

Air Sampling Results

Using nine air sampling stations, the Vermont Department of Health assesses radioactivity in the air around Vermont Yankee. The locations of the air samplers are shown on Map 8 below. The ID numbers on the map may be matched with those on Tables 8, 9, 10 and 11. The sampling apparatus uses a mechanical pump to pull environmental air through sample media. Between the pump and sample media is positioned an in-line flow meter. The flow meter tracks the volume of air drawn through the sample media. The air samplers run continuously, and the air samples collected there are retrieved and analyzed at least monthly.

The air samplers use two different sample media to capture airborne radioactivity. One is a glass fiber filter. This filter collects particulate material. The air filter is analyzed by the Vermont Department of Health Laboratory in Burlington, which reports the results numerically (as calculated) as total alpha radioactivity and total beta radioactivity. Alpha radioactivity is a measure of radioactive materials that emit alpha radiation, while beta radioactivity is a measure of radioactive materials that emit beta radiation. The air filters are also counted for gamma radioactivity in what are called the quarterly composites. An example of a natural radioactive particulate is beryllium-7. A radioactive particulate only associated with human activity is cesium-137.

The second media is a charcoal cartridge treated with triethylenediamine (TEDA). This cartridge has an affinity for radioactive iodine. As air passes through the cartridge, radioactive iodine gets trapped in the charcoal cartridge. The radioactive iodine is measured at the Vermont Department of Health Laboratory. In addition, other radioactive gases and vapors may be trapped in the charcoal cartridge. These, too, are analyzed by the laboratory. A radioactive iodine of particular interest is iodine-131. The lab reports the iodine-131 radioactivity, and identifies any other radioactive gases or vapors that were collected on the cartridge.

Alpha and beta radioactivity on the glass fiber filters is measured using a gas flow proportional counter. This analysis is particularly useful with environmental levels of radioactivity, and allows easy discrimination between alpha and beta radioactivity. Glass fiber filter results are presented numerically with error. The charcoal cartridges are analyzed for radioactive iodine and other gamma radiation emitting radioactive materials with a gamma spectrometer system using a reverse electrode germanium detector. This instrument can detect hundreds of different radioisotopes and identify them individually by their unique gamma radiation energy signatures. The instruments used at the Vermont Department of Health Laboratory are very sensitive and subject to significant quality controls. Still, each instrument has a limit of detection. When a sample is analyzed and no radioactivity is detected, the result is not recorded as zero, but it is recorded as less than the limit of detection. Limits of detection (LOD) are calculated periodically and represent an activity value that can be distinguished from the absence of that activity, LODs are calculated for gamma instruments taking into consideration instrument and sample characteristics such as sample type, count times, sample sizes. The calculated limit of detection for iodine-131, for example is 0.0038 pCi/m³.

Total alpha, total beta, and iodine-131 radioactivity is reported in picocuries per cubic meter. A picocurie (pCi) is a measure of radioactivity. One pCi is one trillionth of a curie, and one curie is the amount of radioactivity in one gram of radium-226. A cubic meter (m³) is a measure of volume, so the number of pCi/m³ in these air samples is a measure of the airborne radioactivity concentration. Table 7 presents the total alpha radioactivity results from the 2008 air sample filters. Table 8 presents the total beta radioactivity from these filters. Table 9 presents the radioactive iodine-131 results following analysis of the charcoal cartridge samples, while Table 10 presents the gamma spectrometry results for the analysis of these charcoal cartridges.

Results for 2008 are that 1) alpha radioactivity is within the historical range of less than the calculated limits of detection to 0.0071 pCi/m³; 2) that beta radioactivity is within eight percent of the maximum in the historical range of less than the calculated limits of

detection to 0.0251 pCi/m³; 3) that iodine-131 samples were all less than the limit of detection; and 4) that all gamma radioactivity detected was of natural origin. Specific concentrations for alpha radioactivity ranged from 0.0 pCi/m³ to 0.00483 pCi/m³ while the specific concentrations for beta radioactivity ranged from 0.00118 pCi/m³ to 0.0271 pCi/m³.

Each calendar quarter, the air filter samples from all nine air sample locations are analyzed together in what is called a quarterly composite. The filters are analyzed with the gamma spectrometer system used to evaluate the air cartridges for radioactive materials. Table 11 presents the quarterly composite results. The results show only naturally occurring beryllium-7, and at levels consistent with the historical range.

In the graph in Figure 1, the mean alpha radioactivity for each of the nine Vermont Department of Health air sample stations is plotted. The graph indicates that there is little difference between results at locations close to Vermont Yankee Nuclear Power Station, for example at the Vernon Elementary School, and at locations far from the plant, for example the Windham County Courthouse in Brattleboro. As with alpha radioactivity, a look at the mean air sample total beta radioactivity indicates no significant difference between air sample results for locations near the plant as compared to locations further from the plant. These mean air sample beta radioactivity results from the nine air sample stations are plotted in the graph in Figure 2.

Table 9 presents the monthly results of iodine-131 sample analysis. No iodine-131 above the calculated limit of detection was identified at any of the nine air sampling stations. The calculated limit of detection is 0.0038 picocuries per cubic meter (pCi/m³).

In Table 10 is presented the gamma spectroscopy results for air sample charcoal cartridges for the nine air samplers in the Vermont Yankee Nuclear Power Station area. All of the results indicate only naturally occurring radioactive materials were detected. Table 12 provides a list of some of the naturally occurring radioactive materials found in gamma spectroscopy at the Vermont Department of Health Laboratory. Table 13 is a list

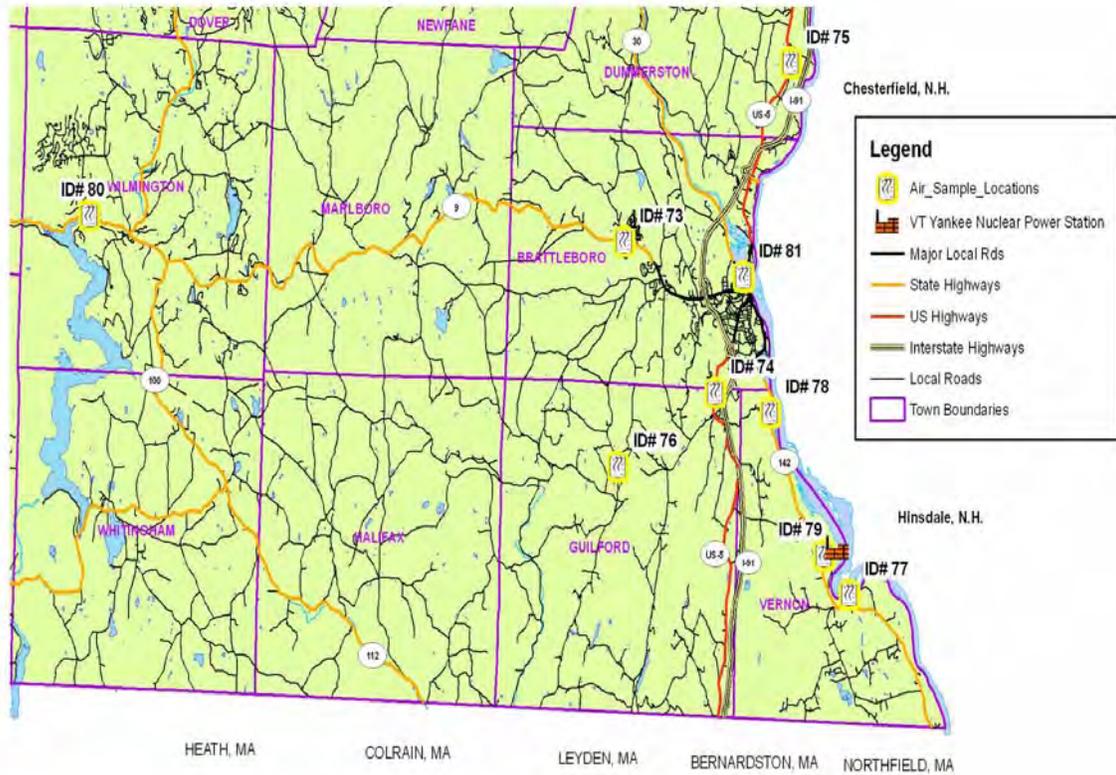
of radioactive materials that may be identified through gamma spectroscopy that are predominantly associated with nuclear facilities.

Table 11 presents the quarterly air sample composite analysis. The quarterly composites are analyses of all air filters collected from the nine air sampling stations over the three-month calendar quarter. The 27 filters collected over the calendar quarter are analyzed by gamma spectroscopy, which can identify any radioactivity that emits gamma radiation. The analysis of these filters indicated only naturally occurring beryllium-7 present in excess of the calculated limit of detection. Beryllium-7 is a cosmogenic radioactive material. Cosmogenic radioactive materials are created by cosmic radiation interactions in the earth's atmosphere. The beryllium-7 accumulates on the surface of the earth when washed out of the atmosphere by precipitation.

In summary, gamma spectroscopy of air sample cartridges and filters around Vermont Yankee showed no evidence of radioactivity from the station. The alpha and beta radioactivity measurements are within the historical range and are considered most likely only associated with natural radioactive materials in the air.

Map 8

Environmental Radiation Surveillance Stations
Air Sample Locations



P. Young
April 2007

Table 7. 2008 Air Sample Alpha Radioactivity Results

Sample Date	Sample Location	Map ID No.	Results pCi/m ³	Error pCi/m ³
1/31/2008	Brattleboro State Police	73	0.00366	0.00075
1/31/2008	D & E Tree	74	0.00217	0.00062
1/31/2008	Dummerston State Garage	75	0.00304	0.0007
1/31/2008	Guilford Town Garage	76	0.00366	0.00082
1/31/2008	Power Line River Crossing	77	0.0033	0.00071
1/31/2008	Renauld Brothers	78	0.00378	0.00079
1/31/2008	Vernon Elementary School	79	0.00369	0.00075
1/31/2008	Wilmington State Garage	80	0.00287	0.00063
1/31/2008	Windham County Court	81	0.00483	0.0011
2/25/2008	Brattleboro State Police	73	0.00239	0.00084
2/25/2008	D & E Tree	74	0.00203	0.0008
2/25/2008	Dummerston State Garage	75	0.00263	0.00087
2/25/2008	Guilford Town Garage	76	0.00254	0.00094
2/25/2008	Power Line River Crossing	77	0.0026	0.00086
2/25/2008	Renauld Brothers	78	0.00275	0.0009
2/25/2008	Vernon Elementary School	79	0.00294	0.00089
2/25/2008	Wilmington State Garage	80	0.00253	0.00079
2/25/2008	Windham County Court	81	0.0019	0.00054
3/27/2008	Brattleboro State Police	73	0.00306	0.00079
3/27/2008	D & E Tree	74	0.00249	0.00074
3/27/2008	Dummerston State Garage	75	0.00244	0.00072
3/27/2008	Guilford Town Garage	76	0.00287	0.00084
3/27/2008	Power Line River Crossing	77	0.00303	0.00078
3/27/2008	Renauld Brothers	78	0.00273	0.00077
3/27/2008	Vernon Elementary School	79	0.00317	0.00079
3/27/2008	Wilmington State Garage	80	0.00226	0.00065
3/27/2008	Windham County Court	81	0.00216	0.00066
4/29/2008	Brattleboro State Police	73	0.00355	0.00085
4/29/2008	D & E Tree	74	0.00271	0.00077
4/29/2008	Dummerston State Garage	75	0.00299	0.00078
4/29/2008	Guilford Town Garage	76	0.00366	0.0009
4/29/2008	Power Line River Crossing	77	0.00367	0.00098
4/29/2008	Renauld Brothers	78	0.00292	0.00076
4/29/2008	Vernon Elementary School	79	0.00379	0.00085
4/29/2008	Wilmington State Garage	80	0.00296	0.00071
4/29/2008	Windham County Court	81	0.00263	0.00071

Table 7. 2008 Air Sample Alpha Radioactivity (continued)

Sample Date	Sample Location	Map ID No	Results pCi/m ³	Error pCi/m ³
6/4/2008	Brattleboro State Police	73	0.00191	0.00063
5/29/2008	D & E Tree	74	0.000876	0.000533
5/29/2008	Dummerston State Garage	75	0.00251	0.00078
5/29/2008	Guilford Town Garage	76	0.00115	0.00061
5/29/2008	Power Line River Crossing	77	0.00042	0.000529
5/29/2008	Renauld Brothers	78	0.000347	0.000396
5/29/2008	Vernon Elementary School	79	0.003	0.00082
6/4/2008	Wilmington State Garage	80	0.00242	0.00064
5/29/2008	Windham County Court	81	0.00179	0.00065
6/30/2008	Brattleboro State Police	73	0.00141	0.0007
6/30/2008	D & E Tree	74	0.00196	0.0007
6/30/2008	Dummerston State Garage	75	0.00112	0.00059
6/30/2008	Guilford Town Garage	76	0.00125	0.00061
6/30/2008	Power Line River Crossing	77	0.00413	0.00207
6/30/2008	Renauld Brothers	78	0.00153	0.00059
6/30/2008	Vernon Elementary School	79	0.00217	0.0007
6/30/2008	Wilmington State Garage	80	0.000657	0.000483
6/30/2008	Windham County Court	81	0.00136	0.00058
7/28/2008	Brattleboro State Police	73	0.00268	0.0009
7/28/2008	D & E Tree	74	0.00157	0.00078
7/28/2008	Dummerston State Garage	75	0.0016	0.00078
7/28/2008	Guilford Town Garage	76	0	0.00053
7/28/2008	Power Line River Crossing	77	0.00315	0.0009
7/28/2008	Renauld Brothers	78	0.000088	0.000435
7/28/2008	Vernon Elementary School	79	0.0032	0.00095
7/28/2008	Wilmington State Garage	80	0.00132	0.00215
7/28/2008	Windham County Court	81	0.00233	0.00084
8/21/2008	Brattleboro State Police	73	0.00242	0.00084
8/21/2008	D & E Tree	74	0.000376	0.000466
8/21/2008	Dummerston State Garage	75	0.00167	0.00074
8/21/2008	Guilford Town Garage	76	0.00262	0.00089
8/21/2008	Power Line River Crossing	77	0.00267	0.00091
8/21/2008	Renauld Brothers	78	0.00246	0.0008
8/21/2008	Vernon Elementary School	79	0.0021	0.00079
8/21/2008	Wilmington State Garage	80	0.00249	0.00096
8/21/2008	Windham County Court	81	0.00255	0.00085

Table 7. 2008 Air Sample Alpha Radioactivity (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/m ³	Error pCi/m ³
9/29/2008	Brattleboro State Police	73	0.00229	0.00062
9/29/2008	D & E Tree	74	0.00197	0.0006
9/29/2008	Dummerston State Garage	75	N/A	N/A
9/29/2008	Guilford Town Garage	76	0.00278	0.0007
9/29/2008	Power Line River Crossing	77	0.00256	0.00068
9/29/2008	Renauld Brothers	78	0.00265	0.00064
9/29/2008	Vernon Elementary School	79	0.0026	0.00066
9/29/2008	Wilmington State Garage	80	0.00334	0.00083
9/29/2008	Windham County Court	81	0.00206	0.00059
10/23/2008	Brattleboro State Police	73	0.00219	0.00084
10/23/2008	D & E Tree	74	0.000731	0.0006
10/23/2008	Dummerston State Garage	75	0.00276	0.00092
10/23/2008	Guilford Town Garage	76	0.00214	0.00088
10/23/2008	Power Line River Crossing	77	0.00193	0.00083
10/23/2008	Renauld Brothers	78	0.00186	0.00076
10/23/2008	Vernon Elementary School	79	0.0027	0.0009
10/23/2008	Wilmington State Garage	80	0.00239	0.00091
10/23/2008	Windham County Court	81	0.00222	0.00082
12/1/2008	Brattleboro State Police	73	0.00236	0.00063
12/1/2008	D & E Tree	74	0.000793	0.000418
12/1/2008	Dummerston State Garage	75	0.00313	0.00071
12/1/2008	Guilford Town Garage	76	0.00346	0.0008
12/1/2008	Power Line River Crossing	77	0.00275	0.0007
12/1/2008	Renauld Brothers	78	0.0017	0.00055
12/1/2008	Vernon Elementary School	79	0.0027	0.00066
12/1/2008	Wilmington State Garage	80	0.00323	0.00077
12/1/2008	Windham County Court	81	0.00239	0.00062
12/23/2008	Brattleboro State Police	73	0.00315	0.00101
12/23/2008	D & E Tree	74	0.000748	0.000661
12/23/2008	Dummerston State Garage	75	0.00279	0.00095
12/23/2008	Guilford Town Garage	76	0.00393	0.0012
12/23/2008	Power Line River Crossing	77	0.00385	0.0011
12/23/2008	Renauld Brothers	78	0.00253	0.00094
12/23/2008	Vernon Elementary School	79	0.00257	0.00092
12/23/2008	Wilmington State Garage	80	0.00305	0.00099
12/23/2008	Windham County Court	81	0.0023	0.00086

