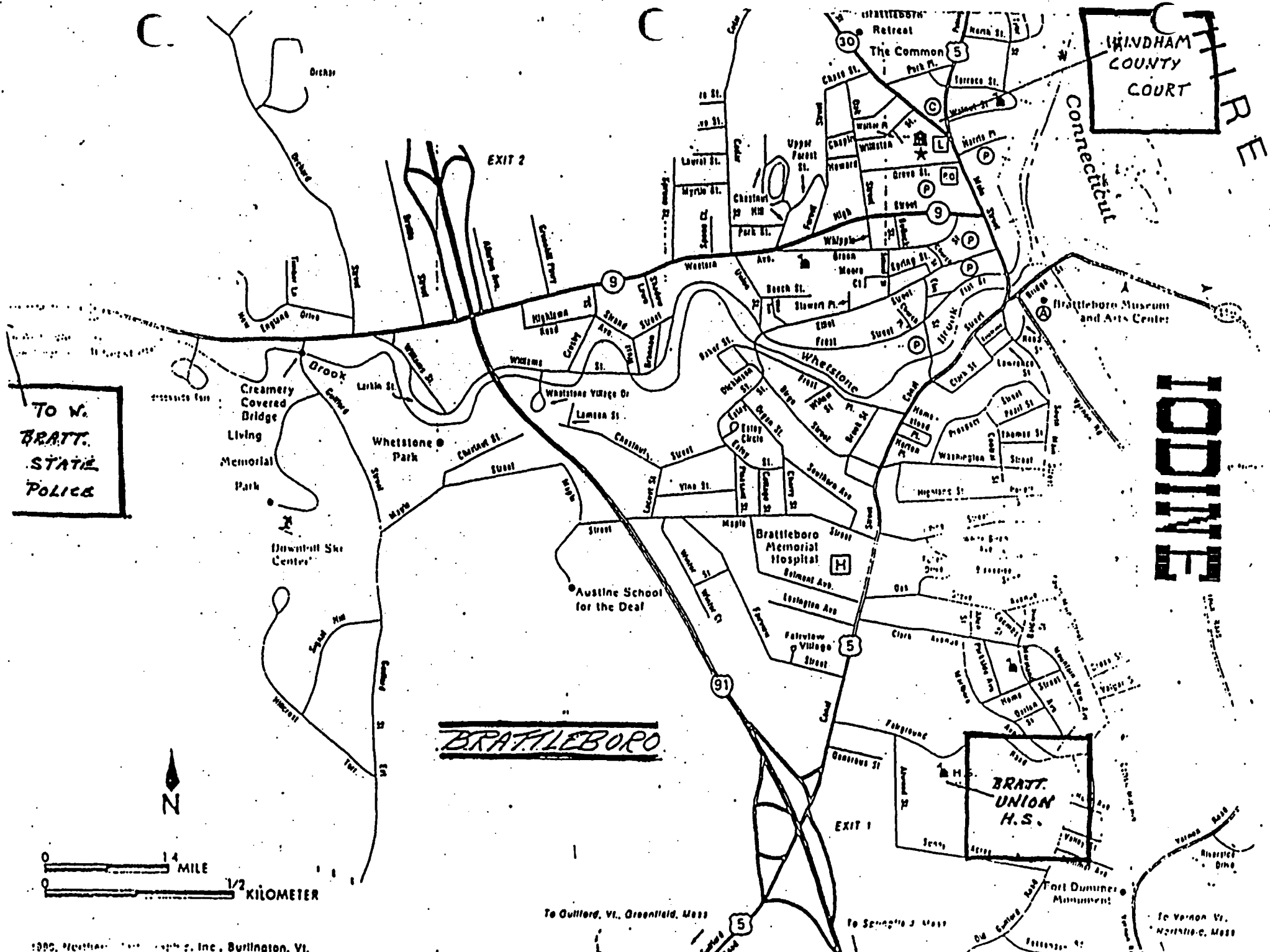
Sample Period	Brattleboro State Police	Windham County Court
January	X	X
February	X	X
March	X	X
April	X	X
May	X	X
June	X	X
July	X	X
August	X	X
September	X	X
October	X	X
November	X	X
December	X	X

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

X = No Evidence of Iodine 131

IODINE





TO W.
BRATT.
STATE
POLICE

WINDHAM
COUNTY
COURT

1001ME

BRATT.
UNION
H.S.