Figure 1, 2008 Mean Alpha Radioactivity in Air Around VYNPS

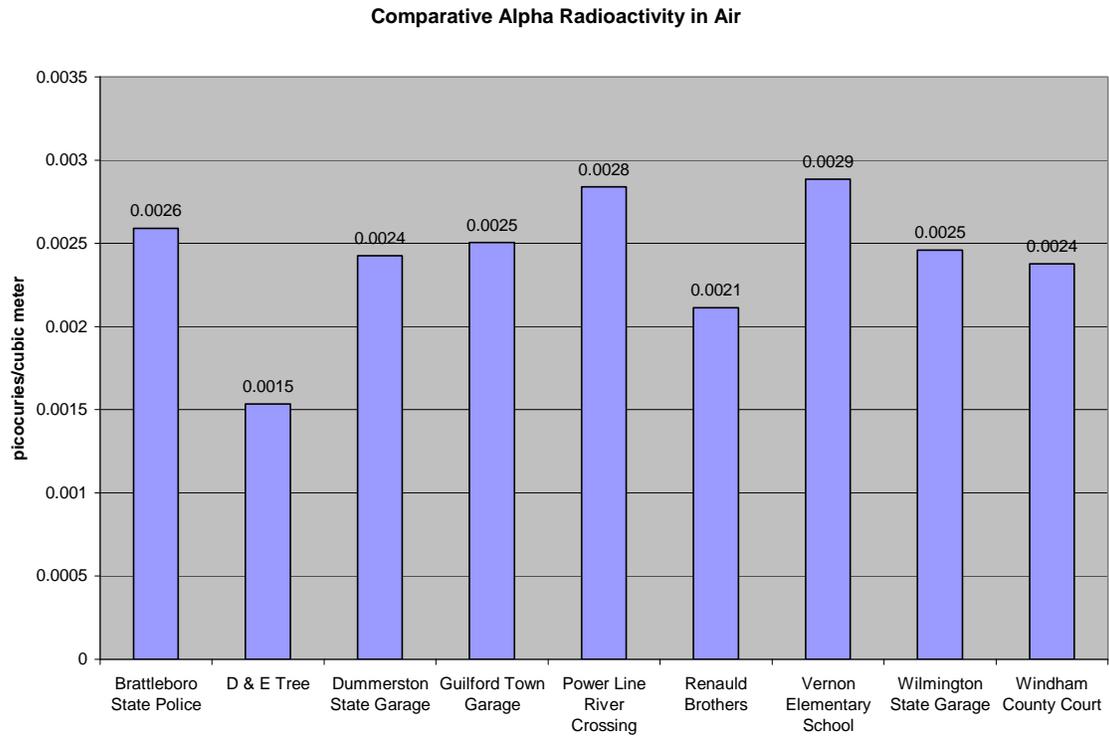


Table 8. 2008 Air Sample Beta Radioactivity Results

Sample Date	Sample Location	Map ID No.	Results pCi/m ³	Error pCi/m ³
1/31/2008	Brattleboro State Police	73	0.0155	0.0012
1/31/2008	D & E Tree	74	0.0137	0.0011
1/31/2008	Dummerston State Garage	75	0.0151	0.0012
1/31/2008	Guilford Town Garage	76	0.0159	0.0013
1/31/2008	Power Line River Crossing	77	0.016	0.0012
1/31/2008	Renauld Brothers	78	0.0193	0.0013
1/31/2008	Vernon Elementary School	79	0.0166	0.0012
1/31/2008	Wilmington State Garage	80	0.0141	0.0011
1/31/2008	Windham County Court	81	0.0254	0.0019
2/25/2008	Brattleboro State Police	73	0.0149	0.0015
2/25/2008	D & E Tree	74	0.015	0.0015
2/25/2008	Dummerston State Garage	75	0.0127	0.0014
2/25/2008	Guilford Town Garage	76	0.015	0.0017
2/25/2008	Power Line River Crossing	77	0.0153	0.0015
2/25/2008	Renauld Brothers	78	0.0165	0.0016
2/25/2008	Vernon Elementary School	79	0.0184	0.0016
2/25/2008	Wilmington State Garage	80	0.0127	0.0013
2/25/2008	Windham County Court	81	0.00863	0.00087
3/27/2008	Brattleboro State Police	73	0.0121	0.0013
3/27/2008	D & E Tree	74	0.0124	0.0013
3/27/2008	Dummerston State Garage	75	0.0104	0.0012
3/27/2008	Guilford Town Garage	76	0.0138	0.0014
3/27/2008	Power Line River Crossing	77	0.0127	0.0013
3/27/2008	Renauld Brothers	78	0.0135	0.0013
3/27/2008	Vernon Elementary School	79	0.0141	0.0013
3/27/2008	Wilmington State Garage	80	0.0106	0.0011
3/27/2008	Windham County Court	81	0.0123	0.0012
4/29/2008	Brattleboro State Police	73	0.0141	0.0013
4/29/2008	D & E Tree	74	0.0119	0.0013
4/29/2008	Dummerston State Garage	75	0.0128	0.0013
4/29/2008	Guilford Town Garage	76	0.0121	0.0012
4/29/2008	Power Line River Crossing	77	0.0148	0.0016
4/29/2008	Renauld Brothers	78	0.0141	0.0013
4/29/2008	Vernon Elementary School	79	0.013	0.0013
4/29/2008	Wilmington State Garage	80	0.011	0.0011
4/29/2008	Windham County Court	81	0.0112	0.0012

Table 8. 2008 Air Sample Beta Radioactivity Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/m³	Error pCi/m³
6/4/2008	Brattleboro State Police	73	0.00606	0.0009
5/29/2008	D & E Tree	74	0.00203	0.00074
5/29/2008	Dummerston State Garage	75	0.00826	0.00113
5/29/2008	Guilford Town Garage	76	0.00573	0.00104
5/29/2008	Power Line River Crossing	77	0.00121	0.00082
5/29/2008	Renauld Brothers	78	0.00118	0.00063
5/29/2008	Vernon Elementary School	79	0.00936	0.00116
6/4/2008	Wilmington State Garage	80	0.00643	0.00085
5/29/2008	Windham County Court	81	0.00996	0.00117
6/30/2008	Brattleboro State Police	73	0.00267	0.00092
6/30/2008	D & E Tree	74	0.00782	0.00111
6/30/2008	Dummerston State Garage	75	0.00634	0.00106
6/30/2008	Guilford Town Garage	76	0.00252	0.0008
6/30/2008	Power Line River Crossing	77	0.0271	0.0039
6/30/2008	Renauld Brothers	78	0.0074	0.001
6/30/2008	Vernon Elementary School	79	0.0108	0.0012
6/30/2008	Wilmington State Garage	80	0.00135	0.00068
6/30/2008	Windham County Court	81	0.00859	0.00109
7/28/2008	Brattleboro State Police	73	0.00268	0.0015
7/28/2008	D & E Tree	74	0.00974	0.0013
7/28/2008	Dummerston State Garage	75	0.0106	0.0013
7/28/2008	Guilford Town Garage	76	0.0018	0.00079
7/28/2008	Power Line River Crossing	77	0.0154	0.0016
7/28/2008	Renauld Brothers	78	0.00227	0.0007
7/28/2008	Vernon Elementary School	79	0.0157	0.0015
7/28/2008	Wilmington State Garage	80	0.00491	0.00265
7/28/2008	Windham County Court	81	0.0128	0.0014
8/21/2008	Brattleboro State Police	73	0.0101	0.0014
8/21/2008	D & E Tree	74	0.00183	0.00094
8/21/2008	Dummerston State Garage	75	0.00755	0.00134
8/21/2008	Guilford Town Garage	76	0.0117	0.0016
8/21/2008	Power Line River Crossing	77	0.011	0.0015
8/21/2008	Renauld Brothers	78	0.00907	0.00131
8/21/2008	Vernon Elementary School	79	0.0114	0.0015
8/21/2008	Wilmington State Garage	80	0.0116	0.0017
8/21/2008	Windham County Court	81	0.00968	0.00139

Table 8. 2008 Air Sample Beta Radioactivity Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/m ³	Error pCi/m ³
9/29/2008	Brattleboro State Police	73	0.0112	0.0011
9/29/2008	D & E Tree	74	0.00766	0.001
9/29/2008	Dummerston State Garage	75	N/A	N/A
9/29/2008	Guilford Town Garage	76	0.0129	0.0012
9/29/2008	Power Line River Crossing	77	0.0126	0.0012
9/29/2008	Renauld Brothers	78	0.0112	0.0011
9/29/2008	Vernon Elementary School	79	0.0118	0.0011
9/29/2008	Wilmington State Garage	80	0.0136	0.0014
9/29/2008	Windham County Court	81	0.011	0.0011
10/23/2008	Brattleboro State Police	73	0.0128	0.0015
10/23/2008	D & E Tree	74	0.00179	0.00092
10/23/2008	Dummerston State Garage	75	0.0096	0.00139
10/23/2008	Guilford Town Garage	76	0.0134	0.0017
10/23/2008	Power Line River Crossing	77	0.0128	0.0016
10/23/2008	Renauld Brothers	78	0.0113	0.0014
10/23/2008	Vernon Elementary School	79	0.0119	0.0015
10/23/2008	Wilmington State Garage	80	0.0123	0.0016
10/23/2008	Windham County Court	81	0.0124	0.0015
12/1/2008	Brattleboro State Police	73	0.012	0.0011
12/1/2008	D & E Tree	74	0.0028	0.00067
12/1/2008	Dummerston State Garage	75	0.0116	0.0011
12/1/2008	Guilford Town Garage	76	0.0124	0.0012
12/1/2008	Power Line River Crossing	77	0.0135	0.0012
12/1/2008	Renauld Brothers	78	0.00905	0.001
12/1/2008	Vernon Elementary School	79	0.0123	0.0011
12/1/2008	Wilmington State Garage	80	0.0107	0.0011
12/1/2008	Windham County Court	81	0.0119	0.0011
12/23/2008	Brattleboro State Police	73	0.0153	0.0016
12/23/2008	D & E Tree	74	0.00324	0.00096
12/23/2008	Dummerston State Garage	75	0.0138	0.0015
12/23/2008	Guilford Town Garage	76	0.0185	0.0019
12/23/2008	Power Line River Crossing	77	0.015	0.0016
12/23/2008	Renauld Brothers	78	0.0193	0.0016
12/23/2008	Vernon Elementary School	79	0.0159	0.0016
12/23/2008	Wilmington State Garage	80	0.0154	0.0016
12/23/2008	Windham County Court	81	0.0138	0.0015

Figure 2, 2008 Mean Beta Radioactivity in Air Around VYNPS

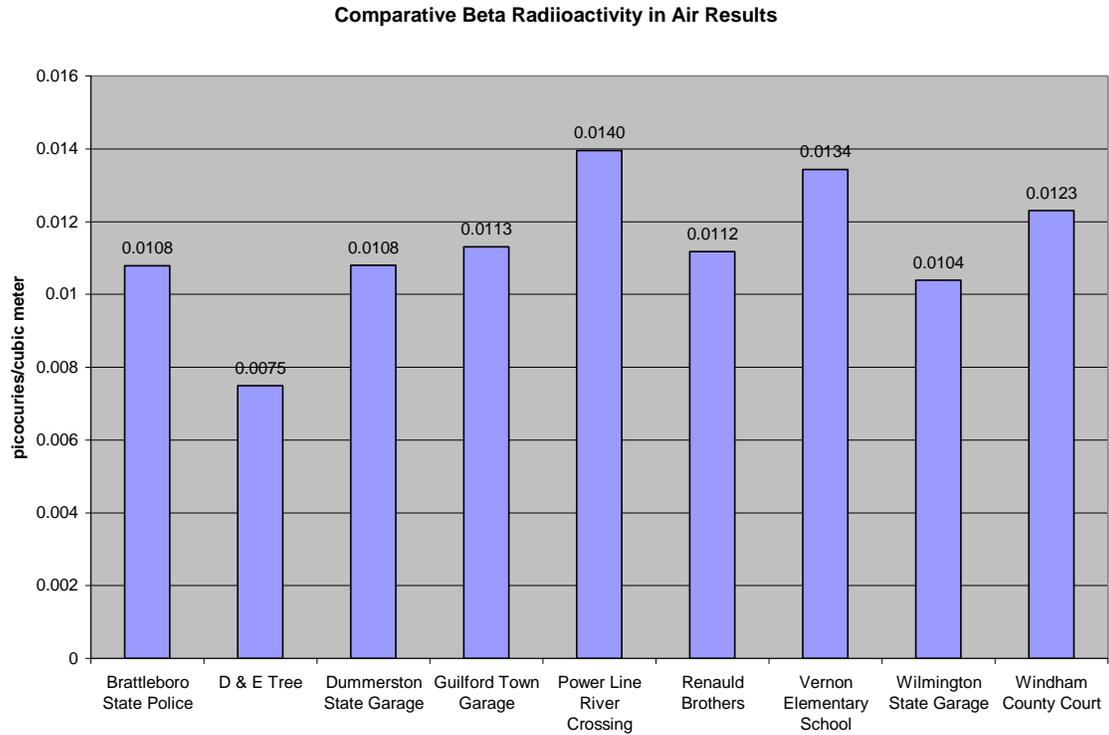


Table 9. 2008 Air Sample Radioactive Iodine-131 Results

Sample Date	Sample Location	Map ID No.	Results pCi/m³
1/31/2008	Brattleboro State Police	73	< LOD
1/31/2008	D & E Tree	74	< LOD
1/31/2008	Dummerston State Garage	75	< LOD
1/31/2008	Guilford Town Garage	76	< LOD
1/31/2008	Power Line River Crossing	77	< LOD
1/31/2008	Renauld Brothers	78	< LOD
1/31/2008	Vernon Elementary School	79	< LOD
1/31/2008	Wilmington State Garage	80	< LOD
1/31/2008	Windham County Court	81	< LOD
2/25/2008	Brattleboro State Police	73	< LOD
2/25/2008	D & E Tree	74	< LOD
2/25/2008	Dummerston State Garage	75	< LOD
2/25/2008	Guilford Town Garage	76	< LOD
2/25/2008	Power Line River Crossing	77	< LOD
2/25/2008	Renauld Brothers	78	< LOD
2/25/2008	Vernon Elementary School	79	< LOD
2/25/2008	Wilmington State Garage	80	< LOD
2/25/2008	Windham County Court	81	< LOD
3/27/2008	Brattleboro State Police	73	< LOD
3/27/2008	D & E Tree	74	< LOD
3/27/2008	Dummerston State Garage	75	< LOD
3/27/2008	Guilford Town Garage	76	< LOD
3/27/2008	Power Line River Crossing	77	< LOD
3/27/2008	Renauld Brothers	78	< LOD
3/27/2008	Vernon Elementary School	79	< LOD
3/27/2008	Wilmington State Garage	80	< LOD
3/27/2008	Windham County Court	81	< LOD
4/29/2008	Brattleboro State Police	73	< LOD
4/29/2008	D & E Tree	74	< LOD
4/29/2008	Dummerston State Garage	75	< LOD
4/29/2008	Guilford Town Garage	76	< LOD
4/29/2008	Power Line River Crossing	77	< LOD
4/29/2008	Renauld Brothers	78	< LOD
4/29/2008	Vernon Elementary School	79	< LOD
4/29/2008	Wilmington State Garage	80	< LOD
4/29/2008	Windham County Court	81	< LOD

LOD = Limit of Detection

Table 9. 2008 Air Sample Radioactive Iodine-131 Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/m³
6/4/2008	Brattleboro State Police	73	< LOD
5/29/2008	D & E Tree	74	< LOD
5/29/2008	Dummerston State Garage	75	< LOD
5/29/2008	Guilford Town Garage	76	< LOD
5/29/2008	Power Line River Crossing	77	< LOD
5/29/2008	Renauld Brothers	78	< LOD
5/29/2008	Vernon Elementary School	79	< LOD
6/4/2008	Wilmington State Garage	80	< LOD
5/29/2008	Windham County Court	81	< LOD
6/30/2008	Brattleboro State Police	73	< LOD
6/30/2008	D & E Tree	74	< LOD
6/30/2008	Dummerston State Garage	75	< LOD
6/30/2008	Guilford Town Garage	76	< LOD
6/30/2008	Power Line River Crossing	77	< LOD
6/30/2008	Renauld Brothers	78	< LOD
6/30/2008	Vernon Elementary School	79	< LOD
6/30/2008	Wilmington State Garage	80	< LOD
6/30/2008	Windham County Court	81	< LOD
7/28/2008	Brattleboro State Police	73	< LOD
7/28/2008	D & E Tree	74	< LOD
7/28/2008	Dummerston State Garage	75	< LOD
7/28/2008	Guilford Town Garage	76	< LOD
7/28/2008	Power Line River Crossing	77	< LOD
7/28/2008	Renauld Brothers	78	< LOD
7/28/2008	Vernon Elementary School	79	< LOD
7/28/2008	Wilmington State Garage	80	< LOD
7/28/2008	Windham County Court	81	< LOD
8/21/2008	Brattleboro State Police	73	< LOD
8/21/2008	D & E Tree	74	< LOD
8/21/2008	Dummerston State Garage	75	< LOD
8/21/2008	Guilford Town Garage	76	< LOD
8/21/2008	Power Line River Crossing	77	< LOD
8/21/2008	Renauld Brothers	78	< LOD
8/21/2008	Vernon Elementary School	79	< LOD
8/21/2008	Wilmington State Garage	80	< LOD
8/21/2008	Windham County Court	81	< LOD

LOD = Limit of Detection

Table 9. 2008 Air Sample Radioactive Iodine-131 Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/m ³
9/29/2008	Brattleboro State Police	73	< LOD
9/29/2008	D & E Tree	74	< LOD
9/29/2008	Dummerston State Garage	75	< LOD
9/29/2008	Guilford Town Garage	76	< LOD
9/29/2008	Power Line River Crossing	77	< LOD
9/29/2008	Renauld Brothers	78	< LOD
9/29/2008	Vernon Elementary School	79	< LOD
9/29/2008	Wilmington State Garage	80	< LOD
9/29/2008	Windham County Court	81	< LOD
10/23/2008	Brattleboro State Police	73	< LOD
10/23/2008	D & E Tree	74	< LOD
10/23/2008	Dummerston State Garage	75	< LOD
10/23/2008	Guilford Town Garage	76	< LOD
10/23/2008	Power Line River Crossing	77	< LOD
10/23/2008	Renauld Brothers	78	< LOD
10/23/2008	Vernon Elementary School	79	< LOD
10/23/2008	Wilmington State Garage	80	< LOD
10/23/2008	Windham County Court	81	< LOD
12/1/2008	Brattleboro State Police	73	< LOD
12/1/2008	D & E Tree	74	< LOD
12/1/2008	Dummerston State Garage	75	< LOD
12/1/2008	Guilford Town Garage	76	< LOD
12/1/2008	Power Line River Crossing	77	< LOD
12/1/2008	Renauld Brothers	78	< LOD
12/1/2008	Vernon Elementary School	79	< LOD
12/1/2008	Wilmington State Garage	80	< LOD
12/1/2008	Windham County Court	81	< LOD
12/23/2008	Brattleboro State Police	73	< LOD
12/23/2008	D & E Tree	74	< LOD
12/23/2008	Dummerston State Garage	75	< LOD
12/23/2008	Guilford Town Garage	76	< LOD
12/23/2008	Power Line River Crossing	77	< LOD
12/23/2008	Renauld Brothers	78	< LOD
12/23/2008	Vernon Elementary School	79	< LOD
12/23/2008	Wilmington State Garage	80	< LOD
12/23/2008	Windham County Court	81	< LOD

LOD = Limit of Detection

Table 10. 2008 Air Sample Gamma Radioactivity Results

Sample Date	Sample Location	Map ID No.	Results pCi/m³
1/31/2008	Brattleboro State Police	73	Natural
1/31/2008	D & E Tree	74	Natural
1/31/2008	Dummerston State Garage	75	Natural
1/31/2008	Guilford Town Garage	76	Natural
1/31/2008	Power Line River Crossing	77	Natural
1/31/2008	Renauld Brothers	78	Natural
1/31/2008	Vernon Elementary School	79	Natural
1/31/2008	Wilmington State Garage	80	Natural
1/31/2008	Windham County Court	81	Natural
2/25/2008	Brattleboro State Police	73	Natural
2/25/2008	D & E Tree	74	Natural
2/25/2008	Dummerston State Garage	75	Natural
2/25/2008	Guilford Town Garage	76	Natural
2/25/2008	Power Line River Crossing	77	Natural
2/25/2008	Renauld Brothers	78	Natural
2/25/2008	Vernon Elementary School	79	Natural
2/25/2008	Wilmington State Garage	80	Natural
2/25/2008	Windham County Court	81	Natural
3/27/2008	Brattleboro State Police	73	Natural
3/27/2008	D & E Tree	74	Natural
3/27/2008	Dummerston State Garage	75	Natural
3/27/2008	Guilford Town Garage	76	Natural
3/27/2008	Power Line River Crossing	77	Natural
3/27/2008	Renauld Brothers	78	Natural
3/27/2008	Vernon Elementary School	79	Natural
3/27/2008	Wilmington State Garage	80	Natural
3/27/2008	Windham County Court	81	Natural
4/29/2008	Brattleboro State Police	73	Natural
4/29/2008	D & E Tree	74	Natural
4/29/2008	Dummerston State Garage	75	Natural
4/29/2008	Guilford Town Garage	76	Natural
4/29/2008	Power Line River Crossing	77	Natural
4/29/2008	Renauld Brothers	78	Natural
4/29/2008	Vernon Elementary School	79	Natural
4/29/2008	Wilmington State Garage	80	Natural
4/29/2008	Windham County Court	81	Natural

Table 10. 2008 Air Sample Gamma Radioactivity Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/m ³
6/4/2008	Brattleboro State Police	73	Natural
5/29/2008	D & E Tree	74	Natural
5/29/2008	Dummerston State Garage	75	Natural
5/29/2008	Guilford Town Garage	76	Natural
5/29/2008	Power Line River Crossing	77	Natural
5/29/2008	Renauld Brothers	78	Natural
5/29/2008	Vernon Elementary School	79	Natural
6/4/2008	Wilmington State Garage	80	Natural
5/29/2008	Windham County Court	81	Natural
6/30/2008	Brattleboro State Police	73	Natural
6/30/2008	D & E Tree	74	Natural
6/30/2008	Dummerston State Garage	75	Natural
6/30/2008	Guilford Town Garage	76	Natural
6/30/2008	Power Line River Crossing	77	Natural
6/30/2008	Renauld Brothers	78	Natural
6/30/2008	Vernon Elementary School	79	Natural
6/30/2008	Wilmington State Garage	80	Natural
6/30/2008	Windham County Court	81	Natural
7/28/2008	Brattleboro State Police	73	Natural
7/28/2008	D & E Tree	74	Natural
7/28/2008	Dummerston State Garage	75	Natural
7/28/2008	Guilford Town Garage	76	Natural
7/28/2008	Power Line River Crossing	77	Natural
7/28/2008	Renauld Brothers	78	Natural
7/28/2008	Vernon Elementary School	79	Natural
7/28/2008	Wilmington State Garage	80	Natural
7/28/2008	Windham County Court	81	Natural
8/21/2008	Brattleboro State Police	73	Natural
8/21/2008	D & E Tree	74	Natural
8/21/2008	Dummerston State Garage	75	Natural
8/21/2008	Guilford Town Garage	76	Natural
8/21/2008	Power Line River Crossing	77	Natural
8/21/2008	Renauld Brothers	78	Natural
8/21/2008	Vernon Elementary School	79	Natural
8/21/2008	Wilmington State Garage	80	Natural
8/21/2008	Windham County Court	81	Natural

Table 10. 2008 Air Sample Gamma Radioactivity Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/m³
9/29/2008	Brattleboro State Police	73	Natural
9/29/2008	D & E Tree	74	Natural
9/29/2009	Dummerston State Garage	75	Natural
9/29/2008	Guilford Town Garage	76	Natural
9/29/2008	Power Line River Crossing	77	Natural
9/29/2008	Renauld Brothers	78	Natural
9/29/2008	Vernon Elementary School	79	Natural
9/29/2008	Wilmington State Garage	80	Natural
9/29/2008	Windham County Court	81	Natural
10/23/2008	Brattleboro State Police	73	Natural
10/23/2008	D & E Tree	74	Natural
10/23/2008	Dummerston State Garage	75	Natural
10/23/2008	Guilford Town Garage	76	Natural
10/23/2008	Power Line River Crossing	77	Natural
10/23/2008	Renauld Brothers	78	Natural
10/23/2008	Vernon Elementary School	79	Natural
10/23/2008	Wilmington State Garage	80	Natural
10/23/2008	Windham County Court	81	Natural
12/1/2008	Brattleboro State Police	73	Natural
12/1/2008	D & E Tree	74	Natural
12/1/2008	Dummerston State Garage	75	Natural
12/1/2008	Guilford Town Garage	76	Natural
12/1/2008	Power Line River Crossing	77	Natural
12/1/2008	Renauld Brothers	78	Natural
12/1/2008	Vernon Elementary School	79	Natural
12/1/2008	Wilmington State Garage	80	Natural
12/1/2008	Windham County Court	81	Natural
12/23/2008	Brattleboro State Police	73	Natural
12/23/2008	D & E Tree	74	Natural
12/23/2008	Dummerston State Garage	75	Natural
12/23/2008	Guilford Town Garage	76	Natural
12/23/2008	Power Line River Crossing	77	Natural
12/23/2008	Renauld Brothers	78	Natural
12/23/2008	Vernon Elementary School	79	Natural
12/23/2008	Wilmington State Garage	80	Natural
12/23/2008	Windham County Court	81	Natural

Table 11. 2008 Air Sample Quarterly Composite Results

Sample Date	Sample Location	Results pCi	Error pCi	Sample Comment
4/15/2008	All 9 Vermont Yankee Filters for Quarter 1	5730	460	Be-7
7/18/2008	All 9 Vermont Yankee Filters for Quarter 2	6140	540	Be-7
11/13/2008	All 9 Vermont Yankee Filters for Quarter 3	6490	510	Be-7
1/13/2009	All 9 Vermont Yankee Filters for Quarter 4	5830	290	Be-7

Table 12. Common Natural Gamma Radiation Emitters

Actinium-228		Beryllium-7
Bismuth-212	Bismuth-214	Lead-210
Lead-212	Lead-214	Polonium-210
Potassium-40	Protactinium-234m	Radium-224
Radium-226	Radium-228	Radon-222
Technetium-99	Thallium-208	Thorium-228
Thorium-229	Thorium-230	Thorium-231
Thorium-232	Thorium-234	Uranium-233
Uranium-234	Uranium-235	Uranium-238

Table 13. Nuclear Facility Gamma Radiation Emitters

Antimony-124	Antimony-126	
Barium-140/Lanthanum-140	Cerium-139	Cerium-140
Cerium-144/promethium-144	Cobalt-56	Cobalt-60
Chromium-51	Cesium-134	Cesium-136
Cesium-137	Iodine-131	Iodine-132
Iodine-133	Iodine-135	Krypton-85
Krypton-88	Manganese-54	Plutonium-239
Plutonium-240	Ruthenium-103	Ruthenium-106
Strontium-85	Strontium-89	Strontium-90
Tellurium-132	Xenon-133	Xenon-133m
Xenon-135	Zinc-65	Zirconium-95/Niobium-95

Water Sampling Results

Water is sampled each month at 10 locations. Six are sample locations in the Connecticut River. Of these six Connecticut River locations, two samples are taken monthly in the pool where the plant discharges cooling water, two are taken monthly downstream of the station in the pool just below the Vernon dam, and two are taken from the river upstream of the station in Brattleboro. The remaining four sample locations include one representing the Brattleboro municipal water supply, and one each from groundwater wells that serve the Miller and Blodgett Farms in Vernon and the Vernon Elementary School. Results are in Tables 14 - 17. As with last year, we have included samples from elsewhere in Vermont for comparison purposes.

Each of the water samples undergoes four different analyses. The first three analyses are like those for the air samples: analysis for alpha radioactivity, analysis for beta radioactivity, and analysis for radionuclides by gamma spectroscopy. The fourth analysis is unique to water samples. It is an analysis for tritium, the common name for the radioisotope hydrogen-3. Some of the water samples were also analyzed specifically for uranium and radium. New for this year, we have included gamma and tritium analyses of groundwater samples from Vermont Yankee's onsite wells.

The concerns about alpha, beta and gamma radiation were discussed earlier. Tritium is a source of very weak beta radiation. Tritium is created when water passes through the reactor core. The reactor coolant water at Vermont Yankee, as is the case at all nuclear power stations, becomes tritiated as the hydrogen atoms in water molecules are activated by neutron radiation in the reactor core. Tritiated water may leave the plant site any way non-radioactive water leaves the plant - in the air, in groundwater and through discharges into surface waters like the Connecticut River. Unmonitored tritium releases from nuclear facilities have always been a source of concern. Tritium monitoring by the Vermont Department of Health may help identify releases if they develop.

A map showing the routine water sample locations around the Vermont Yankee site, Map 9, is below. Tables 14, 15, 16 and 17 present the water sample results. The tables list the map identification numbers so the locations can be seen on Map 9. Sample locations 84A and 86 are in the Connecticut River downstream. These are labeled in Tables 14 to 17 as Connecticut River, Station 3-3 and Connecticut River Downstream. Sample locations 84B and 84D are in the basin where Vermont Yankee Nuclear Power Station discharges water from the plant into the Connecticut River. The tables identify them as Connecticut River, Station 3-4 and Discharge Forebay. Samples 84C and 87 are in the Connecticut River upstream of the plant. They are identified as Connecticut River, Station 3-8 and Connecticut River Upstream in Tables 14, 15, 16 and 17.

In addition to showing the individual analysis results over the course of 2008, we have taken the mean results of each of the samples at the 10 water sample locations, and plotted them in graphs. Figures 3 and 4 allow comparisons of the mean alpha and mean beta radioactivity results for the 10 locations. These figures also depict the analytical results for three other sites in Vermont. The Vermont Department of Health is collecting samples and analyzing them throughout Vermont as part of our emergency preparedness program, and including the analytical results in our annual Vermont Yankee environmental surveillance report. We hope these sample measurements will help us better understand the specific results around Vermont Yankee, as well as the general nature of radioactivity in Vermont as a whole. These sites are depicted in Maps 10 and 11.

As with the samples from 2007, the Department of Health analyzed ground water samples from the Miller Farm, Blodgett Farm and Vernon Elementary School for radium and uranium. This was done to help identify the source of some of the elevated alpha and beta radioactivity found in ground water samples over the years. We believed that the elevated alpha and beta radioactivity measurements in ground water samples as compared to Brattleboro municipal water was due to radium, uranium and other natural radioactive materials being filtered from the water at the Brattleboro water treatment facility. We also

believed the ground water samples had higher alpha and beta radioactivity as compared to surface water samples because of contact with naturally occurring radioactive materials. Precursors of radon - uranium, radium and thorium, the radon gas itself and the particulate radon decay products are often found in groundwater but not surface water.

Alpha Radioactivity Analyses

The alpha radioactivity measured in all samples is within the historical range for alpha radioactivity. In particular, alpha radioactivity measurements around Vermont Yankee over the past 37 years of operations and environmental surveillance have ranged from below the limit of detection for alpha radioactivity up to 15 picocuries per liter (pCi). The 2008 results for all samples ranged from -1.64 to 7.28 pCi/l and are shown in Table 14. The mean results, shown in Figure 3, indicate the Blodgett Farm and the Vernon Elementary School have the highest natural alpha emitters in their water.

The mean Connecticut River upstream sample results of 0.113 to 0.18 picocuries per liter (pCi/l) may be useful as a sort of background relative to water samples taken in the Connecticut River near the Vermont Yankee Nuclear Power Station discharge area and downstream in the Connecticut River. The upstream samples are taken near Brattleboro. The samples more likely to be affected by Vermont Yankee Nuclear Power Station operations, near the discharge and downstream of the plant discharge have mean sample results in the range of -0.07 to 0.029 pCi/l and -0.185 to 0.387 pCi/l, respectively. Considering the results with their uncertainty at the 95 percent confidence level, there is no statistical difference between water samples in the discharge basin and downstream of Vermont Yankee Nuclear Power Station as compared to water samples upstream of Vermont Yankee. The Brattleboro municipal water supply mean results of -0.154 pCi/l are also not significantly different from samples obtained from the Connecticut River upstream of the nuclear power station.