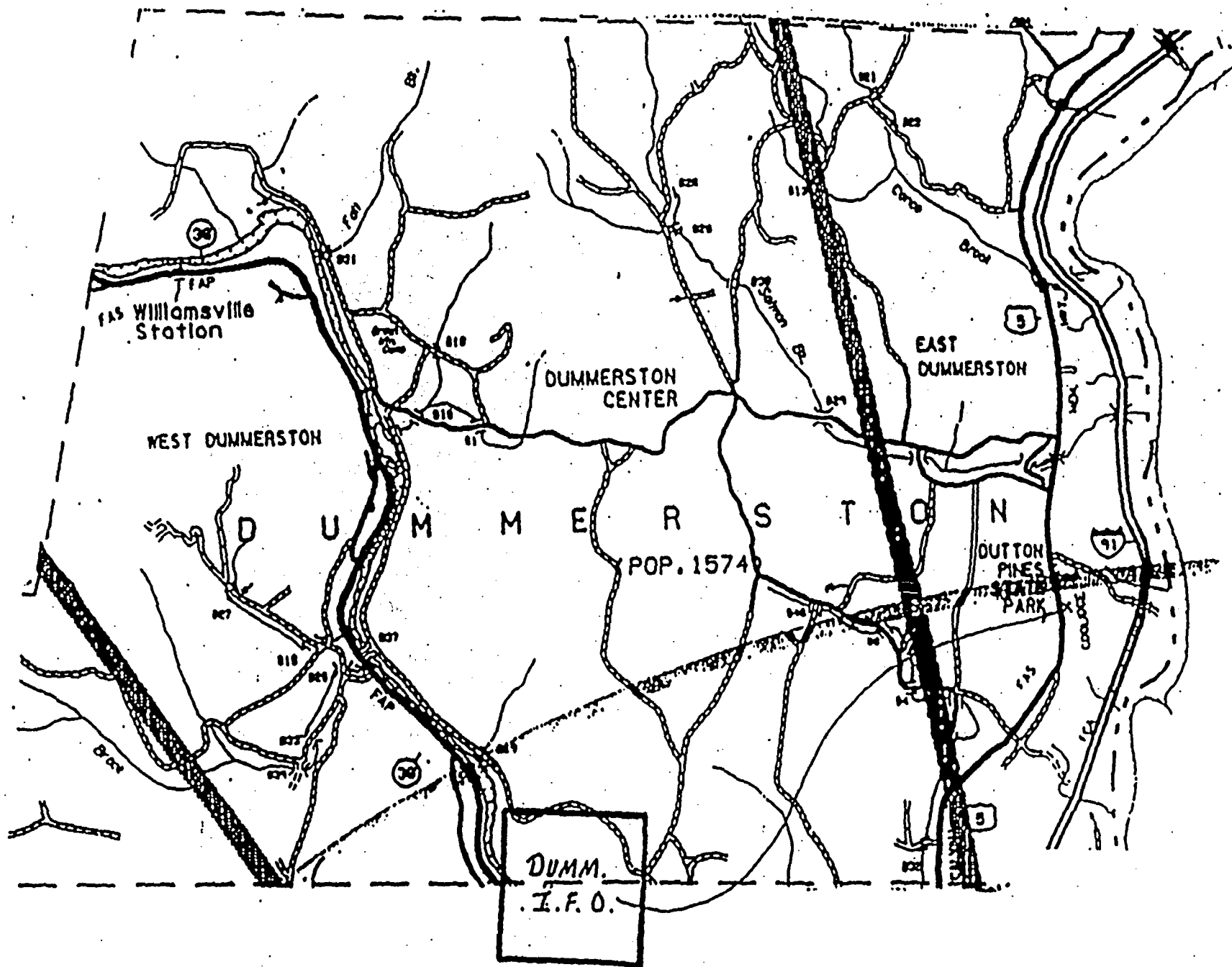
BRATTLEBORO

0 1/4 MILE
0 1/2 KILOMETER

To Guilford, Vt., Greenfield, Mass

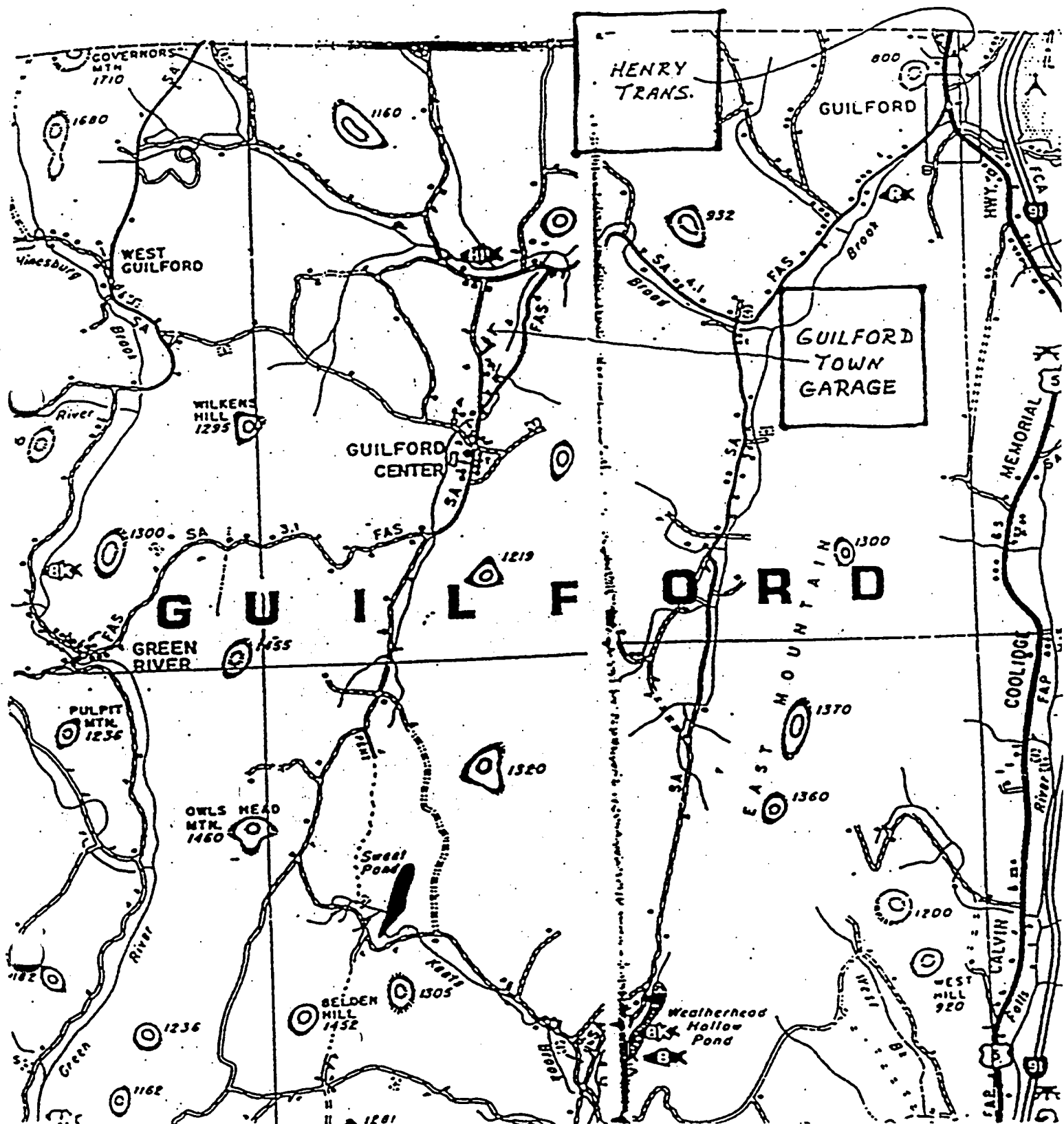
To Springfield, Mass

To Vernon, Vt.,
Northfield, Mass

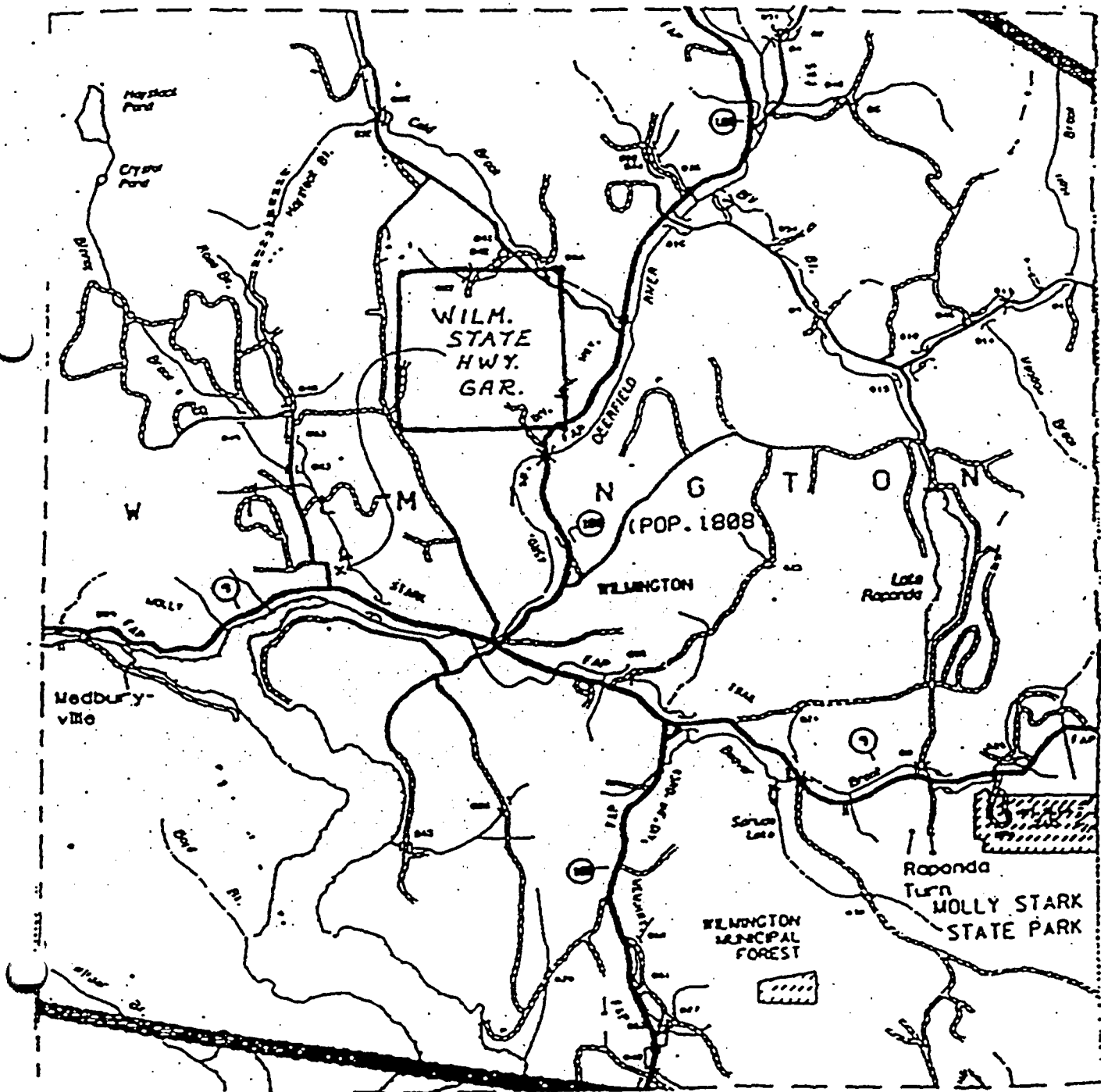


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IODINE



IODINE



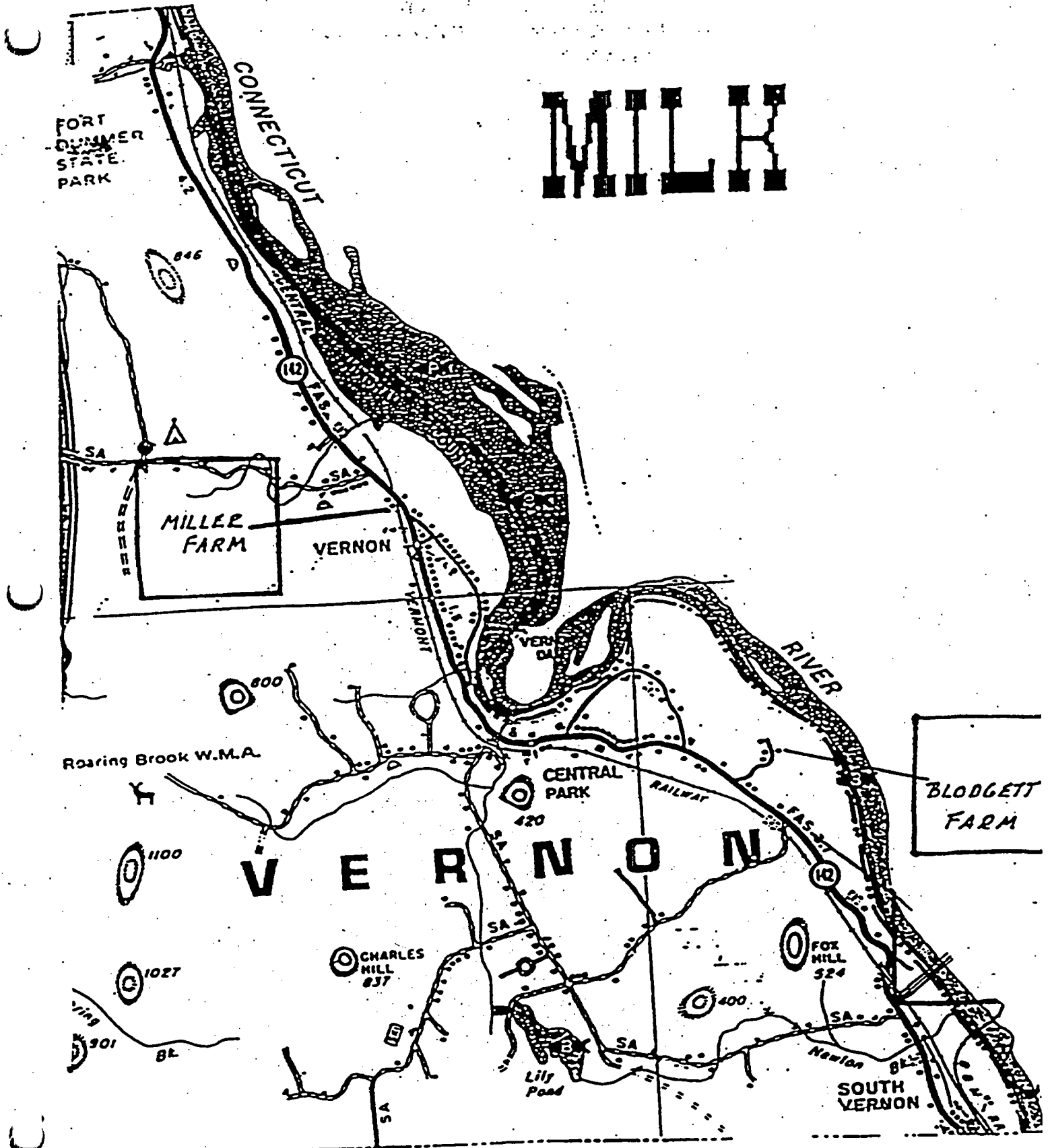
MILK 2000

All samples were analyzed for Iodine-131. No results, except as noted, were found above or at the detection limit of 10 picoCuries/liter. Significant indications of the presence of any other radionuclides were also investigated in all cases.

Farm	Jan	Feb	Mar	Apr	May	Jun
Blodgett	X	X	X	X	X	X
Miller	X	X	X	X	X	X
Newton	X	X	X	X	X	X

Farm	Jul	Aug	Sept	Oct	Nov	Dec
Blodgett	X	X	X	X	X	X
Miller	X	X	X	X	X	X
Newton	X	X	X	Discontinued	Discontinued	Discontinued

MILK



SEDIMENT - 2000

A sediment sample is taken ranging from 0.75 to 1.25 kilograms, approximate, from the Connecticut River at three separate locations in the spring and fall of each year. The sample is dried and sieved with 1/8" mesh hardware cloth, then weighed and top loaded in a one liter Marinelli Beaker and counted. A normal spectrum will include primordial radionuclides with daughters, and archival Cesium-137 dissipating from former open atmospheric nuclear testing. On occasion short-lived cosmogenic Beryllium-7 can be discerned at levels comparable with natural Potassium-40.

SPRING pCi/kilogram

Site	Cesium-137*	Potassium-40	Beryllium-7**
3-3	ND	8850 + 700	ND
3-4	47 + 25	10400 + 800	ND
3-8	59 + 23	13200 + 1000	ND

FALL pCi/kilogram

Site	Cesium-137*	Potassium-40	Beryllium-7**
3-3	22 + 22	12200 + 900	ND
3-4	78 + 24	12900 + 1000	ND
3-8	107 + 23	12500 + 1000	ND

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

Radionuclide	L.L.D.	Radionuclide	L.L.D.
Cr-51	69	Sb-126	18
Mn-54	15	I-131	27
Co-56	15	Cs-134	58
Co-60	21	Cs-136	18
Zn-65	18	Cs-137	5
Sr-85	86	Ce-139	93
Ru/Rh-103	32	Ce-141	98
Sb-124	18	Ce-144	98

* = Chönobyl event and archival atmospheric testing

** = Cosmogenic

ND = None Detected

SOIL 2000

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 bottles and analyzed in the laboratory gamma spectrometer. Usual spectra include primordial radionuclides, archival Cesium-137 and occasional cosmogenic Beryllium-7. Reporting units are picoCuries per Kilogram.

Northwest Corner Vermont Yankee Fence

Season	Cesium-137*	Potassium-40	Beryllium-7**	
Spring 5/9/00	ND	12100 + 2790	ND	

* = Chernobyl event and archival atmospheric testing

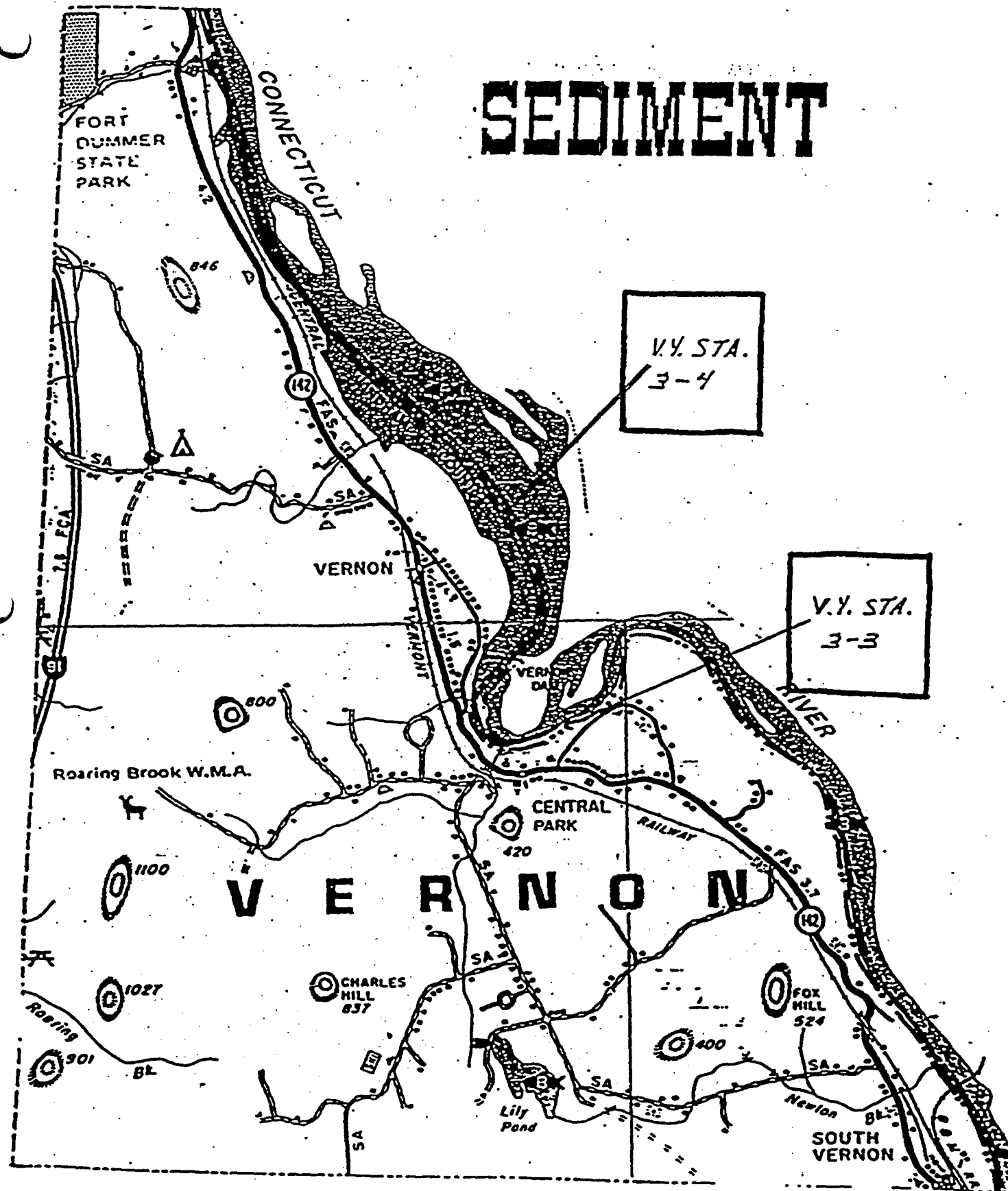
** = Cosmogenic

+ = No Samples This Period

++ = Comparison Sample

ND = Below Detection Limits

SEDIMENT



SPECIAL STUDY - SEDIMENT
VERMONT YANKEE - NORTH STORM DRAIN OUTFALL
Results in pCi/kilogram
SPRING 2000

Grid Location	Beryllium-7	Cobalt-60	Potassium-40	Cesium-137
S-1	ND	ND	19400 ± 1500	154 ± 40
S-2	ND	ND	19400 ± 1400	183 ± 43
S-3	ND	ND	18000 ± 1400	173 ± 46
S-4	ND	ND	16800 ± 1200	154 ± 32
S-5	*	*	*	*
T-1	ND	ND	18300 ± 1400	114 ± 31
T-2	ND	ND	20100 ± 1400	161 ± 39
T-3	ND	ND	16600 ± 1300	149 ± 33
T-4	ND	ND	15000 ± 1100	141 ± 36
T-5	*	*	*	*
U-1	ND	ND	16200 ± 1200	264 ± 42
U-2	ND	ND	16600 ± 1200	176 ± 41
U-3	ND	ND	15500 ± 1200	105 ± 35
U-4	ND	ND	14300 ± 1100	151 ± 42
U-5	*	*	*	*
V-1	ND	ND	18300 ± 1400	159 ± 39
V-2	ND	ND	18000 ± 1300	148 ± 36
V-3	ND	ND	16500 ± 1300	151 ± 35
V-4	ND	ND	15800 ± 1100	134 ± 28
V-5	*	*	*	*
W-1	*	*	*	*
W-2	ND	ND	21000 ± 1600	232 ± 40
W-3	ND	ND	18400 ± 1300	194 ± 46
W-4	ND	ND	16200 ± 1200	169 ± 40
W-5	*	*	*	*
X-1	*	*	*	*
X-2	ND	ND	14400 ± 1000	138 ± 38
X-3	ND	ND	16600 ± 1300	131 ± 41
X-4	ND	ND	17300 ± 1300	143 ± 43
X-5	*	*	*	*
Y-1	*	*	*	*
Y-2	ND	ND	16800 ± 1300	219 ± 48
Y-3	ND	ND	14900 ± 1100	144 ± 40
Y-4	*	*	*	*
Y-5	*	*	*	*
Z-1	*	*	*	*
Z-2	*	*	*	*
Z-3	ND	ND	17700 ± 1300	142 ± 37
Z-4	ND	ND	16400 ± 1300	178 ± 46
Z-5	*	*	*	*

* Location not included for sampling
= None Detected

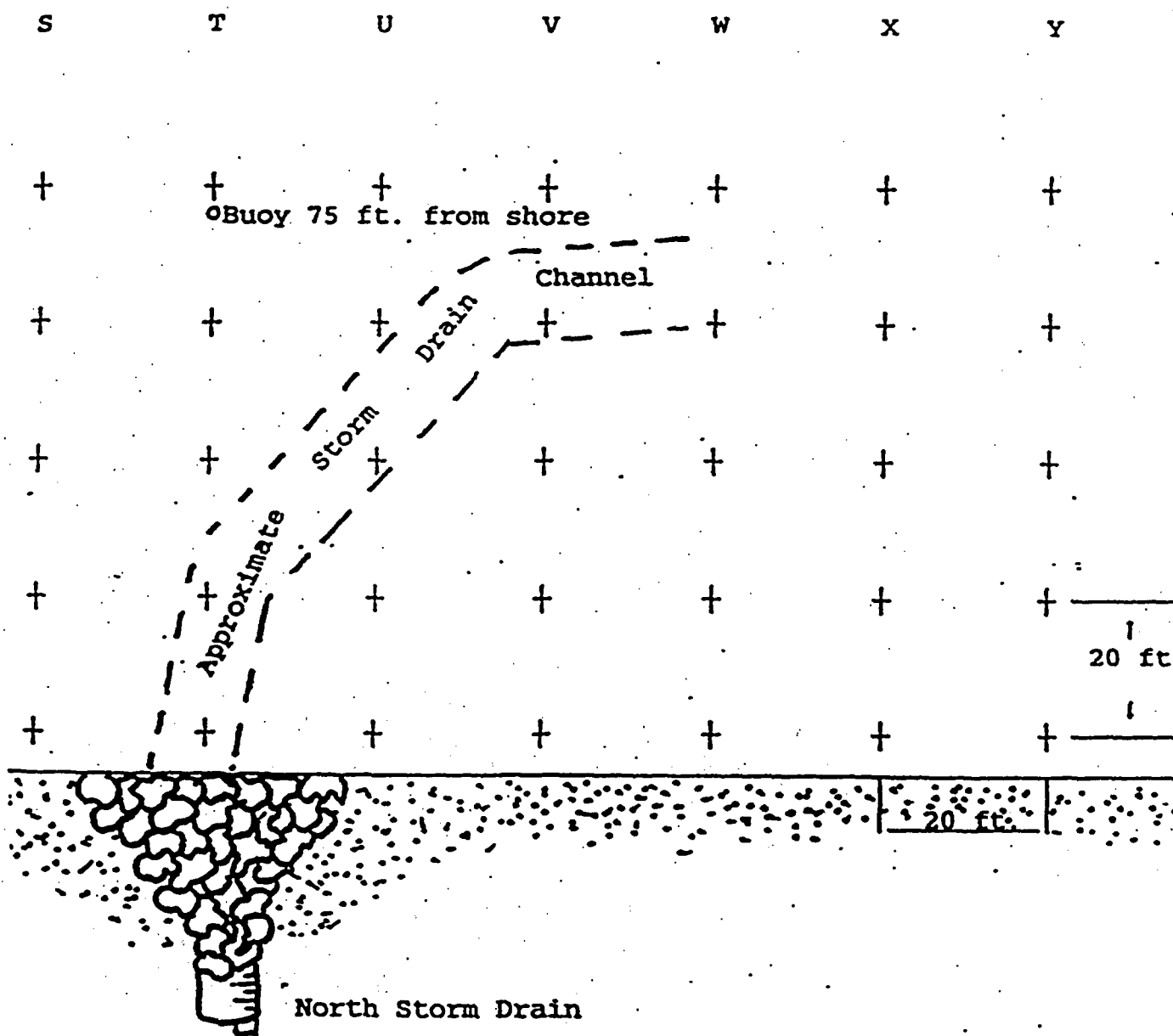
SPECIAL STUDY - SEDIMENT
VERMONT YANKEE - NORTH STORM DRAIN OUTFALL
 Results in pCi/kilogram
 FALL 2000