While there are elevated measurements of alpha radioactivity at the Blodgett Farm and at the Vernon elementary School, the same results were not found at the Miller Farm. Given

the Miller Farm samples do show elevated beta radioactivity (see below) and traces of uranium and radium, it is thought that the Miller Farm geology consists of more natural beta radiation emitting radioactive materials and less natural alpha emitting radioactive materials as compared to the Blodgett Farm and Vernon Elementary School. This characteristic is not unique to the Miller Farm, as indicated in Figures 3 and 4. These graphs show similarly low alpha radioactivity measurements and elevated beta radioactivity measurements at Allis State Park in Randolph, Vermont and the Vermont State Police barracks in Royalton, Vermont.

Beta Radioactivity Analysis

The beta radioactivity analysis results are found in Table 15. The results were all well within the historical range of less than the calculated limit of detection and 15 picocuries per liter. Specifically, the measurements in Table 15 range from -2.87 to 7.88 picocuries per liter. Taking the mean results for each of the sample sites and plotting them gives us the graph in Figure 4. In this graph, some of the characteristic results observed in the alpha radioactivity analyses are also seen with beta radioactivity. Specifically, the river water samples contain significantly less radioactivity as compared to the groundwater samples. Also like the alpha radioactivity sample results, the samples from the Connecticut River near the Vermont Yankee Nuclear Power Station discharge area and downstream of the plant, ranging from 0.87 to 1.12 pCi/l and from 0.97 to 1.44 pCi/l, respectively, are not significantly different from the samples from the Connecticut River upstream of the station where the sample means ranged between 0.99 and 1.27 pCi/l. Another similarity is seen in the Brattleboro municipal water sample: the mean beta radioactivity measured over the year is not significantly different from other mean beta radioactivity measurements, including in the Connecticut River upstream of Vermont Yankee.

One difference between the alpha and beta radioactivity measurements is what is seen in the groundwater measurements. While the Blodgett Farm and the Vernon Elementary School alpha radioactivity samples were significantly higher than the Miller Farm alpha

radioactivity results, the beta radioactivity measurements for the three sites fed by well water are not significantly different. As mentioned above, the elevated beta radioactivity at Miller Farm is not coincident with elevated alpha radioactivity, and this characteristic is shared with the samples taken from bodies of surface water near Randolph, Vermont and from ground water from Royalton, Vermont. These features are thought to be due to the different geological attributes at each of the sites causing the expression of certain natural radioactive materials and not others.

Analysis of Natural Radioactivity in Water

There is a relatively small number of naturally occurring radioactive materials. They are found in the soil and sediments that cover the Earth and they are always found in minute quantities in the air and waters that flow around, over and through the Earth. A list of some of these naturally occurring radioactive materials is found in Table 12 above. The natural isotopes uranium-235, uranium-238 and thorium-232 are very important because as they undergo radioactive decay to shed the excess energy in their nuclei, these three isotopes generate many other prominent radioactive materials including radium 226, radium 228 and radon-222. Each of these decays to create other radioactive materials. Most of them emit beta and gamma radiation, and most of the heaviest isotopes, those heavier than lead, emit alpha radiation. The Vermont Department of Health Laboratory can analyze water samples for radium-226, radium-228 and total uranium to assess the relative risk to members of the public from these radioisotopes and their precursor and daughter decay products.

In Figures 5, 6 and 7, the mean of radium and uranium measurements for the Miller and Blodgett Farms and for the Vernon Elementary School are presented. While the bars in the charts seem to indicate a lot of natural radioactivity, note that the values in picocuries per liter and milligrams per liter are quite small. To put them into context, the United States Environmental Protection Agency and the State of Vermont have limits on these three radioactive contaminants to help manage risk. Radium-226 and radium-228 radioactivity are limited to 5 picocuries per liter (pCi/l), while total uranium is limited to

20 micrograms per liter ($\mu\text{g/l}$). None of the sample natural radioactivity measurements from the Blodgett Farm, the Miller Farm or the Vernon Elementary School are near these limits. The mean radium-226 results shown in Figure 5 range from 0.15 to 0.95 pCi/l; the mean radium-228 results shown in Figure 6 range from 0.12 to 0.63 pCi/l; and the mean uranium results shown in Figure 7 range from 0.0 to 0.006 mg/l.

Gamma Spectroscopy

Gamma spectroscopy is a technique that allows for the identification and quantification of radioactive material that emits gamma radiation. Most of the water samples, 85 of them, were found to be less than the calculated limit of detection. Gamma radiation-emitting radioactive materials were identified in the remaining 32 samples, but all were naturally occurring radioactive materials. The gamma spectroscopy results for the water samples are found in Table 16. The calculated limits of detection for water samples are listed in Table 19 below. The commonly identified natural radioactive materials that emit gamma radiation may be found listed in Table 12 above.

Tritium Measurement Results

From January through March 2008, no tritium radioactivity above the laboratory instrumentation limit of detection of approximately 500 pCi/l was identified in any of the offsite groundwater, surface water or municipal water samples obtained by the Vermont Department of Health. Starting in April and throughout the rest of the year, the Vermont Department of Health Laboratory reported results numerically (as calculated) and levels are well below this previous limit of detection. The results of these changes are reported in Table 17, showing tritium concentrations less than 500 pCi/l. with their associated error at the 95 percent confidence level.

While 85 of the 90 tritium measurements of offsite water samples made from April through December 2008 were not statistically significant at the 95 percent confidence level, i.e. not indicative of tritium, five samples did indicate the presence of tritium. Two of the five samples were from the same source for two consecutive months and the

remaining three samples were from different sources for a single month each. The tritium levels detected were extremely low. In particular, even the highest positive result of 156 pCi/l would indicate a dose of less than 0.0004 percent of the Vermont limit on doses from all liquid discharges of five millirem per year. Subsequent monthly tests from the source with the highest result in one month were not indicative of tritium.

Also, the presence of tritium in a sample does not mean the tritium is from Vermont Yankee or any other human-made source. Tritium is found in the natural environment due to cosmic radiation interactions with water. This fact is seen where one of the five samples that tested positive for tritium came from Royalton, Vermont far from Vermont Yankee and another positive sample was taken from the Connecticut River upstream of the station. In addition, each of the samples that tested positive for tritium was preceded by a negative sample the month before or a negative sample the month after. It is important to note as well that the groundwater samples from wells actually on the Vermont Yankee Nuclear Power Station site did not test positive for tritium (see below).

This is the first year tritium levels have been detected, due to the instrument improvements at the Public Health Laboratory. There is little to no dose consequence indicated by these samples, nor any evidence that the positive test results are not simply natural tritium. The Department of Health will continue to obtain on-site and off-site samples of water and analyze the results carefully for tritium to determine whether there has been any kind of release from Vermont Yankee Nuclear Power Station. All of the tritium analysis results are presented in Table 17.

On-site Groundwater Well Sample Results

New this year is analysis of seven groundwater wells that are located on the Vermont Yankee Nuclear Power Station site itself. Although groundwater analysis has been conducted for years to ascertain whether drinking water has been contaminated by plant operations, obtaining and analyzing groundwater from wells on-site gets our assessment closer to the source. This is assumed to be an improved posture for assessing impacts on the public and natural environment.

Seven wells within the Vermont Yankee property were sampled by the Vermont Department of Health and the samples were analyzed by the Vermont Department of Health Laboratory. As with the off-site groundwater samples, there was no radioactivity solely attributable to Vermont Yankee operations detected in the samples. The specific results are that the only gamma radiation emitting radionuclides that were detected were of natural origin, and no tritium was detected outside the limits of uncertainty at the 95 percent confidence level. Table 18 lists these results.