Grid Location	Beryllium-7	Cobalt-60	Potassium-40	Cesium-137
S-1	ND	ND	16500 + 1300	147 + 36
S-2	ND	ND	20300 + 1500	206 + 45
S-3	ND	ND	18200 + 1300	185 + 43
S-4	ND	ND	18200 + 1400	164 + 39
S-5	*	*	*	*
T-1	ND	ND	20900 + 1500	227 + 43
T-2	ND	ND	19100 + 1400	196 + 35
T-3	ND	ND	18900 + 1400	137 + 31
T-4	ND	ND	14400 + 1100	105 + 26
T-5	*	*	*	*
U-1	ND	ND	14200 + 1100	103 + 27
U-2	ND	ND	17200 + 1200	200 + 41
U-3	ND	ND	18300 + 1300	192 + 33
U-4	ND	ND	16200 + 1200	137 + 29
U-5	*	*	*	*
V-1	499 + 214	ND	14900 + 1100	112 + 22
V-2	957 + 342	ND	13600 + 1000	140 + 26
V-3	ND	ND	16300 + 1200	160 + 34
V-4	ND	ND	18200 + 1300	190 + 52
V-5	*	*	*	*
W-1	*	*	*	*
W-2	ND	ND	17500 + 1300	152 + 45
W-3	ND	ND	17600 + 1300	144 + 33
W-4	ND	ND	15700 + 1200	138 + 32
W-5	*	*	*	*
X-1	*	*	*	*
X-2	ND	ND	16300 + 1200	146 + 32
X-3	ND	ND	14900 + 1100	118 + 30
X-4	ND	ND	12500 + 900	99 + 22
X-5	*	*	*	*
Y-1	*	*	*	*
Y-2	ND	ND	18200 + 1400	184 + 33
Y-3	ND	ND	16100 + 1200	142 + 30
Y-4	*	*	*	*
Y-5	*	*	*	*
Z-1	*	*	*	*
Z-2	*	*	*	*
Z-3	ND	ND	17600 + 1200	148 + 37
Z-4	ND	ND	12600 + 960	92 + 24
Z-5	*	*	*	*

* Location not included for sampling
 = None Detected

APPENDIX A
RADIOLOGICAL SAMPLING PROGRAM OF BOTTOM SEDIMENT
NORTH STORM DRAIN

← NORTH



2000
THERMOLUMINESCENT DOSIMETRY (TLD) DATA
(milliRoentgens \pm 2 Sigma)

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 over twenty selected locations where direct radiation levels have been measure for over ten years. Some of these sites are located where other types of samples - air, milk, water are collected. Detectors were provided to the State of Vermont by Teledyne Inc. for the first, second and third quarters of this year. The fourth quarter laboratory service was provided by Proxtronics, Inc. as Teledyne decided to discontinue this type of service. The fourth quarter dosimeters contained two detection cells for each dosimeter. Levels of direct radiation from the natural environment are routinely detected at each site.

Location	1st Qtr.	2nd Qtr.
Miller Farm, Vernon	18.6 \pm 0.6	17.1 \pm 1.8
Elementary School Exterior, Vernon *	19.6 \pm 0.6	18.7 \pm 1.2
Elementary School Interior, Vernon	23.8 \pm 2.0	21.1 \pm 0.6
VY North Fence, Vernon	18.9 \pm 1.6	19.8 \pm 1.0
VY Parking Lot Fence, Vernon	22.7 \pm 2.2	22.8 \pm 3.0
Dummerston State Highway Garage (IFO)	19.6 \pm 1.6	18.1 \pm 1.0
VY Southwest Fence, Vernon	18.3 \pm 1.4	18.4 \pm 0.6
Renaud Bros. (Puffers), Vernon*	18.7 \pm 1.0	18.8 \pm 1.2
Tyler Hill & Franklin Road, Vernon	19.2 \pm 1.8	18.4 \pm 1.0
Power Line River Crossing, Vernon *	19.3 \pm 0.6	17.8 \pm 1.8
Blodgett Farm, Vernon	20.5 \pm 1.2	18.5 \pm 0.8
Brattleboro U.H.S., Brattleboro	20.2 \pm 1.6	18.7 \pm 0.4
Henry Transportation, Guilford *	18.3 \pm 1.4	19.1 \pm 0.8
Guilford Town Highway Garage, Guilford *	19.3 \pm 2.0	18.6 \pm 1.0
Evans Farm, Guilford	18.0 \pm 1.4	17.3 \pm 0.8
Putney Town Clerk, Putney	17.8 \pm 1.2	17.0 \pm 2.0
State Highway Garage, Wilmington *	20.9 \pm 1.4	20.9 \pm 1.2
State Police, West Brattleboro *	17.5 \pm 1.4	17.3 \pm 1.2
Windham County Courthouse, Brattleboro	18.7 \pm 0.8	16.9 \pm 0.8
VDORH-A	19.5 \pm 3.4	18.4 \pm 0.8
Smead Lumber, Vernon	18.3 \pm 1.0	17.6 \pm 1.4
Pond Rd. & Rte. 142 N, Vernon	19.1 \pm 1.4	18.1 \pm 0.8
Engle Dr., West Rd., Vernon	18.6 \pm 0.8	17.9 \pm 1.0
Fairman Rd., Vernon	18.9 \pm 1.6	19.5 \pm 1.2
Pond Rd. & Houghton Hill Rd., Vernon	18.0 \pm 1.6	17.5 \pm 0.4
Rte. 5, Transmission Line, Guilford (10)	20.7 \pm 1.4	19.8 \pm 2.0
Rte. 5, Andrews Cemetery, Guilford (40)	18.9 \pm 1.2	19.4 \pm 1.4
Rte. 5 & Tkaczyk Farm Rd., Guilford (11)	18.6 \pm 1.4	18.9 \pm 1.4
Tyler Hill Rd., Vernon	19.3 \pm 1.6	19.7 \pm 1.4
Rte. 142 N of Transmission Line, Vernon	18.3 \pm 0.8	18.4 \pm 1.8
Rte. 5 to Guilford Ctr. Rd., Guilford (14)	18.2 \pm 1.0	17.3 \pm 0.2
Guilford Ctr Rd. & Tater Rd., Guilford (15)	18.6 \pm 1.8	17.9 \pm 0.8
Weatherhead Hollow & Stony Hill Rds, Gfd	17.4 \pm 1.4	17.5 \pm 1.8

Location	1st Qtr.	2nd Qtr.
Huckle Hill Rd. N of VT/MA Border, Vernon	18.6 + 1.8	20.9 + 1.4
Rte. 5, Dummerston School, Dummerston	18.5 + 1.8	18.9 + 0.8
Pond Rd., Vernon Rec. Area, Vernon	18.4 + 1.4	17.0 + 1.2
Rte. 142, Vernon Fire Dept., Vernon	17.8 + 1.8	18.4 + 1.4
Rte. 142 S & Pond Rd., Vernon	18.9 + 2.0	18.1 + 0.8
Rte. 142 & Newton Rd., Vernon	17.3 + 0.8	16.6 + 1.0
Rte. 142 & Depot St., VT/MA Line, Vernon	19.2 + 1.6	17.7 + 1.0
Gov. Hunt Rd. at Vernon Elem. School	19.8 + 1.8	19.6 + 1.2

* Collocated with Air Sampling Station

2000
THERMOLUMINESCENT DOSIMETRY (TLD) DATA
(milliRoentgens \pm 2 Sigma)

Location	3rd Qtr.	4 th Qtr.
Miller Farm, Vernon	19.4 \pm 1.0	19.8 \pm 2.8
Elementary School Exterior, Vernon *	20.2 \pm 2.0	20.6 \pm 0.8
Elementary School Interior, Vernon	25.0 \pm 1.8	23.3 \pm 1.8
VY North Fence, Vernon	21.6 \pm 1.4	21.8 #
VY Parking Lot Fence, Vernon	24.8 \pm 5.0	26.7 \pm 7.1
Dummerston State Highway Garage (IFO)	20.8 \pm 2.4	20.2 \pm 2.1
VY Southwest Fence, Vernon	20.1 \pm 2.0	23.1 \pm 5.0
Renaud Bros. (Puffers), Vernon*	20.8 \pm 1.0	20.3 \pm 0.9
Tyler Hill & Franklin Road, Vernon	20.0 \pm 0.8	22.3 \pm 0.7
Power Line River Crossing, Vernon *	19.5 \pm 1.0	19.7 \pm 2.7
Blodgett Farm, Vernon	20.8 \pm 1.8	20.8 \pm 3.0
Brattleboro U.H.S., Brattleboro*	19.2 \pm 1.2	19.6 \pm 1.6
Henry Transportation, Guilford *	19.6 \pm 0.8	19.6 \pm 1.6
Guilford Town Highway Garage, Guilford *	18.6 \pm 3.2	20.2 \pm 3.0
Evans Farm, Guilford	18.6 \pm 1.0	18.8 \pm 0.5
Putney Town Clerk, Putney	18.1 \pm 2.0	19.1 \pm 3.8
State Highway Garage, Wilmington *	10.1 \pm 1.0	22.6 \pm 1.6
State Police, West Brattleboro *	18.5 \pm 1.2	18.6 \pm 2.4
Windham County Courthouse, Brattleboro	19.0 \pm 1.6	19.2 \pm 1.7
VDORH A	18.6 \pm 2.8	18.7 \pm 1.7
Smead Lumber, Vernon	20.7 \pm 2.6	20.1 \pm 2.6
Pond Rd. & Rte. 142 N, Vernon	19.0 \pm 1.4	20.1 \pm 2.4
Engle Dr., West Rd., Vernon	19.2 \pm 1.0	19.8 \pm 3.3
Fairman Rd., Vernon	19.5 \pm 1.6	20.2 \pm 2.9
Pond Rd. & Houghton Hill Rd., Vernon	19.6 \pm 0.8	19.8 \pm 2.0
Rte. 5, Wolosko, (10)	21.8 \pm 3.4	21.7 \pm 5.1
Rte. 5, Andrews Cemetery, Guilford (40)	19.7 \pm 1.4	20.8 \pm 3.4
Rte. 5 & Tkaczyk Farm Rd., Guilford	21.3 \pm 2.4	21.2 \pm 2.6
Tyler Hill Rd., Vernon	20.5 \pm 1.8	21.0 \pm 4.5
Rte. 142 N of Transmission Line, Vernon	19.2 \pm 3.0	20.4 \pm 1.7
Rte. 5 to Guilford Ctr. Rd., Guilford (14)	18.4 \pm 1.8	20.5 \pm 1.6
Guilford Ctr Rd. & Tater Rd., Guilford (15)	20.6 \pm 2.0	20.1 \pm 3.1
Weatherhead Hollow & Stony Hill Rds, Gfd	19.6 \pm 2.6	17.3 \pm 1.7

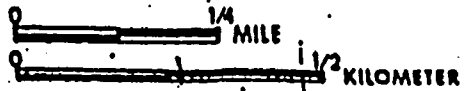
Location	3rd Qtr.	4th Qtr.
Huckle Hill Rd. N of VT/MA Border, Vernon	23.3 \pm 2.0	25.4 \pm 4.0
Rte. 5, Dummerston School, Dummerston	19.8 \pm 2.0	21.7 \pm 3.4
Pond Rd., Vernon Rec. Area, Vernon	19.6 \pm 2.0	17.8 \pm 2.1
Rte. 142, Vernon Fire Dept., Vernon	19.1 \pm 2.6	19.7 \pm 2.1
Rte. 142 S & Pond Rd., Vernon	19.1 \pm 1.2	19.8 \pm 3.6
Rte. 142 & Newton Rd., Vernon	17.7 \pm 1.2	17.9 \pm 1.9
Rte. 142 & Depot St., VT/MA Line, Vernon	18.4 \pm 2.6	19.9 \pm 3.4
Gov. Hunt Rd. at Vernon Elem. School	20.9 \pm 1.6	22.1 \pm 6.0

* Collocated with Air Sampling Station

Data from single element. Vendor indicates probable water interference with second element data.

TO W.
BRATT.
STATE
POLICE

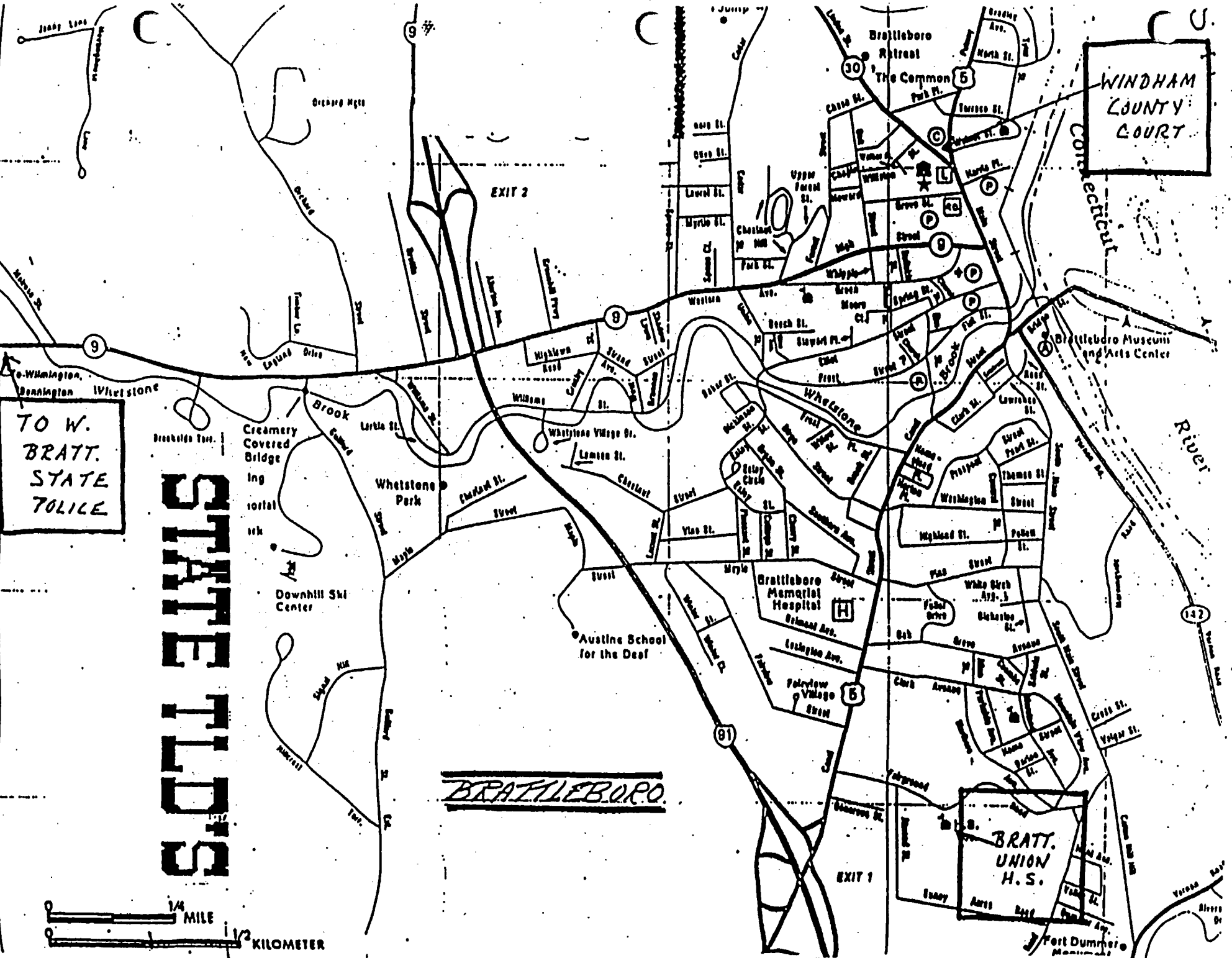
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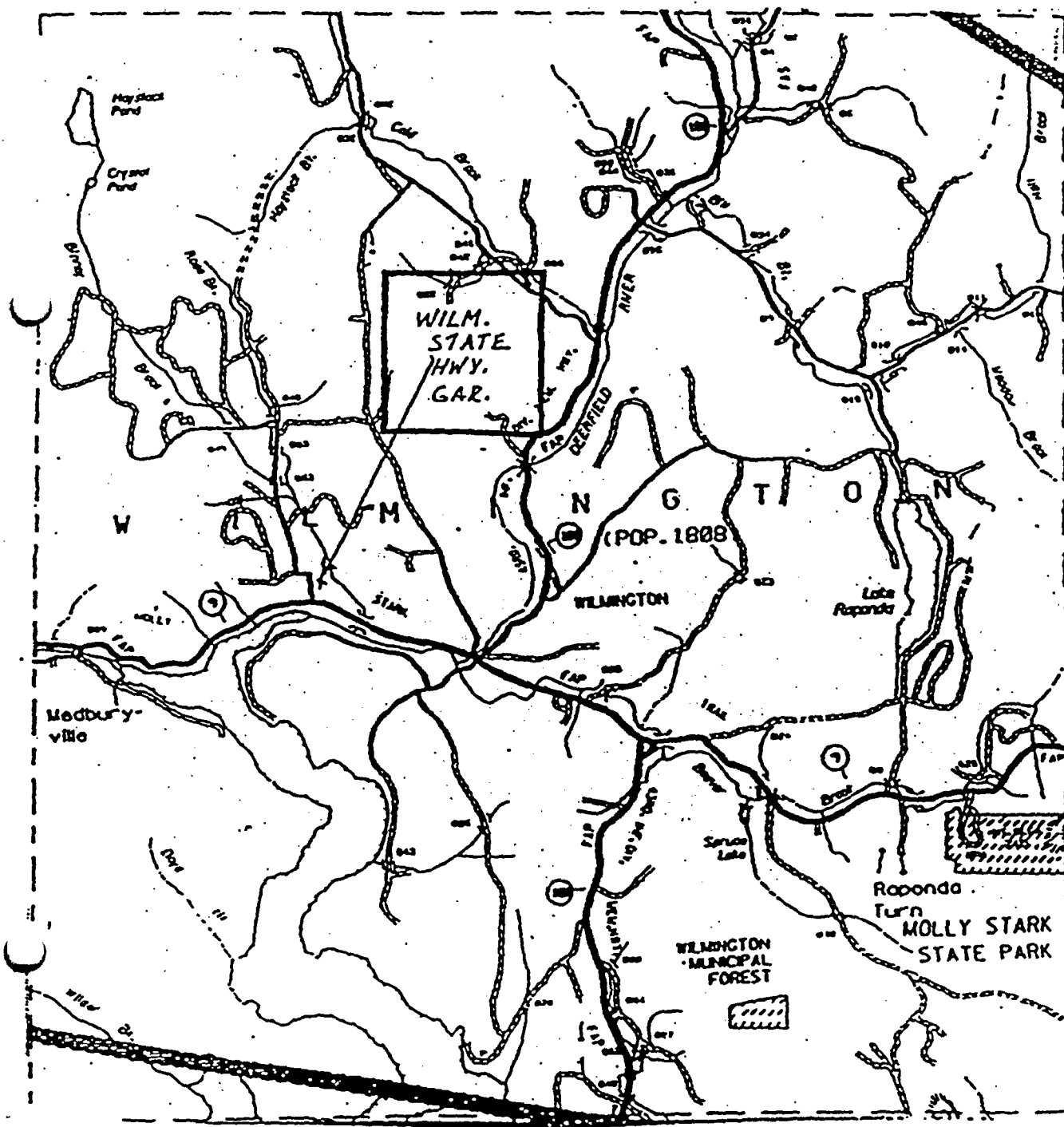
BRATTLEBORO.

WINDHAM
COUNTY
COURT

BRATT.
UNION
H.S.