Figure 3

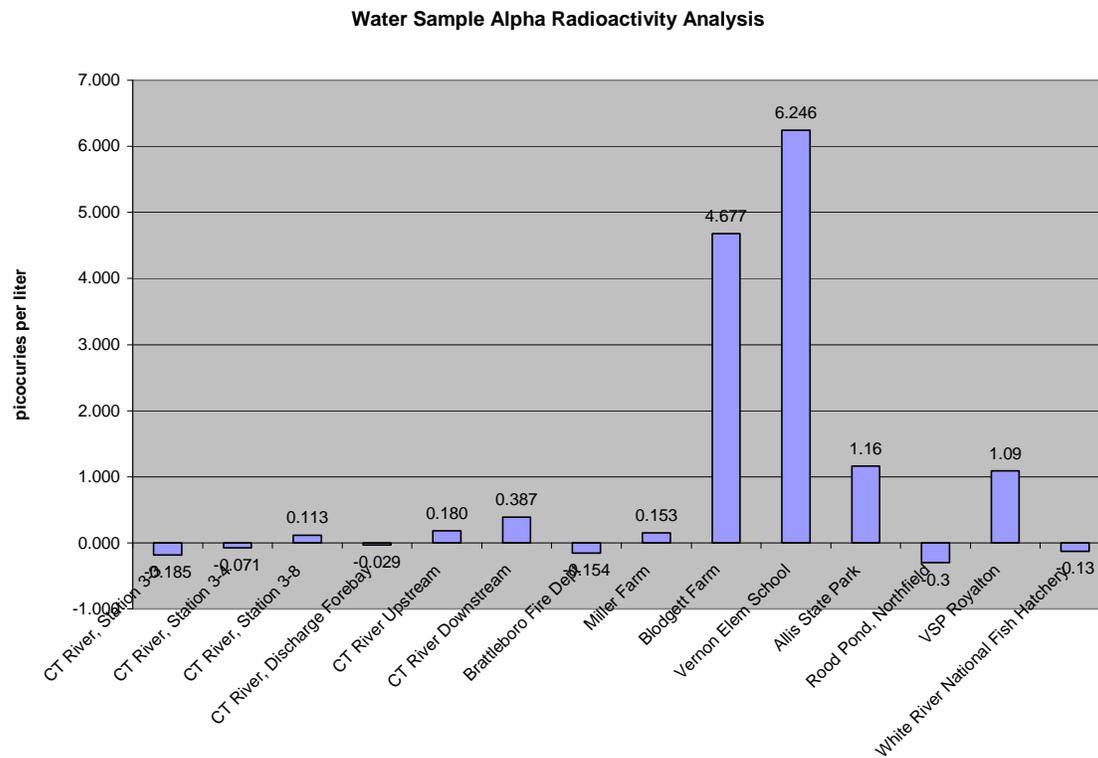


Figure 4

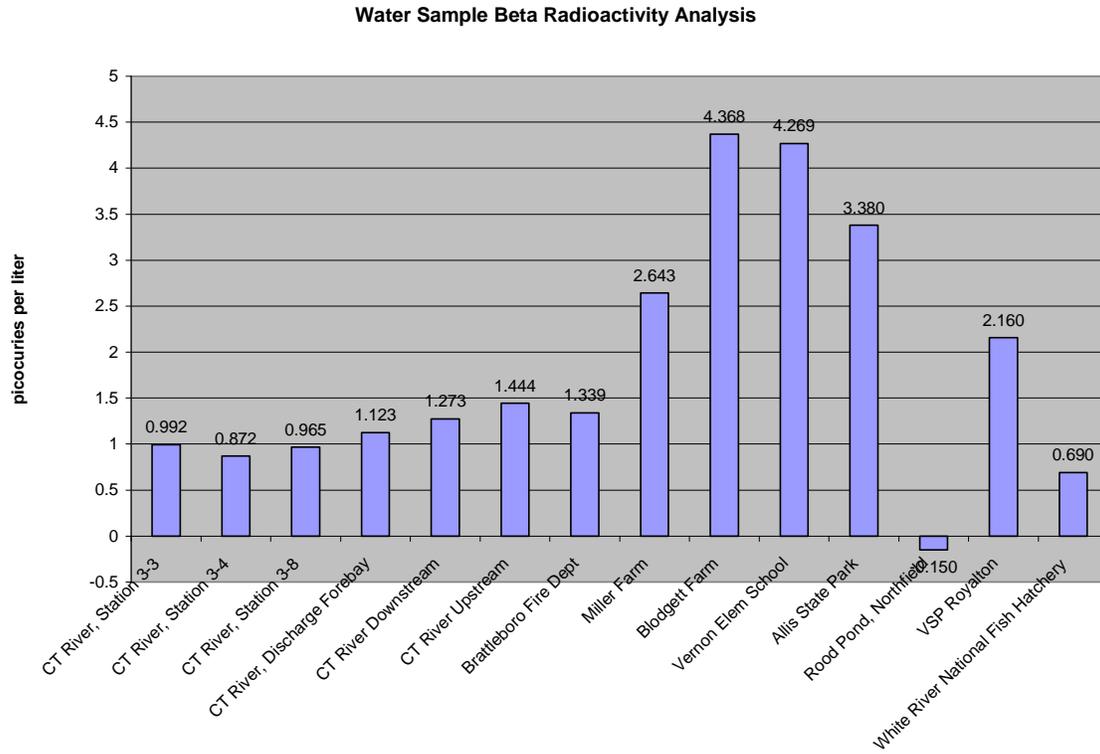


Figure 5

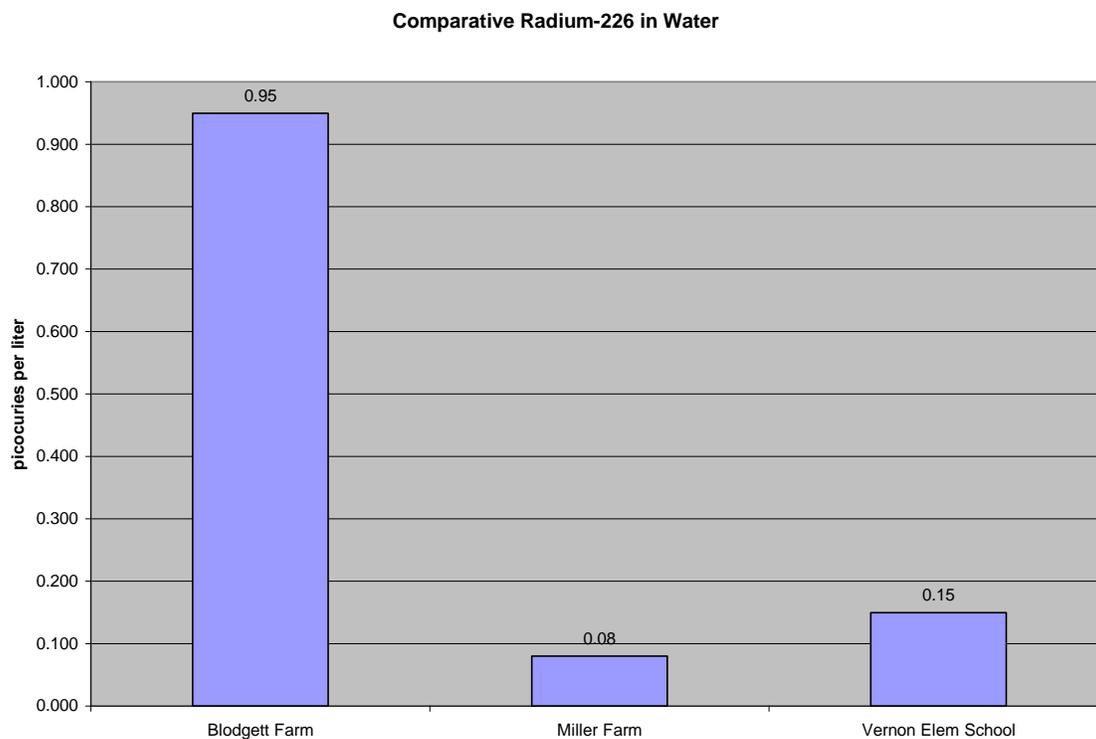


Figure 6

Comparative Radium-228 in Water

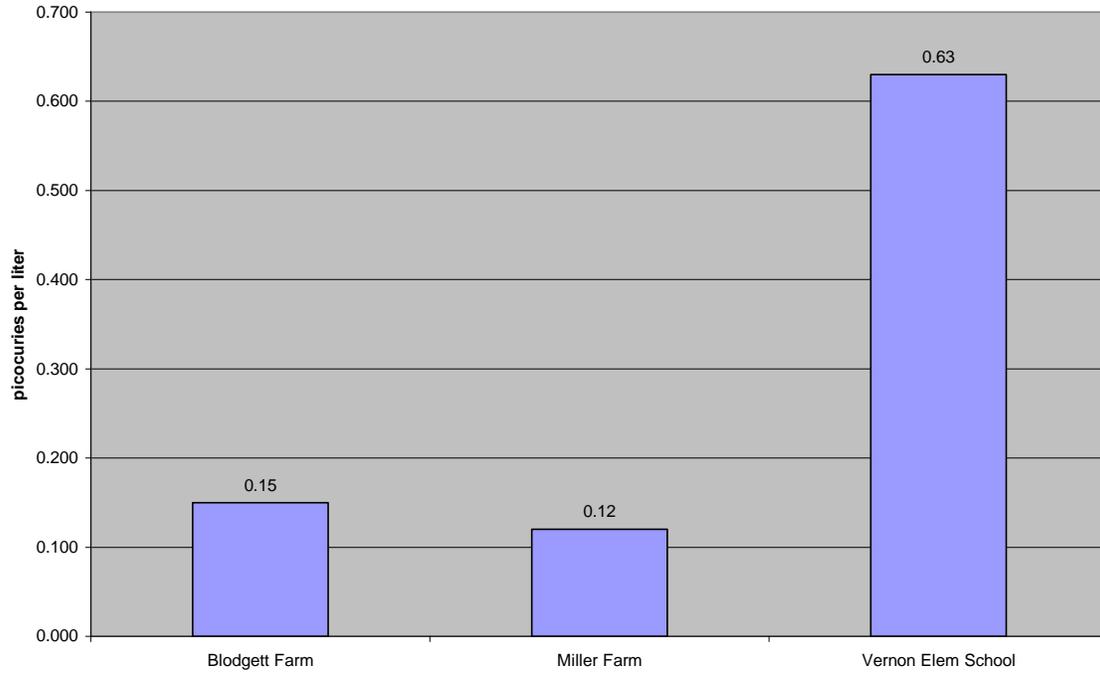
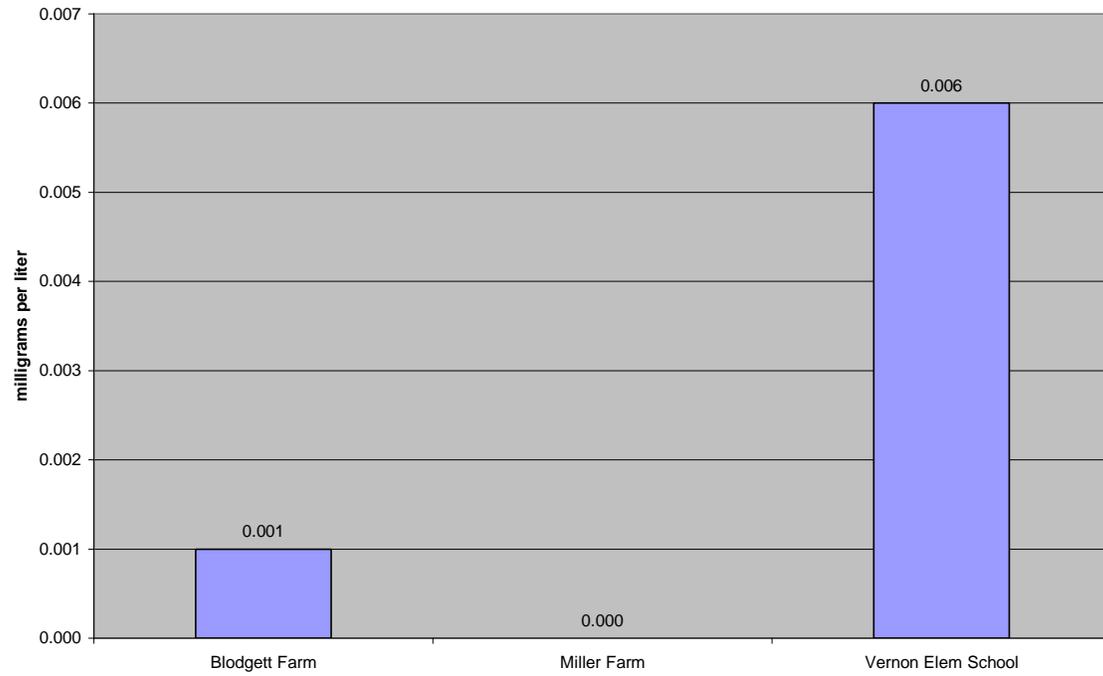
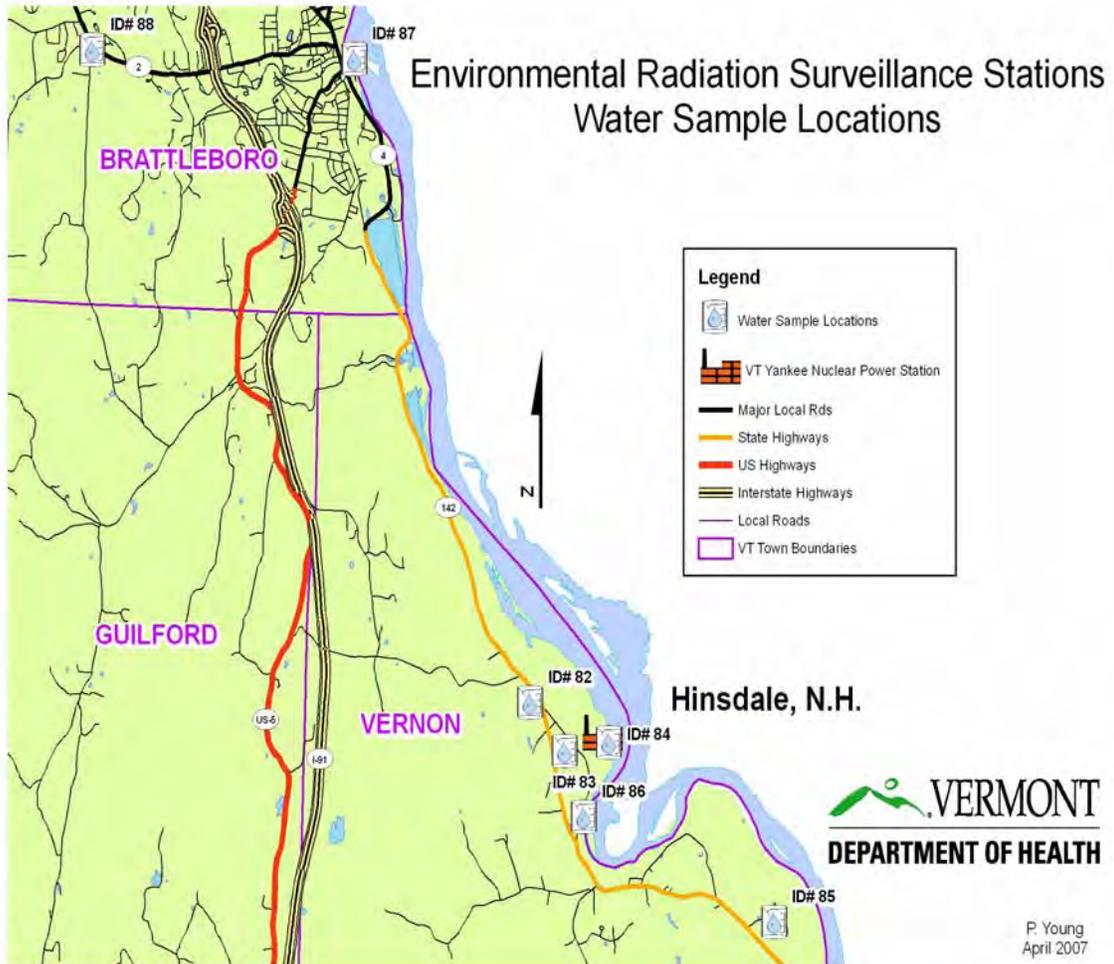


Figure 7

Comparative Uranium in Water

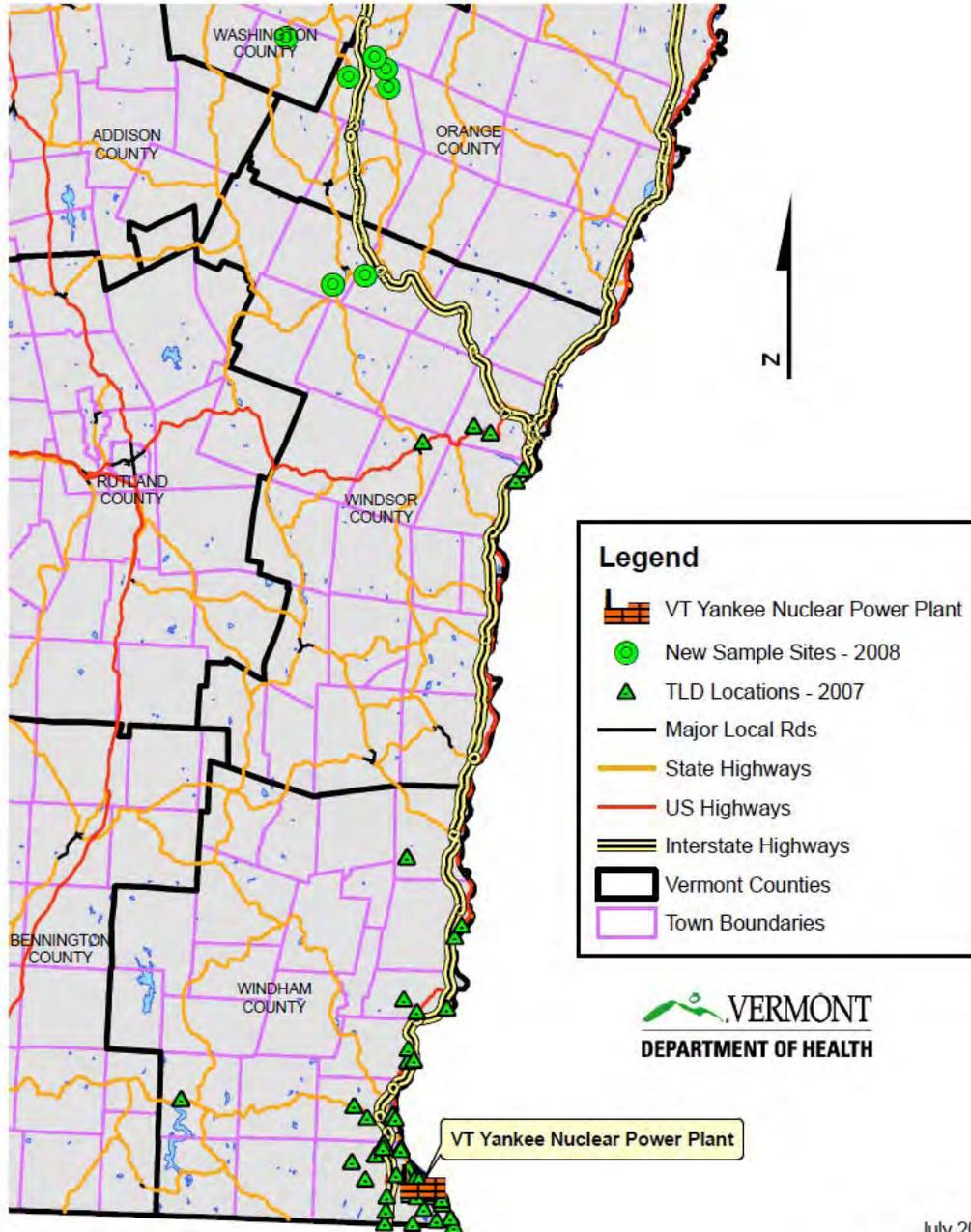


Map 9



Map 10, Special Sampling Locations for 2008, Central Vermont

Environmental Radiation Surveillance Report
New 2008 Sample Locations



July 2009
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Table 14. 2008 Water Sample Alpha Radioactivity Results

Sample Date	Sample Location	Map ID No.	Results pCi/l	Error pCi/l	Analysis Method
1/15/2008	3-3	84A	0.29	0.76	EPA 900
1/15/2008	3-4	84B	0.15	0.77	EPA 900
1/15/2008	3-8	84C	0.15	0.76	EPA 900
1/15/2008	Discharge Forebay	84D	-0.29	0.73	EPA 900
1/31/2008	Blodgett Farm	85	3.64	1	EERF 00-02
1/31/2008	Brattleboro Fire Dept	88	-0.15	0.75	EPA 900
1/31/2008	Conn River Downstream	86	1.04	1.41	EPA 900
1/31/2008	Conn River Upstream	87	0.27	1.4	EPA 900
1/31/2008	Miller Farm	82	0.28	0.73	EERF 00-02
1/31/2008	Vernon Elem School	83	7.28	1.23	EERF 00-02
2/14/2008	3-3		-1.08	1.43	EPA 900
2/14/2008	3-4		-0.27	1.48	EPA 900
2/14/2008	3-8		-0.06	0.32	EPA 900
2/14/2008	Discharge Forebay		-1.64	1.41	EPA 900
2/25/2008	Blodgett Farm		5.27	1.1	EERF 00-02
2/25/2008	Brattleboro Fire Dept		-0.61	0.8	EPA 900
2/25/2008	Miller Farm		0.34	0.73	EERF 00-02
3/13/2008	3-3	84A	0.3	0.86	EPA 900
3/13/2008	3-4	84B	-0.6	0.79	EPA 900
3/13/2008	3-8	84C	0.91	0.9	EPA 900
3/13/2008	Discharge Forebay	84D	1.37	0.92	EPA 900
3/27/2008	Blodgett Farm	85	3.43	0.97	EERF 00-02
3/27/2008	Brattleboro Fire Dept	88	1.09	1.41	EPA 900
3/27/2008	Conn River Downstream	86	0.26	1.31	EPA 900
3/27/2008	Conn River Upstream	87	0.27	1.35	EPA 900
3/27/2008	Miller Farm	82	0.48	0.73	EERF 00-02
3/27/2008	Vernon Elem School	83	6.66	1.18	EERF 00-02
4/17/2008	3-3	84A	0.87	1	EPA 900
4/17/2008	3-4	84B	1.85	1.08	EPA 900
4/17/2008	3-8	84C	1.3	1.41	EPA 900
4/17/2008	Discharge Forebay	84D	1.86	1.09	EPA 900
4/29/2008	Blodgett Farm	85	4.96	1.12	EERF 00-02
4/29/2008	Brattleboro Fire Dept	88	0.46	1.01	EPA 900
4/29/2008	Conn River Downstream	86	1.62	0.84	EPA 900
4/29/2008	Conn River Upstream	87	1.26	0.79	EPA 900
4/29/2008	Miller Farm	82	-0.2	0.75	EERF 00-02
4/29/2008	Vernon Elem School	83	4.76	1.11	EERF 00-02
1/15/2008	3-3	84A	0.29	0.76	EPA 900
1/15/2008	3-4	84B	0.15	0.77	EPA 900
1/15/2008	3-8	84C	0.15	0.76	EPA 900