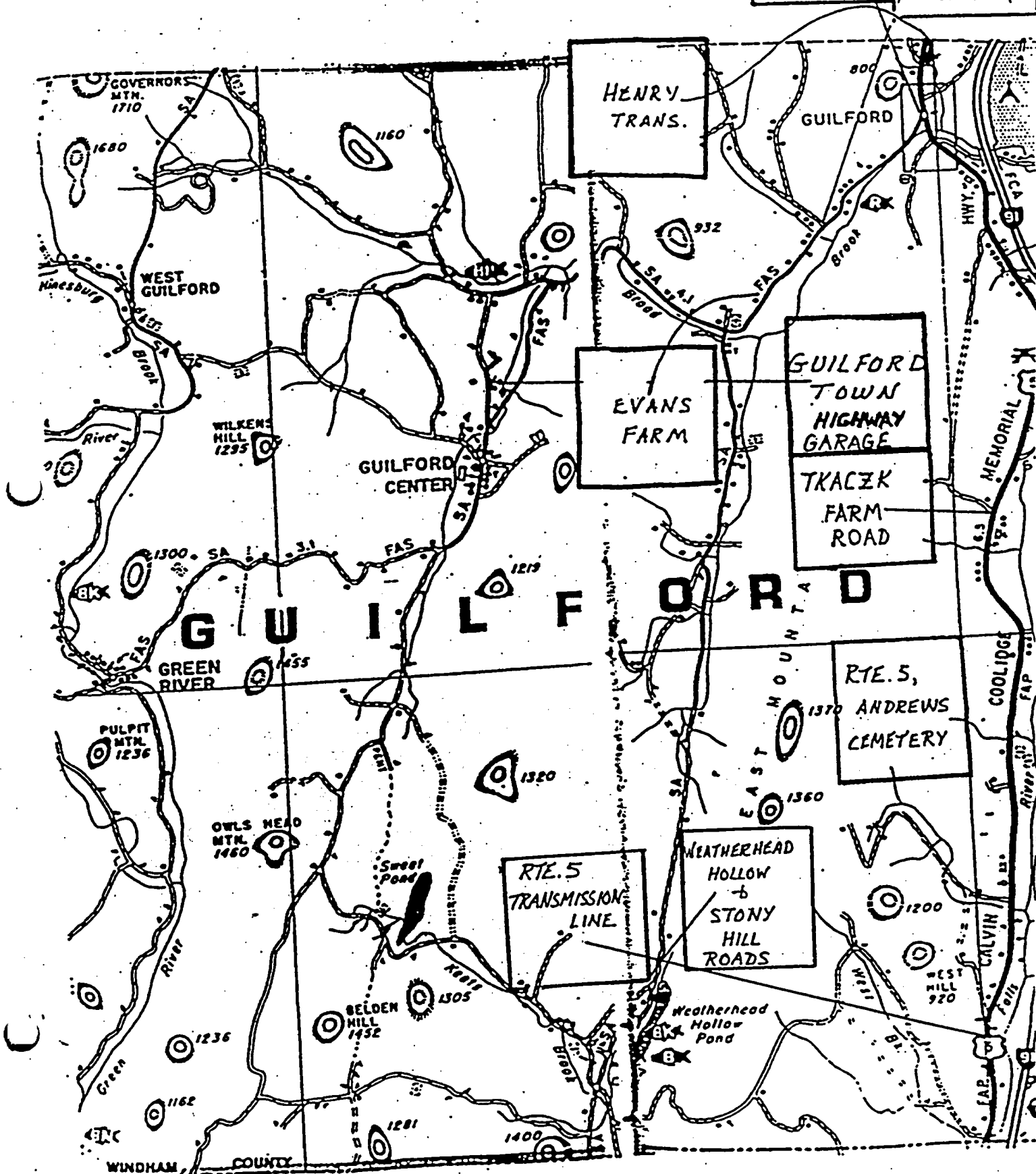
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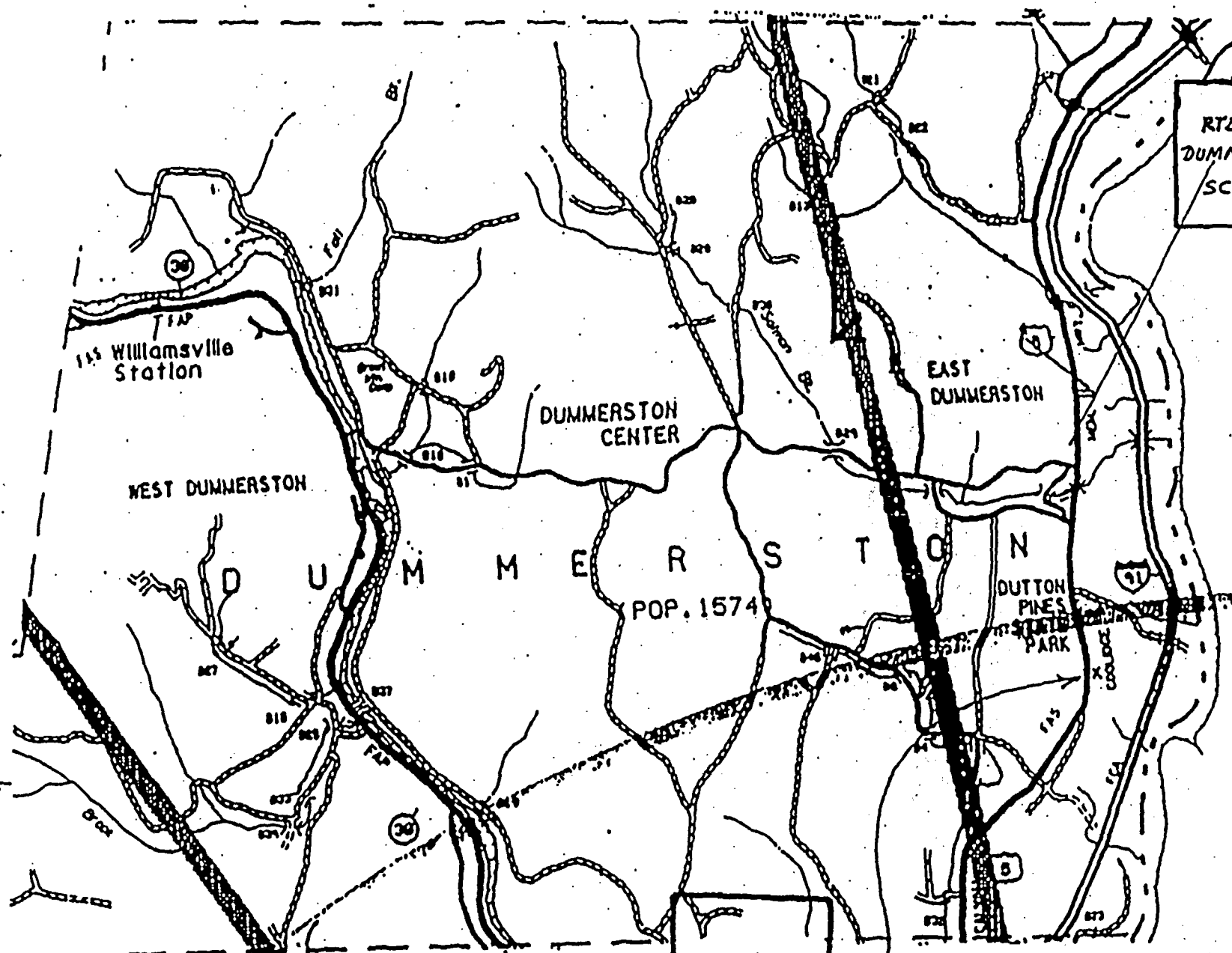