Table 14. 2008 Water Sample Alpha Radioactivity Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/l	Error pCi/l	Analysis Method
5/14/2008	3-3	84A	-1.1	1.35	EPA 900
5/14/2008	3-4	84B	0	1.51	EPA 900
5/14/2008	3-8	84C	-0.54	1.37	EPA 900
5/14/2008	Discharge Forebay	84D	0.28	1.45	EPA 900
5/29/2008	Blodgett Farm	85	3.72	0.96	EERF 00-02
5/29/2008	Conn River Downstream	88	0	1.58	EPA 900
5/29/2008	Conn River Upstream	86	-0.31	1.57	EPA 900
5/29/2008	Miller Farm	87	0.39	0.67	EERF 00-02
5/29/2008	Vernon Elem School	82	6.92	1.17	EERF 00-02
6/4/2008	Brattleboro Fire Dept	83	-0.45	0.75	EPA 900
6/13/2008	3-3	84A	0.83	1.48	EPA 900
6/13/2008	3-4	84B	-1.08	1.32	EPA 900
6/13/2008	3-8	84C	0	1.34	EPA 900
6/13/2008	Discharge Forebay	84D	-0.27	1.36	EPA 900
6/30/2008	Blodgett Farm	85	6.33	1.18	EERF 00-02
6/30/2008	Brattleboro Fire Dept	88	-0.52	1.31	EPA 900
6/30/2008	Conn River Downstream	86	0.26	1.38	EPA 900
6/30/2008	Conn River Upstream	87	0.52	1.38	EPA 900
6/30/2008	Miller Farm	82	0.24	0.74	EERF 00-02
6/30/2008	Vernon Elem School	83	6.12	1.17	EERF 00-02
7/14/2008	3-3	84A	-0.54	1.33	EPA 900
7/14/2008	3-4	84B	0	1.37	EPA 900
7/14/2008	3-8	84C	0	1.37	EPA 900
7/14/2008	Discharge Forebay	84D	-0.54	1.32	EPA 900
7/28/2008	Blodgett Farm	85	4.81	1.1	EERF 00-02
7/28/2008	Brattleboro Fire Dept	88	-0.53	1.3	EPA 900
7/28/2008	Conn River Downstream	86	0.45	0.79	EPA 900
7/28/2008	Conn River Upstream	87	0.46	0.8	EPA 900
7/28/2008	Miller Farm	82	-0.61	0.68	EERF 00-02
7/28/2008	Vernon Elem School	83	5.83	1.16	EERF 00-02
8/14/2008	3-3	84A	-0.51	1.29	EPA 900
8/14/2008	3-4	84B	0.72	0.79	EPA 900
8/14/2008	3-8	84C	-0.14	0.74	EPA 900
8/14/2008	Discharge Forebay	84D	0.57	0.77	EPA 900
8/21/2008	Blodgett Farm	85	5.42	1.11	EERF 00-02
8/21/2008	Brattleboro Fire Dept	88	-0.52	1.31	EPA 900
8/21/2008	Conn River Downstream	86	0.8	1.43	EPA 900
8/21/2008	Conn River Upstream	87	0.27	1.4	EPA 900
8/21/2008	Miller Farm	82	0.07	0.7	EERF 00-02
8/21/2008	Vernon Elem School	83	5.07	1.09	EERF 00-02

Table 14. 2008 Water Sample Alpha Radioactivity Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/l	Error pCi/l	Analysis Method
9/15/2008	3-3	84A	-0.26	1.37	EPA 900
9/15/2008	3-4	84B	-0.27	1.42	EPA 900
9/15/2008	3-8	84C	-0.27	1.42	EPA 900
9/15/2008	Discharge Forebay	84D	-0.55	1.41	EPA 900
9/29/2008	Blodgett Farm	85	5.26	1.13	EERF 00-02
9/29/2008	Brattleboro Fire Dept	88	0	1.41	EPA 900
9/29/2008	Conn River Downstream	86	-0.56	1.45	EPA 900
9/29/2008	Conn River Upstream	87	-0.54	1.4	EPA 900
9/29/2008	Miller Farm	82	0.63	0.8	EERF 00-02
9/29/2008	Vernon Elem School	83	6.94	1.23	EERF 00-02
10/14/2008	3-3	84A	0	1.4	EPA 900
10/14/2008	3-4	84B	0	1.41	EPA 900
10/14/2008	3-8	84C	0.27	1.42	EPA 900
10/14/2008	Discharge Forebay	84D	-0.55	1.37	EPA 900
10/24/2008	Blodgett Farm	85	5.04	1.12	EERF 00-02
10/24/2008	Brattleboro Fire Dept	88	0.15	0.77	EPA 900
10/24/2008	Conn River Downstream	86	0.55	1.45	EPA 900
10/24/2008	Conn River Upstream	87	-0.28	1.43	EPA 900
10/24/2008	Miller Farm	82	0.28	0.77	EERF 00-02
10/24/2008	Vernon Elem School	83	6.35	1.2	EERF 00-02
11/14/2008	3-3	84A	-1.32	1.34	EPA 900
11/14/2008	3-4	84B	-1.35	1.37	EPA 900
11/14/2008	3-8	84C	-0.27	0.72	EPA 900
11/14/2008	Discharge Forebay	84D	-0.8	1.39	EPA 900
12/1/2008	Blodgett Farm	85	3.42	0.99	EERF 00-02
12/1/2008	Brattleboro Fire Dept	88	-0.3	0.81	EPA 900
12/1/2008	Conn River Downstream	86	-0.31	0.81	EPA 900
12/1/2008	Conn River Upstream	87	-0.15	0.8	EPA 900
12/1/2008	Miller Farm	82	0.21	0.73	EERF 00-02
12/1/2008	Vernon Elem School	83	6.84	1.2	EERF 00-02
12/15/2008	3-3	84A	0.3	0.86	EPA 900
12/15/2008	3-4	84B	0	0.88	EPA 900
12/15/2008	3-8	84C	0	0.35	EPA 900
12/15/2008	Discharge Forebay	84D	0	0.83	EPA 900
12/23/2008	Blodgett Farm	85	4.82	1.05	EERF 00-02
12/23/2008	Brattleboro Fire Dept	88	-0.47	0.85	EPA 900
12/23/2008	Conn River Downstream	86	0.15	0.88	EPA 900
12/23/2008	Conn River Upstream	87	0.21	0.62	EPA 900
12/23/2008	Miller Farm	82	-0.28	0.62	EERF 00-02
12/23/2008	Vernon Elem School	83	5.94	1.12	EERF 00-02

Table 15. 2008 Water Sample Beta Radioactivity Results

Sample	Sample	Map	Results	Error	Analysis
Date	Location	ID No.	pCi/l	pCi/l	Method
1/15/2008	3-3	84A	1.26	0.94	EPA 900
1/15/2008	3-4	84B	0.94	0.93	EPA 900
1/15/2008	3-8	84C	-0.08	0.91	EPA 900
1/15/2008	Discharge Forebay	84D	0.71	0.93	EPA 900
1/31/2008	Blodgett Farm	85	3.01	1.9	EPA 900
1/31/2008	Brattleboro Fire Dept	88	1.57	0.95	EPA 900
1/31/2008	Conn River Downstream	86	1.1	1.84	EPA 900
1/31/2008	Conn River Upstream	87	1.89	1.86	EPA 900
1/31/2008	Miller Farm	82	3.15	1.9	EPA 900
1/31/2008	Vernon Elem School	83	2.84	1.89	EPA 900
2/14/2008	3-3	84A	0.62	2.04	EPA 900
2/14/2008	3-4	84B	3.91	2.12	EPA 900
2/14/2008	3-8	84C	0.69	0.42	EPA 900
2/14/2008	Discharge Forebay	84D	2.66	2.09	EPA 900
2/25/2008	Blodgett Farm	85	5.5	2.17	EPA 900
2/25/2008	Brattleboro Fire Dept	88	2.66	1.08	EPA 900
2/25/2008	Miller Farm	82	3.93	2.14	EPA 900
3/13/2008	3-3	84A	1.1	1.04	EPA 900
3/13/2008	3-4	84B	2.97	1.09	EPA 900
3/13/2008	3-8	84C	2.27	1.07	EPA 900
3/13/2008	Discharge Forebay	84D	3.29	1.1	EPA 900
3/27/2008	Blodgett Farm	85	3.8	1.97	EPA 900
3/27/2008	Brattleboro Fire Dept	88	2.68	1.94	EPA 900
3/27/2008	Conn River Downstream	86	1.42	1.91	EPA 900
3/27/2008	Conn River Upstream	87	0.94	1.9	EPA 900
3/27/2008	Miller Farm	82	0.32	1.89	EPA 900
3/27/2008	Vernon Elem School	83	2.05	1.93	EPA 900
4/17/2008	3-3	84A	2.67	1.06	EPA 900
4/17/2008	3-4	84B	1.49	1.08	EPA 900
4/17/2008	3-8	84C	1.41	1.03	EPA 900
4/17/2008	Discharge Forebay	84D	2.51	1.05	EPA 900
4/29/2008	Blodgett Farm	85	7.88	2.18	EPA 900
4/29/2008	Brattleboro Fire Dept	88	0.71	1.01	EPA 900
4/29/2008	Conn River Downstream	86	2.05	0.71	EPA 900
4/29/2008	Conn River Upstream	87	1.89	0.71	EPA 900
4/29/2008	Miller Farm	82	3.78	2.08	EPA 900
4/29/2008	Vernon Elem School	83	5.35	2.12	EPA 900

Table 15. 2008 Water Sample Beta Radioactivity Results (continued)

Sample	Sample	Map	Results	Error	Analysis
Date	Location	ID No.	pCi/l	pCi/l	Method
5/14/2008	3-3	84A	1.39	1.84	EPA 900
5/14/2008	3-4	84B	1.08	1.83	EPA 900
5/14/2008	3-8	84C	2.01	1.85	EPA 900
5/14/2008	Discharge Forebay	84D	-0.62	1.79	EPA 900
5/29/2008	Blodgett Farm	85	4.2	1.91	EPA 900
5/29/2008	Conn River Downstream	88	1.09	1.83	EPA 900
5/29/2008	Conn River Upstream	86	1.55	1.85	EPA 900
5/29/2008	Miller Farm	87	3.1	1.88	EPA 900
5/29/2008	Vernon Elem School	82	4.34	1.91	EPA 900
6/4/2008	Brattleboro Fire Dept	83	0.7	0.92	EPA 900
6/13/2008	3-3	84A	1.53	1.92	EPA 900
6/13/2008	3-4	84B	0.46	1.89	EPA 900
6/13/2008	3-8	84C	0.46	1.89	EPA 900
6/13/2008	Discharge Forebay	84D	1.53	1.92	EPA 900
6/30/2008	Blodgett Farm	85	5.08	2.02	EPA 900
6/30/2008	Brattleboro Fire Dept	88	2.3	1.31	EPA 900
6/30/2008	Conn River Downstream	86	2.15	1.94	EPA 900
6/30/2008	Conn River Upstream	87	2.45	1.95	EPA 900
6/30/2008	Miller Farm	82	3.22	1.97	EPA 900
6/30/2008	Vernon Elem School	83	4.92	2.02	EPA 900
7/14/2008	3-3	84A	0	1.81	EPA 900
7/14/2008	3-4	84B	-0.31	1.81	EPA 900
7/14/2008	3-8	84C	1.1	1.84	EPA 900
7/14/2008	Discharge Forebay	84D	0.63	1.83	EPA 900
7/28/2008	Blodgett Farm	85	4.9	1.94	EPA 900
7/28/2008	Brattleboro Fire Dept	88	0	1.81	EPA 900
7/28/2008	Conn River Downstream	86	1.03	0.93	EPA 900
7/28/2008	Conn River Upstream	87	1.58	0.95	EPA 900
7/28/2008	Miller Farm	82	3	1.89	EPA 900
7/28/2008	Vernon Elem School	83	3.63	1.91	EPA 900
8/14/2008	3-3	84A	1.86	1.74	EPA 900
8/14/2008	3-4	84B	2.09	0.9	EPA 900
8/14/2008	3-8	84C	1.78	0.89	EPA 900
8/14/2008	Discharge Forebay	84D	2.33	0.9	EPA 900
8/21/2008	Blodgett Farm	85	6.69	1.86	EPA 900
8/21/2008	Brattleboro Fire Dept	88	4.49	1.8	EPA 900
8/21/2008	Conn River Downstream	86	2.94	1.76	EPA 900
8/21/2008	Conn River Upstream	87	2.94	1.76	EPA 900
8/21/2008	Miller Farm	82	7	1.87	EPA 900
8/21/2008	Vernon Elem School	83	5.93	1.85	EPA 900

Table 15. 2008 Water Sample Beta Radioactivity Results (continued)

Sample	Sample	Map	Results	Error	Analysis
Date	Location	ID No.	pCi/l	pCi/l	Method
9/15/2008	3-3	84A	1.25	1.87	EPA 900
9/15/2008	3-4	84B	0.16	1.84	EPA 900
9/15/2008	3-8	84C	1.1	1.86	EPA 900
9/15/2008	Discharge Forebay	84D	-1.1	1.81	EPA 900
9/29/2008	Blodgett Farm	85	3.94	1.94	EPA 900
9/29/2008	Brattleboro Fire Dept	88	-0.63	1.82	EPA 900
9/29/2008	Conn River Downstream	86	0.63	1.85	EPA 900
9/29/2008	Conn River Upstream	87	1.73	1.88	EPA 900
9/29/2008	Miller Farm	82	2.51	1.9	EPA 900
9/29/2008	Vernon Elem School	83	3.15	1.92	EPA 900
10/14/2008	3-3	84A	1.21	1.84	EPA 900
10/14/2008	3-4	84B	0.91	1.84	EPA 900
10/14/2008	3-8	84C	0.46	1.83	EPA 900
10/14/2008	Discharge Forebay	84D	3.04	1.89	EPA 900
10/24/2008	Blodgett Farm	85	2.75	1.89	EPA 900
10/24/2008	Brattleboro Fire Dept	88	1.37	0.94	EPA 900
10/24/2008	Conn River Downstream	86	1.97	1.86	EPA 900
10/24/2008	Conn River Upstream	87	0.61	1.83	EPA 900
10/24/2008	Miller Farm	82	5.17	1.94	EPA 900
10/24/2008	Vernon Elem School	83	6.4	1.97	EPA 900
11/14/2008	3-3	84A	-1.66	1.9	EPA 900
11/14/2008	3-4	84B	-2.72	1.88	EPA 900
11/14/2008	3-8	84C	0.38	0.98	EPA 900
11/14/2008	Discharge Forebay	84D	-1.36	1.91	EPA 900
12/1/2008	Blodgett Farm	85	1.97	1.99	EPA 900
12/1/2008	Brattleboro Fire Dept	88	-0.3	0.81	EPA 900
12/1/2008	Conn River Downstream	86	-0.38	0.96	EPA 900
12/1/2008	Conn River Upstream	87	-0.15	0.8	EPA 900
12/1/2008	Miller Farm	82	-2.87	1.87	EPA 900
12/1/2008	Vernon Elem School	83	6.84	1.2	EPA 900
12/15/2008	3-3	84A	0.67	0.99	EPA 900
12/15/2008	3-4	84B	-0.52	0.97	EPA 900
12/15/2008	3-8	84C	0	0.39	EPA 900
12/15/2008	Discharge Forebay	84D	-0.15	0.97	EPA 900
12/23/2008	Blodgett Farm	85	2.7	2.02	EPA 900
12/23/2008	Brattleboro Fire Dept	88	0.52	0.99	EPA 900
12/23/2008	Conn River Downstream	86	0	0.98	EPA 900
12/23/2008	Conn River Upstream	87	0.45	0.66	EPA 900
12/23/2008	Miller Farm	82	-0.6	1.94	EPA 900
12/23/2008	Vernon Elem School	83	1.51	2.02	EPA 900

Table 16. 2008 Water Sample Gamma Radioactivity Results

Sample Date	Sample Location	Map ID No.	Results pCi/l
1/15/2008	3-3	84A	< LOD
1/15/2008	3-4	84B	< LOD
1/15/2008	3-8	84C	< LOD
1/15/2008	Discharge Forebay	84D	< LOD
1/31/2008	Blodgett Farm	85	Natural
1/31/2008	Brattleboro Fire Dept	88	< LOD
1/31/2008	Conn River Downstream	86	< LOD
1/31/2008	Conn River Upstream	87	< LOD
1/31/2008	Miller Farm	82	Natural
1/31/2008	Vernon Elem School	83	Natural
2/14/2008	3-3	84A	< LOD
2/14/2008	3-4	84B	< LOD
2/14/2008	3-8	84C	< LOD
2/14/2008	Discharge Forebay	84D	< LOD
2/25/2008	Blodgett Farm	85	Natural
2/25/2008	Brattleboro Fire Dept	88	< LOD
2/25/2008	Miller Farm	82	Natural
3/13/2008	3-3	84A	< LOD
3/13/2008	3-4	84B	< LOD
3/13/2008	3-8	84C	< LOD
3/13/2008	Discharge Forebay	84D	< LOD
3/27/2008	Blodgett Farm	85	Natural
3/27/2008	Brattleboro Fire Dept	88	< LOD
3/27/2008	Conn River Downstream	86	< LOD
3/27/2008	Conn River Upstream	87	< LOD
3/27/2008	Miller Farm	82	Natural
3/27/2008	Vernon Elem School	83	Natural
4/17/2008	3-3	84A	< LOD
4/17/2008	3-4	84B	< LOD
4/17/2008	3-8	84C	< LOD
4/17/2008	Discharge Forebay	84D	< LOD
4/29/2008	Blodgett Farm	85	Natural
4/29/2008	Brattleboro Fire Dept	88	< LOD
4/29/2008	Conn River Downstream	86	< LOD
4/29/2008	Conn River Upstream	87	< LOD
4/29/2008	Miller Farm	82	Natural
4/29/2008	Vernon Elem School	83	Natural

LOD: limits of detection

Table 16. 2008 Water Sample Gamma Radioactivity Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/l
5/14/2008	3-3	84A	< LOD
5/14/2008	3-4	84B	< LOD
5/14/2008	3-8	84C	< LOD
5/14/2008	Discharge Forebay	84D	< LOD
5/29/2008	Blodgett Farm	85	Natural
5/29/2008	Conn River Downstream	86	< LOD
5/29/2008	Conn River Upstream	87	< LOD
5/29/2008	Miller Farm	82	Natural
5/29/2008	Vernon Elem School	83	Natural
6/4/2008	Brattleboro Fire Dept	88	< LOD
6/13/2008	3-3	84A	< LOD
6/13/2008	3-4	84B	< LOD
6/13/2008	3-8	84C	< LOD
6/13/2008	Discharge Forebay	84D	< LOD
6/30/2008	Blodgett Farm	85	Natural
6/30/2008	Brattleboro Fire Dept	88	< LOD
6/30/2008	Conn River Downstream	86	< LOD
6/30/2008	Conn River Upstream	87	< LOD
6/30/2008	Miller Farm	82	Natural
6/30/2008	Vernon Elem School	83	Natural
7/14/2008	3-3	84A	< LOD
7/14/2008	3-4	84B	< LOD
7/14/2008	3-8	84C	< LOD
7/14/2008	Discharge Forebay	84D	< LOD
7/28/2008	Blodgett Farm	85	Natural
7/28/2008	Brattleboro Fire Dept	88	< LOD
7/28/2008	Conn River Downstream	86	< LOD
7/28/2008	Conn River Upstream	87	< LOD
7/28/2008	Miller Farm	82	Natural
7/28/2008	Vernon Elem School	83	< LOD
8/14/2008	3-3	84A	< LOD
8/14/2008	3-4	84B	< LOD
8/14/2008	3-8	84C	< LOD
8/14/2008	Discharge Forebay	84D	< LOD
8/21/2008	Blodgett Farm	85	Natural
8/21/2008	Brattleboro Fire Dept	88	< LOD
8/21/2008	Conn River Downstream	86	< LOD
8/21/2008	Conn River Upstream	87	< LOD
8/21/2008	Miller Farm	82	< LOD
8/21/2008	Vernon Elem School	83	< LOD

LOD: limits of detection

Table 16. 2008 Water Sample Gamma Radioactivity Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/l
9/15/2008	3-3	84A	< LOD
9/15/2008	3-4	84B	< LOD
9/15/2008	3-8	84C	< LOD
9/15/2008	Discharge Forebay	84D	< LOD
9/29/2008	Blodgett Farm	85	Natural
9/29/2008	Brattleboro Fire Dept	88	< LOD
9/29/2008	Conn River Downstream	86	< LOD
9/29/2008	Conn River Upstream	87	< LOD
9/29/2008	Miller Farm	82	Natural
9/29/2008	Vernon Elem School	83	Natural
10/14/2008	3-3	84A	< LOD
10/14/2008	3-4	84B	< LOD
10/14/2008	3-8	84C	< LOD
10/14/2008	Discharge Forebay	84D	< LOD
10/24/2008	Blodgett Farm	85	Natural
10/24/2008	Brattleboro Fire Dept	88	< LOD
10/24/2008	Conn River Downstream	86	< LOD
10/24/2008	Conn River Upstream	87	< LOD
10/24/2008	Miller Farm	82	Natural
10/24/2008	Vernon Elem School	83	Natural
11/14/2008	3-3	84A	< LOD
11/14/2008	3-4	84B	< LOD
11/14/2008	3-8	84C	< LOD
11/14/2008	Discharge Forebay	84D	< LOD
12/1/2008	Blodgett Farm	85	Natural
12/1/2008	Brattleboro Fire Dept	88	< LOD
12/1/2008	Conn River Downstream	86	< LOD
12/1/2008	Conn River Upstream	87	< LOD
12/1/2008	Miller Farm	82	Natural
12/1/2008	Vernon Elem School	83	Natural
12/15/2008	3-3	84A	< LOD
12/15/2008	3-4	84B	< LOD
12/15/2008	3-8	84C	< LOD
12/15/2008	Discharge Forebay	84D	< LOD
12/23/2008	Blodgett Farm	85	Natural
12/23/2008	Brattleboro Fire Dept	88	< LOD
12/23/2008	Conn River Downstream	86	< LOD
12/23/2008	Conn River Upstream	87	< LOD
12/23/2008	Miller Farm	82	Natural
12/23/2008	Vernon Elem School	83	Natural

LOD: limits of detection

Table 17. 2008 Water Sample Tritium Results

Sample Date	Sample Location	Map ID No.	Results pCi/l	Error pCi/l
1/15/2008	3-3	84A	< 500	N/A
1/15/2008	3-4	84B	< 500	N/A
1/15/2008	3-8	84C	< 500	N/A
1/15/2008	Discharge Forebay	84D	< 500	N/A
1/31/2008	Blodgett Farm	85	< 500	N/A
1/31/2008	Brattleboro Fire Dept	88	< 500	N/A
1/31/2008	Conn River Downstream	86	< 500	N/A
1/31/2008	Conn River Upstream	87	< 500	N/A
1/31/2008	Miller Farm	82	< 500	N/A
1/31/2008	Vernon Elem School	83	< 500	N/A
2/14/2008	3-3	84A	< 500	N/A
2/14/2008	3-4	84B	< 500	N/A
2/14/2008	3-8	84C	< 500	N/A
2/14/2008	Discharge Forebay	84D	< 500	N/A
2/25/2008	Blodgett Farm	85	< 500	N/A
2/25/2008	Brattleboro Fire Dept	88	< 500	N/A
2/25/2008	Miller Farm	82	< 500	N/A
3/13/2008	3-3	84A	< 500	N/A
3/13/2008	3-4	84B	< 500	N/A
3/13/2008	3-8	84C	< 500	N/A
3/13/2008	Discharge Forebay	84D	< 500	N/A
3/27/2008	Blodgett Farm	85	< 500	N/A
3/27/2008	Brattleboro Fire Dept	88	< 500	N/A
3/27/2008	Conn River Downstream	86	< 500	N/A
3/27/2008	Conn River Upstream	87	< 500	N/A
3/27/2008	Miller Farm	82	< 500	N/A
3/27/2008	Vernon Elem School	83	< 500	N/A
4/17/2008	3-3	84A	-129	153
4/17/2008	3-4	84B	-74	153
4/17/2008	3-8	84C	25	154
4/17/2008	Discharge Forebay	84D	-35	154
4/29/2008	Blodgett Farm	85	-4	154
4/29/2008	Brattleboro Fire Dept	88	37	154
4/29/2008	Conn River Downstream	86	14	154
4/29/2008	Conn River Upstream	87	-37	154
4/29/2008	Miller Farm	82	-55	154
4/29/2008	Vernon Elem School	83	49	155

Table 17. 2008 Water Sample Tritium Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/l	Error pCi/l
5/14/2008	3-3	84A	-96	154
5/14/2008	3-4	84B	-35	155
5/14/2008	3-8	84C	92	156
5/14/2008	Discharge Forebay	84D	-72	154
5/29/2008	Blodgett Farm	85	176	157
5/29/2008	Conn River Downstream	88	82	156
5/29/2008	Conn River Upstream	86	108	156
5/29/2008	Miller Farm	87	72	156
5/29/2008	Vernon Elem School	82	121	156
6/4/2008	Brattleboro Fire Dept	83	80	156
6/13/2008	3-3	84A	96	155
6/13/2008	3-4	84B	116	155
6/13/2008	3-8	84C	35	155
6/13/2008	Discharge Forebay	84D	123	155
6/30/2008	Blodgett Farm	85	313	157
6/30/2008	Brattleboro Fire Dept	88	49	155
6/30/2008	Conn River Downstream	86	47	155
6/30/2008	Conn River Upstream	87	-45	154
6/30/2008	Miller Farm	82	104	155
6/30/2008	Vernon Elem School	83	98	155
7/14/2008	3-3	84A	-6	157
7/14/2008	3-4	84B	-62	157
7/14/2008	3-8	84C	-6	157
7/14/2008	Discharge Forebay	84D	-115	156
7/28/2008	Blodgett Farm	85	-86	156
7/28/2008	Brattleboro Fire Dept	88	-92	156
7/28/2008	Conn River Downstream	86	-76	157
7/28/2008	Conn River Upstream	87	-102	156
7/28/2008	Miller Farm	82	-28	157
7/28/2008	Vernon Elem School	83	66	158
8/14/2008	3-3	84A	12	157
8/14/2008	3-4	84B	68	157
8/14/2008	3-8	84C	-68	156
8/14/2008	Discharge Forebay	84D	58	157
8/21/2008	Blodgett Farm	85	8	157
8/21/2008	Brattleboro Fire Dept	88	18	157
8/21/2008	Conn River Downstream	86	58	157
8/21/2008	Conn River Upstream	87	131	158
8/21/2008	Miller Farm	82	127	158
8/21/2008	Vernon Elem School	83	-44	156

Table 17. 2008 Water Sample Tritium Results (continued)

Sample Date	Sample Location	Map ID No.	Results pCi/l	Error pCi/l
9/15/2008	3-3	84A	-95	155
9/15/2008	3-4	84B	8	156
9/15/2008	3-8	84C	177	158
9/15/2008	Discharge Forebay	84D	-76	155
9/29/2008	Blodgett Farm	85	-2	170
9/29/2008	Brattleboro Fire Dept	88	-50	156
9/29/2008	Conn River Downstream	86	-66	156
9/29/2008	Conn River Upstream	87	-68	155
9/29/2008	Miller Farm	82	-24	156
9/29/2008	Vernon Elem School	83	26	156
10/14/2008	3-3	84A	37	170
10/14/2008	3-4	84B	-2	170
10/14/2008	3-8	84C	45	170
10/14/2008	Discharge Forebay	84D	-56	169
10/24/2008	Blodgett Farm	85	-32	170
10/24/2008	Brattleboro Fire Dept	88	-45	170
10/24/2008	Conn River Downstream	86	106	171
10/24/2008	Conn River Upstream	87	84	171
10/24/2008	Miller Farm	82	34	170
10/24/2008	Vernon Elem School	83	-43	170
11/14/2008	3-3	84A	-84	177
11/14/2008	3-4	84B	-11	178
11/14/2008	3-8	84C	-91	177
11/14/2008	Discharge Forebay	84D	-6	178
12/1/2008	Blodgett Farm	85	69	170
12/1/2008	Brattleboro Fire Dept	88	-82	177
12/1/2008	Conn River Downstream	86	86	179
12/1/2008	Conn River Upstream	87	22	178
12/1/2008	Miller Farm	82	9	178
12/1/2008	Vernon Elem School	83	149	179
12/15/2008	3-3	84A	-41	171
12/15/2008	3-4	84B	-160	170
12/15/2008	3-8	84C	-142	170
12/15/2008	Discharge Forebay	84D	28	172
12/23/2008	Blodgett Farm	85	-132	170
12/23/2008	Brattleboro Fire Dept	88	-99	170
12/23/2008	Conn River Downstream	86	-71	171
12/23/2008	Conn River Upstream	87	-22	171
12/23/2008	Miller Farm	82	183	173
12/23/2008	Vernon Elem School	83	-45	171

Table 18, On-Site Groundwater Sample Analysis Results

Sample Date	Sample Location	Results pCi/l Gamma	Results pCi/l Tritium	Error +/- pCi/l Tritium
10/23/2008	Well GW0201	Less than LOD	-30	169
10/21/2008	Well GW0202	Naturally Occuring Radionuclides	-83	211
10/23/2008	Well GW0203	Naturally Occuring Radionuclides	54	213
10/21/2008	Well GW0204	Less than LOD	62	213
10/21/2008	Well GZ-1	Naturally Occuring Radionuclides	3	212
10/21/2008	Well GZ-3	Naturally Occuring Radionuclides	-32	212
10/21/2008	Well GZ-5	Naturally Occuring Radionuclides	13	212

Food Chain Sampling Results

Monitoring of the food chain involves direct monitoring of some foods such as milk, cultivated vegetation and fish. It also involves monitoring of the soil and sediment that support land and aquatic species, and natural vegetation like grass, ferns, and fungi that serves as feed to land animals.

Milk Sample Results for 2008

Cow's raw milk is sampled monthly from two farms in Vernon. One farm is about one-half mile north of Vermont Yankee Nuclear Power Station and the other is about three miles south of the plant. Map 11 shows the location of these two dairy farms.

Milk is analyzed for all gamma radiation-emitting radioactive materials, and a separate assessment for iodine-131 is conducted. Table 20 shows the iodine-131 results. The analyses found no iodine-131 greater than the calculated limit of detection, which is 2.53 picocuries per liter (pCi/l).

As recorded in Table 21, the gamma spectroscopy of milk also revealed no nuclear facility-generated radioactive materials in excess of the counting system's limits of detection. The calculated limits of detection for radioactive materials in milk are listed in Table 19. Note also that there are iodine-131 and gamma spectrometry results for the Sprague Farm this year. This is a farm in Brookfield, Vermont, and their milk was sampled during a radiological emergency response plan exercise conducted in June of 2008. Samples of milk from other parts of the state will routinely be obtained from now on in order that we may be able to show background levels of radioactivity, if any is detected, in these samples from sites far from, and unaffected by, Vermont Yankee.

The one radioactive material that was detected above its calculated limit of detection was potassium-40, a primordial radioactive material. Primordial radioactive materials are those created with the formation of the earth and other cosmic features. Potassium-40 has a half-life of 1,280,000,000 years. The gamma spectroscopy results are presented in

Table 21. The potassium-40 results for all milk samples, ranging from 1340 to 1790 pCi/l, fall within the historical range for potassium-40 of 1,200 to 2,000 pCi/l.

Vegetation Sample Results for 2008

A variety of natural and cultivated plants are sampled to verify that no Vermont Yankee Nuclear Power Station radioactive materials are accumulating in the human and animal food chains. No vegetation samples taken in the immediate vicinity of Vermont Yankee were analyzed in 2008. Instead, samples were obtained elsewhere in Vermont to help us understand what the background levels of radioactivity in vegetation are in Vermont. None of the sample results were outside of the historical range for vegetation samples that have been reported from the Vermont Yankee vicinity in other years. The historical range for gamma radioactivity in vegetation varies for the specific kind of plant, but, generally, the range is from the calculated limit of detection to 20,400 picocuries per kilogram (pCi/kg). The specific values for 2008 are found in Table 23.

In June 2008, members of the Vermont Emergency Management Radiological Sampling Team, composed of employees from the Vermont Department of Health, the Agency for Natural Resources and the Agency of Agriculture, conducted one of their biannual Vermont Yankee emergency preparedness drills in the Randolph area of Vermont. During the drill, many environmental samples were collected and several of them were analyzed by the Vermont Department of Health Laboratory. From this June 2008 drill, samples of natural vegetation were analyzed. These results from Roxbury, Brookfield, Bethel and Northfield, Vermont help serve as a background for comparison to samples near Vermont Yankee taken in past years. Map 10 above shows where all of the environmental samples were taken. Table 23 lists four of the sites from Map 10 where vegetation samples were taken, the Roxbury Fish Hatchery, the White River National Fish Hatchery, Stowell and Son Farm and Rood Pond.

The gamma radioactivity results in picocuries per kilogram for the 2008 vegetation samples are shown in Figures 8 and 9. Figure 8 shows the beryllium-7 results, while Figure 9 shows the potassium-40 results. Remember that these radioactive materials, potassium-40 and beryllium-7, are purely naturally-occurring radioactive materials. Remember, too, that these concentrations are within the historical range for vegetation samples which has been as high as 20,400 picocuries per kilogram.

Soil Sample Results for 2008

Soil samples were also collected in the same fashion as with the vegetation samples – at a Sampling Team drill in the spring of 2008. The locations of the June 2008 samples in the Randolph area are shown on Map 10 above. The table of soil sample results is Table 24.