STATE TLD'S

RT. 5 &
GUILFORD
CENTER
ROAD

GUILFORD CTR.
ROAD &
TATER
ROAD



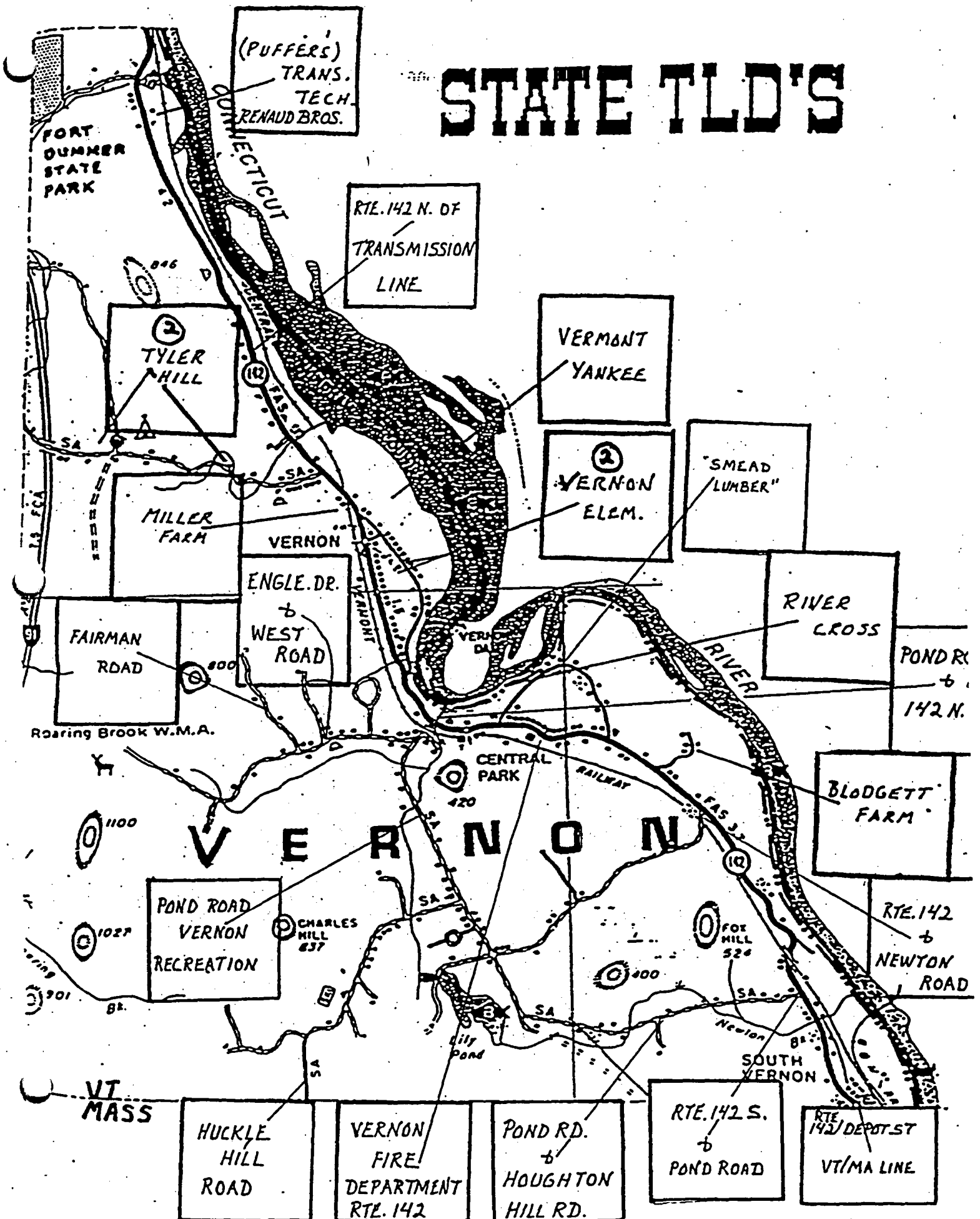


RTE. 5
DUMMERSTON
SCHOOL

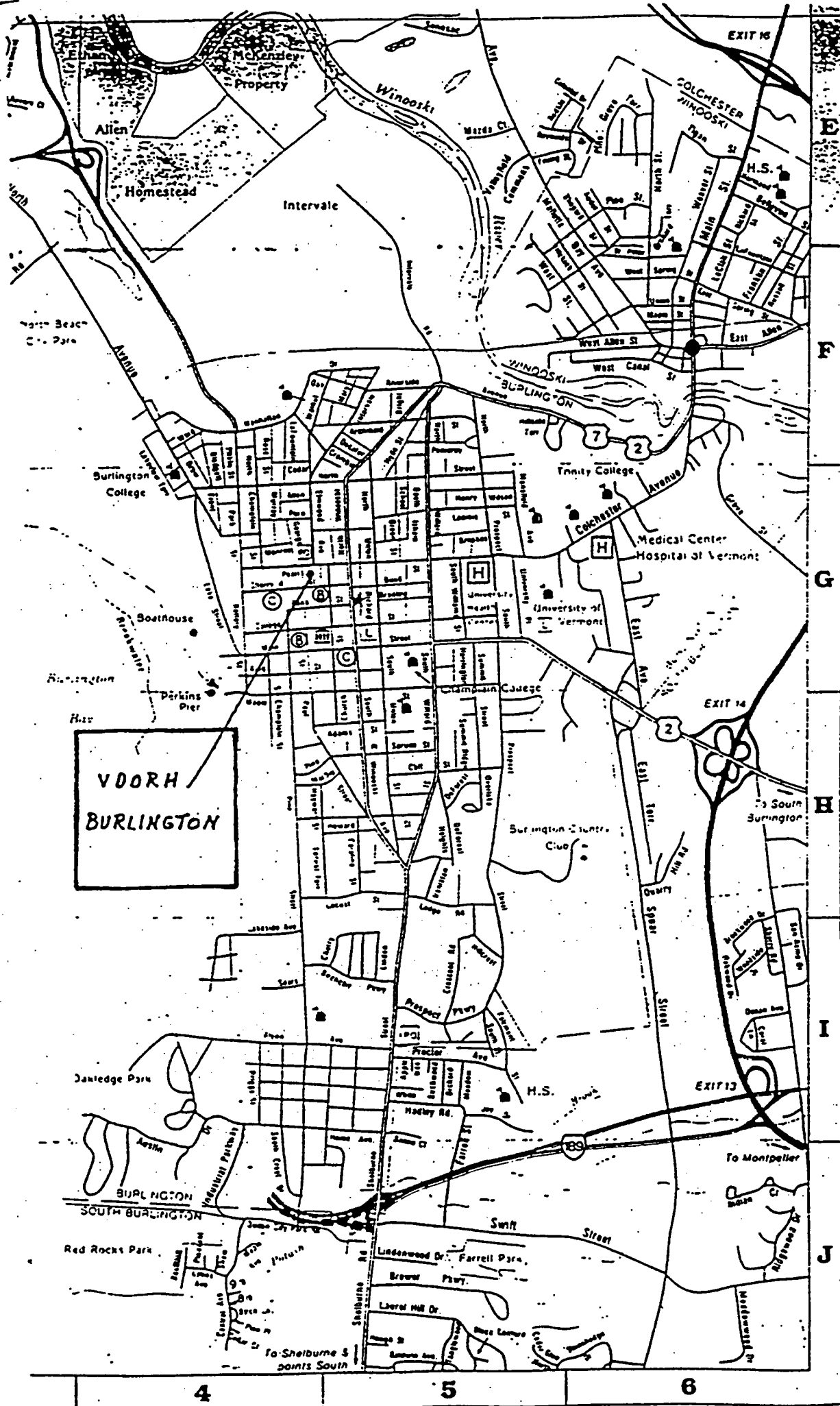
STATE RD'S

DUMM. LEO
STATE
HIGHWAY
GARAGE

STATE TLD'S



STATE TLD'S



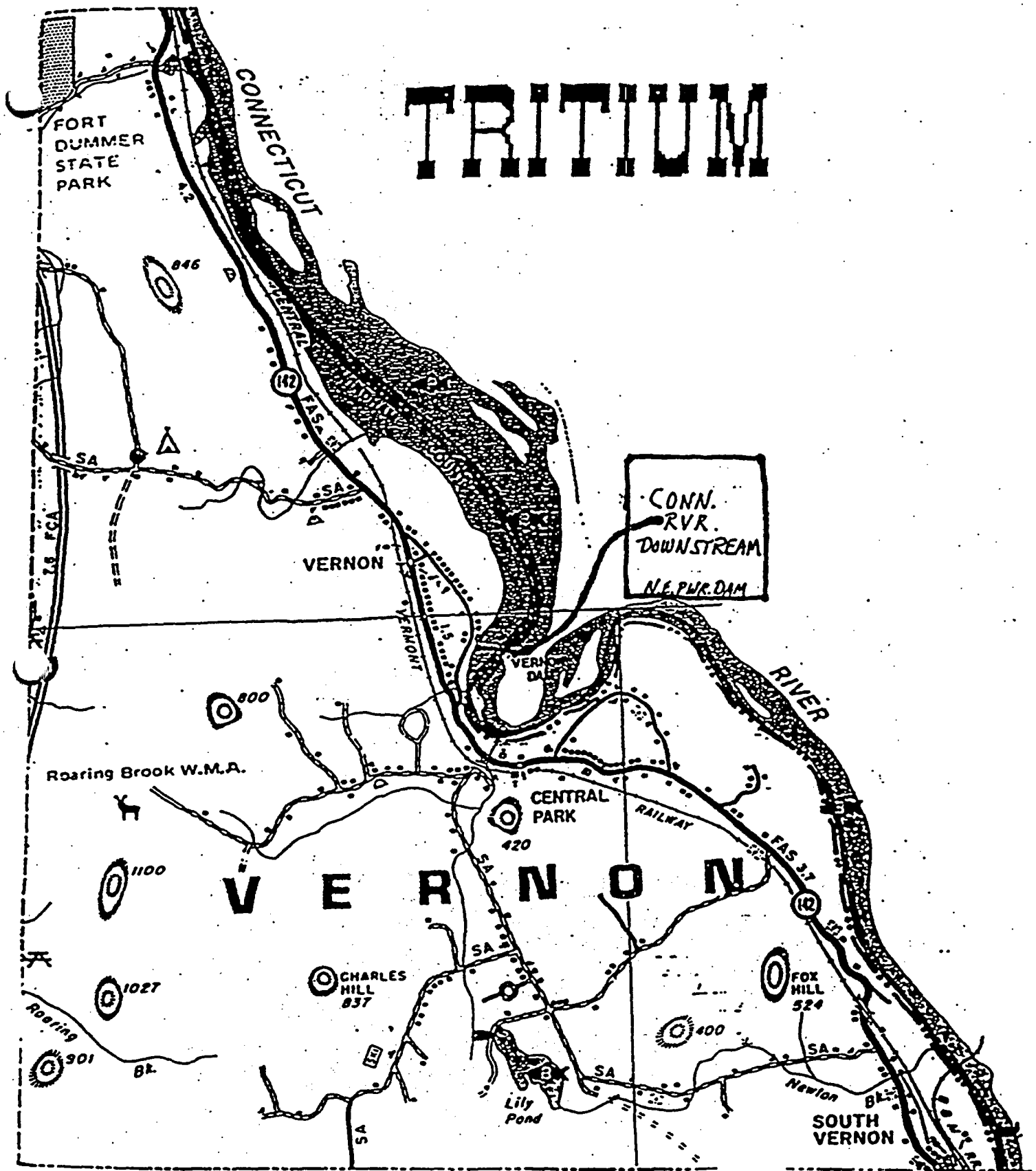
Burlington

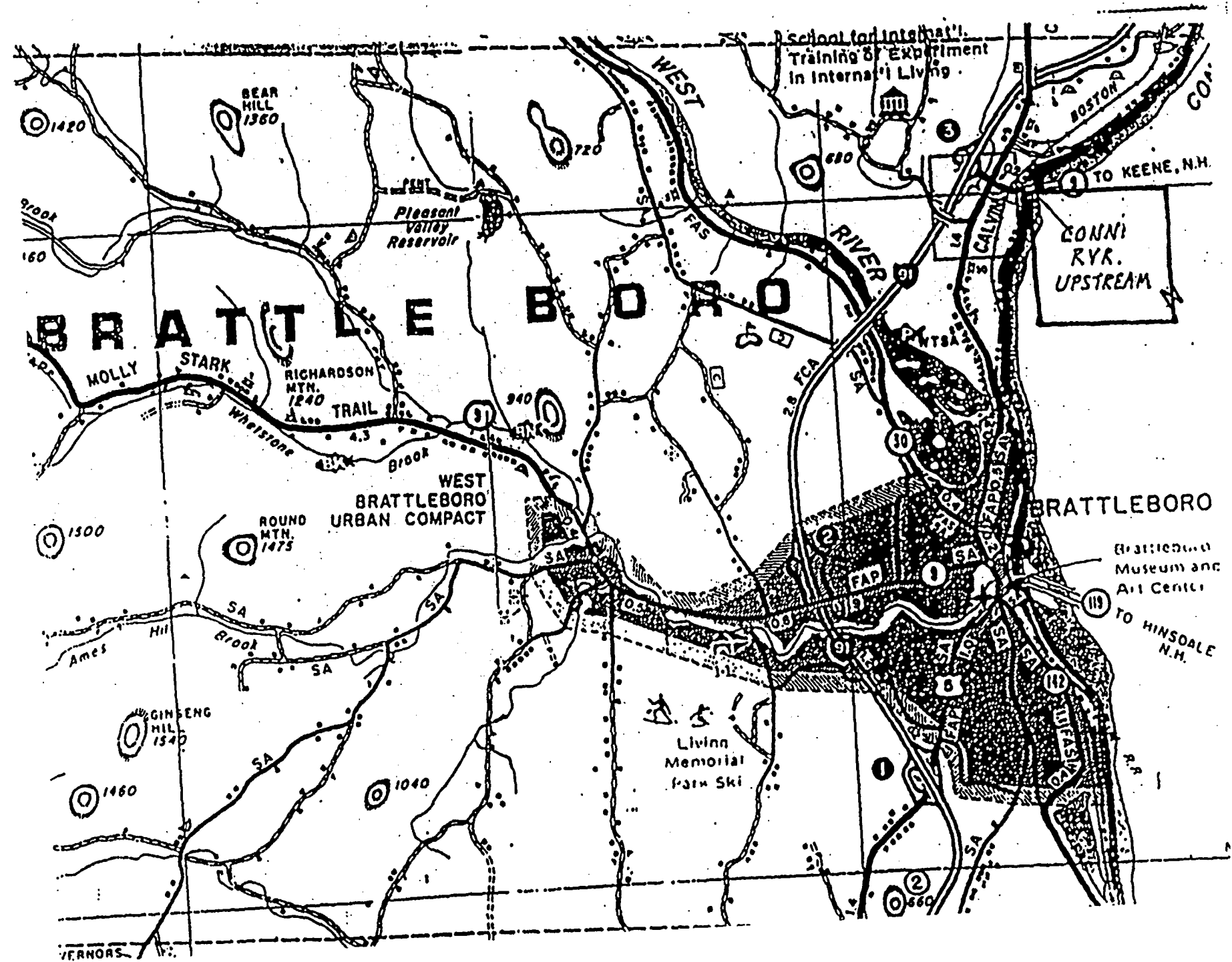
2000
TRITIUM IN WATER
VERMONT YANKEE (CONNECTICUT RIVER)
Results (nCi/liter ± 2 Sigma)

As part of the water sampling effort, an aliquot of the monthly grab samples is analyzed for Hydrogen -3. Two locations are reported monthly for Hydrogen-3 content from the Connecticut River (upstream and downstream of the power station).

Month	Downstream	Upstream
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

TRITIUM





BRATTLEBORO

2000 WATER SAMPLES
(picoCuries/Liter)

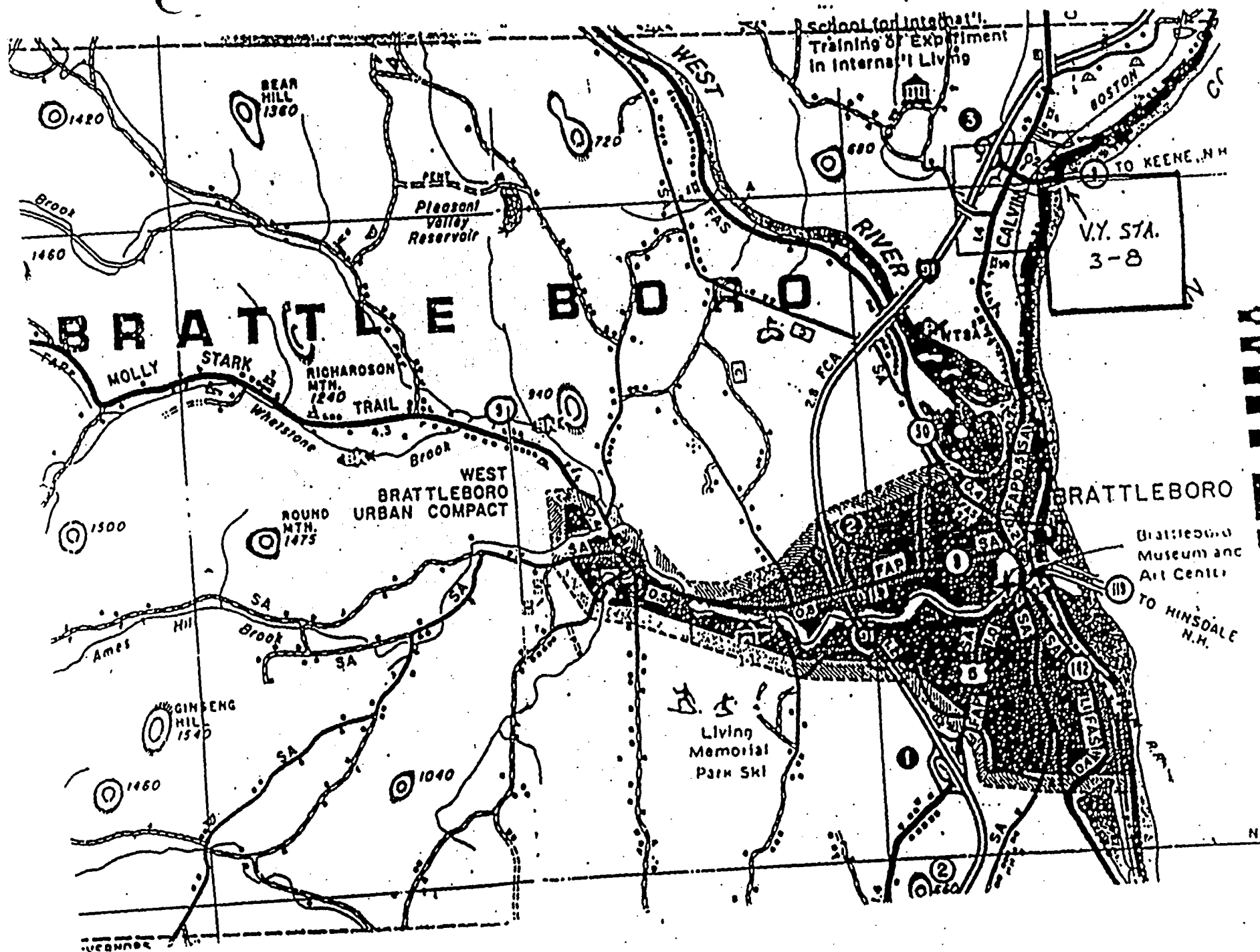
Month	Test	Vernon School Well	NE Power Dam	VY Discharge	Brattleboro Town
January	Alpha	7.0 + 1.3	< 1.4	< 1.4	< 1.4
	Beta	4.5 + 1.8	< 2.3	< 2.3	< 2.7
	Gamma	*	ND	*	ND
February	Alpha	6.0 + 1.1	4.6 + 1.8	1.9 + 1.1	< 1.5
	Beta	3.3 + 1.6	2.3 + 1.5	< 2.3	< 2.3
	Gamma	*	ND	ND	*
March	Alpha	9.7 + 1.3	< 2.5	< 2.3	< 2.3
	Beta	4.8 + 1.6	< 2.3	< 2.3	< 2.3
	Gamma	*	ND	ND	ND
April	Alpha	8.0 + 1.2	2.6 + 1.6	2.3 + 1.3	< 1.6
	Beta	4.2 + 1.8	2.5 + 1.5	< 2.3	3.9 + 1.6
	Gamma	*	ND	ND	ND
May	Alpha	7.1 + 1.2	4.5 + 1.6	2.6 + 1.3	3.6 + 1.4
	Beta	3.3 + 1.6	2.6 + 1.4	< 2.1	< 2.1
	Gamma	*	ND	ND	ND
June	Alpha	6.0 + 1.1	< 1.7	2.9 + 1.2	< 0.9
	Beta	13.7 + 1.7	< 2.2	< 2.2	< 1.1
	Gamma	*	ND	ND	ND
July	Alpha	5.1 + 1.0	< 1.4	< 1.4	< 1.4
	Beta	6.1 + 1.8	< 2.7	< 2.7	< 2.4
	Gamma	ND	ND	ND	ND
August	Alpha	4.9 + 1.2	4.0 + 1.2	< 1.4	< 1.4
	Beta	5.6 + 1.8	< 2.8	< 2.8	< 2.8
	Gamma	ND	ND	ND	ND
September	Alpha	4.9 + 1.0	< 1.6	< 2.7	< 1.6
	Beta	5.0 + 1.8	< 2.3	< 2.7	< 2.3
	Gamma	*	ND	ND	ND
October	Alpha	6.2 + 1.1	< 2.3	< 2.3	< 2.2
	Beta	3.9 + 1.6	< 2.4	< 2.4	< 2.4
	Gamma	*	ND	ND	ND
November	Alpha	5.2 + 1.0	< 2.8	< 2.6	< 2.5
	Beta	3.8 + 1.5	3.0 + 1.4	< 2.2	< 2.2
	Gamma	*	ND	ND	ND
December	Alpha	5.5 + 1.1	< 2.8	< 2.7	< 2.7
	Beta	5.0 + 1.6	< 2.4	< 2.4	< 2.4
	Gamma	*	ND	ND	ND

* = Naturally Occurring Radionuclides
ND = None Detected

2000 WATER SAMPLES
(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	< 1.4	< 1.2	< 1.1
	Beta	< 2.3	< 2.8	< 2.0	< 2.0
	Gamma	ND	*	ND	*
February	Alpha	< 1.5	< 0.9	2.9 + 1.3	< 1.5
	Beta	< 2.3	5.2 + 1.6	2.9 + 1.5	< 2.3
	Gamma	ND	ND	*	*
March	Alpha	< 2.7	< 2.4	< 2.6	< 1.8
	Beta	< 2.6	< 2.3	< 2.6	< 2.5
	Gamma	*	*	ND	*
April	Alpha	2.5 + 1.7	< 1.5	< 2.5	3.1 + 1.7
	Beta	4.3 + 1.4	< 2.3	3.2 + 1.4	2.0 + 1.3
	Gamma	ND	*	ND	ND
May	Alpha	4.3 + 1.9	2.2 + 1.2	2.8 + 1.6	2.8 + 1.6
	Beta	< 2.2	2.2 + 1.4	2.3 + 1.5	< 2.2
	Gamma	ND	ND	ND	ND
June	Alpha	< 3.0	< 1.5	< 3.0	< 3.0
	Beta	< 2.4	2.8 + 1.4	< 2.4	< 2.4
	Gamma	ND	ND	ND	ND
July	Alpha	3.3 + 0.8	< 1.4	< 1.2	1.6 + 0.6
	Beta	4.2 + 0.8	< 2.7	< 2.4	2.6 + 0.8
	Gamma	ND	ND	ND	ND
August	Alpha	< 1.4	< 1.4	< 1.4	< 1.4
	Beta	< 2.7	< 2.8	< 2.7	5.0 + 1.8
	Gamma	ND	ND	ND	ND
September	Alpha	< 1.4	< 1.6	< 1.4	< 1.4
	Beta	< 2.4	3.1 + 1.5	< 2.3	< 2.4
	Gamma	ND	ND	ND	ND
October	Alpha	< 1.4	< 2.4	< 1.5	< 1.5
	Beta	< 2.4	< 2.4	< 2.4	< 2.4
	Gamma	ND	ND	ND	ND
November	Alpha	< 1.4	< 2.6	< 1.4	< 1.4
	Beta	3.1 + 1.5	2.2 + 1.4	< 2.3	2.4 + 1.5
	Gamma	*	ND	ND	*
December	Alpha	< 1.5	< 2.8	1.6 + 1.1	< 1.5
	Beta	< 2.4	< 2.4	0.7 + 1.7	< 2.4
	Gamma	ND	*	ND	ND

* = Naturally Occurring Radionuclides
ND = None Detected



VERMONT

WATER