All sample results were within the historical range of less than the calculated limit of detection to 500 picocuries per kilogram for cesium-137, and from 7,000 to 20,000 picocuries per kilogram for potassium-40. There is also one sample that tested positive for the natural radionuclide beryllium-7. Of course, potassium-40 is also a purely natural radionuclide. Unlike potassium-40 and beryllium-7, cesium-137 exists only due to human activity. Figure 10 shows the samples with cesium-137 activity. As can be seen, cesium-137 may be found in central Vermont near Randolph. This is true for samples throughout Vermont and the United States as a whole. This must be recollected when sample results from past and future years show cesium-137 in southern Vermont near Vermont Yankee. In past reports, we have explained the positive cesium-137 results around Vermont Yankee in terms of residual radioactivity from above ground nuclear weapons testing fallout and from fallout from the plume that sent radioactivity around the world for several weeks following the nuclear reactor explosion and fire at Chernobyl in the former Soviet Union.

Sediment Sample Results for 2008

Sediment samples are taken from the bottom of the Connecticut River by an environmental contractor. The samples in this report are analyzed by the Vermont Department of Health Laboratory. The sediment samples are taken from four areas of the Connecticut River. The first is near what is called the North Storm Drain. It is an area where radioactive sedimentary contaminants from Vermont Yankee Nuclear Power Station were discovered prior to 1998, and it is an area just east of the plant stack. Sample locations S-1, S-2, T-1, T-2, T-3, U-1, U-2, U-3, U-4, V-3, V-4, V-5, W-4, W-5 and X-5 are from this North Storm Drain area. These sample locations are shown in an illustration included as Figure 12.

The second location is in the pool upstream of the Vernon Dam, near the primary plant discharge at the south end of the plant property near the cooling towers. In Table 25, the samples for location 3-4 are from this part of the Connecticut River. The third location, 3-3, is south of the Vernon Dam in the pool created downstream of the hydroelectric facility there. The final sample location, 3-8, is well upstream of the plant where the Route 9 highway bridge crosses the Connecticut River north of Brattleboro.

Two sets of samples are obtained, one set in the spring and one set in the fall. A sediment sample is taken with a mass ranging from 0.75 to 1.25 kilograms. At the Vermont Department of Health Laboratory, the sample is dried, weighed on a top-loaded balance and placed in a 500 milliliter high density polyethylene bottle. The sample is counted on the gamma spectrometer system using a reverse germanium detector. A normal spectrum will include naturally occurring, primordial radioactive materials such as potassium-40, cosmogenic, naturally occurring radioactive materials such as beryllium-7, and archival cesium-137 from past atmospheric nuclear weapons testing and the releases from Chernobyl. North Storm Drain samples in the past included trace amounts of cobalt-60. Like cesium-137, cobalt-60 is radioactive material of only human origin.

For 2008, primordial potassium-40 is within the historical range of 6,000 – 26,000 pCi/kg at 7,660 – 21,200 pCi/kg. The archival cesium-137 is within the historical range of the calculated limit of detection to 500 pCi/kg at 45.5 – 218 pCi/kg. There were no other radioactive materials in excess of the counting system's calculated limits of detection including cobalt-60. The calculated limits of detection for sediment are the same as those for soil, and shown in Table 22. The potassium-40 results are graphed in Figure 13, while the results for cesium-137 are graphed in Figure 14.

Fish Sample Results for 2008

Table 26 presents the results of gamma spectroscopy of fish samples. The fish were obtained from the Connecticut River by an environmental contractor. The fish samples were analyzed by the Vermont Department of Health Laboratory. Table 26 shows that the only results in excess of the counting system's calculated limits of detection were for naturally occurring, cosmogenic potassium-40. Potassium-40 in 2008, ranging from 2,590 to 2,970 pCi/kg falls within the historical range for these samples: 1,000 – 5,000 pCi/kg.

Location 3-4 in the table above corresponds with the Vernon Pond, the basin formed by the Vernon Dam on the Connecticut River just downstream from Vermont Yankee Nuclear Power Station. Location 3-8 is near the Route 9 highway bridge north of Brattleboro. Fish are captured via an electroshock method. The fish are frozen whole, weighed and chopped or blended for loading into a reentrant beaker. The total sample of about one kilogram is then analyzed with a gamma spectrometer system using a reverse electrode germanium detector.

Table 19. Gamma Spectroscopy Calculated Limits of Detection for Milk, Water, Vegetation and Fish Samples

Radioactive material	Calculated Limit of Detection
Cadmium-109	46 pCi/l or pCi/kg
Cobalt-58	2 pCi/l or pCi/kg
Cerium-139	2 pCi/l or pCi/kg
Mercury-203	2 pCi/l or pCi/kg
Tin-113	3 pCi/l or pCi/kg
Cesium-137	3 pCi/l or pCi/kg
Yttrium-88	2 & 3 pCi/l or pCi/kg
Cobalt-60	2 & 2 pCi/l or pCi/kg
Beryllium-7	20 pCi/l or pCi/kg
Potassium-40	42 pCi/l or pCi/kg
Barium-133	3 pCi/l or pCi/kg
Cesium-134	3 pCi/l or pCi/kg
Iodine-131	3 pCi/l or pCi/kg
Zinc-65	5 pCi/l or pCi/kg
Manganese-54	3. pCi/l or pCi/kg
Silver-110m	3 pCi/l or pCi/kg
Cerium-144	15 pCi/l or pCi/kg
Cerium-141	4 pCi/l or pCi/kg
Chromium-51	20 pCi/l or pCi/kg
Antimony-126	2. pCi/l or pCi/kg
Ruthenium-103	2 pCi/l or pCi/kg
Strontium-90	3 pCi/l or pCi/kg
Antimony-124	3 pCi/l or pCi/kg
Ruthenium-106	25 pCi/l or pCi/kg
Cesium-136	3 pCi/l or pCi/kg
Cobalt-58	2 pCi/l or pCi/kg

Map 11

Environmental Radiation Surveillance Stations
Milk Sample Locations

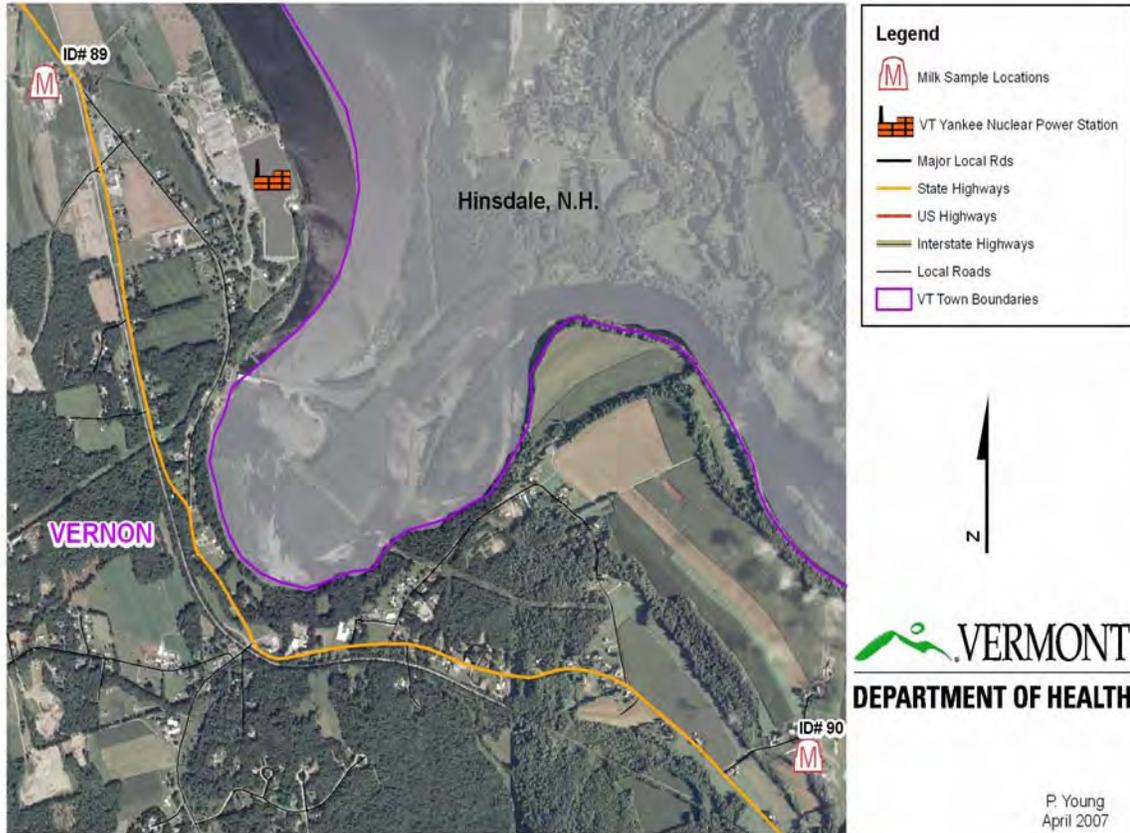


Table 20. 2008 Milk Sample Iodine-131 Results

Sample Date	Sample Location	Map ID No.	Results Nuclides	Results pCi/l
1/31/2008	Blodgett Farm	90	I-131	< LOD
1/31/2008	Miller Farm	89	I-131	< LOD
2/25/2008	Blodgett Farm	90	I-131	< LOD
2/25/2008	Miller Farm	89	I-131	< LOD
3/27/2008	Blodgett Farm	90	I-131	< LOD
3/27/2008	Miller Farm	89	I-131	< LOD
4/29/2008	Blodgett Farm	90	I-131	< LOD
4/29/2008	Miller Farm	89	I-131	< LOD
5/29/2008	Blodgett Farm	90	I-131	< LOD
5/29/2009	Miller Farm	89	I-131	< LOD
6/17/2008	Sprague Farm	*	I-131	< LOD
7/28/2008	Miller Farm	89	I-131	< LOD
7/28/2008	Blodgett Farm	90	I-131	< LOD
8/21/2008	Miller Farm	89	I-131	< LOD
8/21/2008	Blodgett Farm	90	I-131	< LOD
9/29/2008	Miller Farm	89	I-131	< LOD
9/29/2008	Blodgett Farm	90	I-131	< LOD
10/24/2008	Miller Farm	89	I-131	< LOD
10/23/2008	Blodgett Farm	90	I-131	< LOD
12/1/2008	Miller Farm	89	I-131	< LOD
12/1/2008	Blodgett Farm	90	I-131	< LOD
12/23/2008	Miller Farm	89	I-131	< LOD
12/23/2008	Blodgett Farm	90	I-131	< LOD

*Brookfield, Vermont

Table 21. 2008 Milk Sample Gamma Radioactivity Results

Sample Date	Sample Location	Map ID No.	Results Nuclides	Results pCi/l	Error pCi/l
1/31/2008	Blodgett Farm	90	K-40	1480	100
1/31/2008	Miller Farm	89	K-40	1560	100
2/25/2008	Blodgett Farm	90	K-40	1500	100
2/25/2008	Miller Farm	89	K-40	1550	110
3/27/2008	Blodgett Farm	90	K-40	1450	100
3/27/2008	Miller Farm	89	K-40	1790	120
4/29/2008	Blodgett Farm	90	K-40	1380	100
4/29/2008	Miller Farm	89	K-40	1370	90
5/29/2008	Blodgett Farm	90	K-40	1520	100
5/29/2009	Miller Farm	89	K-40	1340	90
6/17/2008	Sprague Farm	*\	K-40	1360	170
7/28/2008	Miller Farm	89	K-40	1690	120
7/28/2008	Blodgett Farm	90	K-40	1500	100
8/21/2008	Miller Farm	89	K-40	1480	100
8/21/2008	Blodgett Farm	90	K-40	1370	100
9/29/2008	Miller Farm	89	K-40	1370	940
9/29/2008	Blodgett Farm	90	K-40	1380	940
10/24/2008	Miller Farm	89	K-40	1660	120
10/23/2008	Blodgett Farm	90	K-40	1500	100
12/1/2008	Miller Farm	89	K-40	1410	100
12/1/2008	Blodgett Farm	90	K-40	1510	100
12/23/2008	Miller Farm	89	K-40	1530	100
12/23/2008	Blodgett Farm	90	K-40	1480	100

*Brookfield, Vermont

Table 22. Calculated Limits of Detection for Soil and Sediment Samples

Radioactive material	Calculated Limit of Detection
Cadmium-109	272 pCi/kg
Cobalt-57	11 pCi/kg
Cerium-139	13 pCi/kg
Mercury-203	15 pCi/kg
Tin-113	21 pCi/kg
Cesium-137	17 pCi/kg
Yttrium-88	19 & 13 pCi/kg
Cobalt-60	17 pCi/kg
Beryllium-7	1278 pCi/kg
Potassium-40	274 pCi/kg
Barium-133	20 pCi/kg
Cesium-134	17 pCi/kg
Iodine-131	16 pCi/kg
Zinc-65	35 pCi/kg
Manganese-54	18 pCi/kg
Silver-110m	16 pCi/kg
Cerium-144	88 pCi/kg
Cerium-141	21 pCi/kg
Chromium-51	124 pCi/kg
Antimony-126	15. pCi/kg
Ruthenium-103	15 pCi/kg
Strontium-90	18 pCi/kg
Antimony-124	17 pCi/kg
Ruthenium-106	159 pCi/kg
Cesium-136	16 pCi/kg
Cobalt-58	17 pCi/kg

Table 23. 2008 Vegetation Gamma Radioactivity Results

Sample	Sample	Results	Error	Results	Comment
Date	Location	pCi/kg	pCi/kg	Nuclides	
6/17/2008	Roxbury Fish Hatchery	7150	760	K-40	Grass
6/17/2008	Roxbury Fish Hatchery	1630	380	Be-7	Grass
6/17/2008	White River National Fish Hatchery	7220	660	K-40	Grass
6/17/2008	White River National Fish Hatchery	725	231	Be-7	Grass
6/17/2008	Stowell & Son Farm, Brookfield	5220	520	K-40	Grass
6/17/2008	Stowell & Son Farm, Brookfield	2460	350	Be-7	Grass
6/17/2008	Rood Pond, Northfield	4970	420	K-40	Grass
6/17/2008	Rood Pond, Northfield	633	125	Be-7	Grass

Figure 8

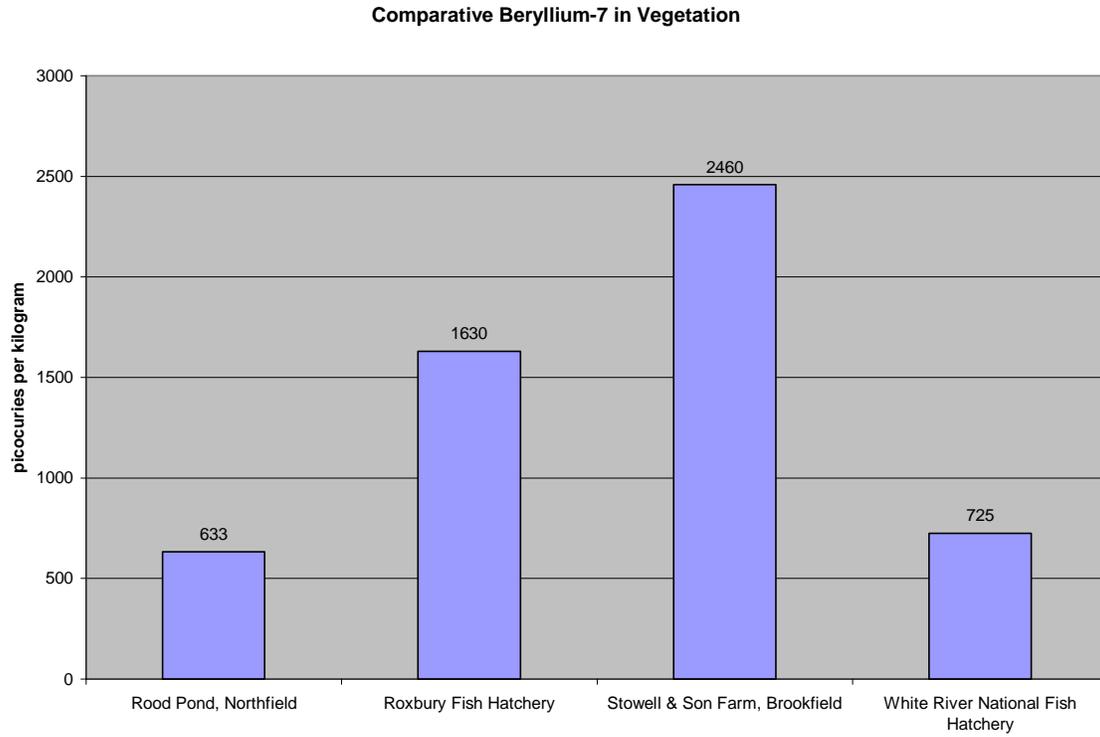
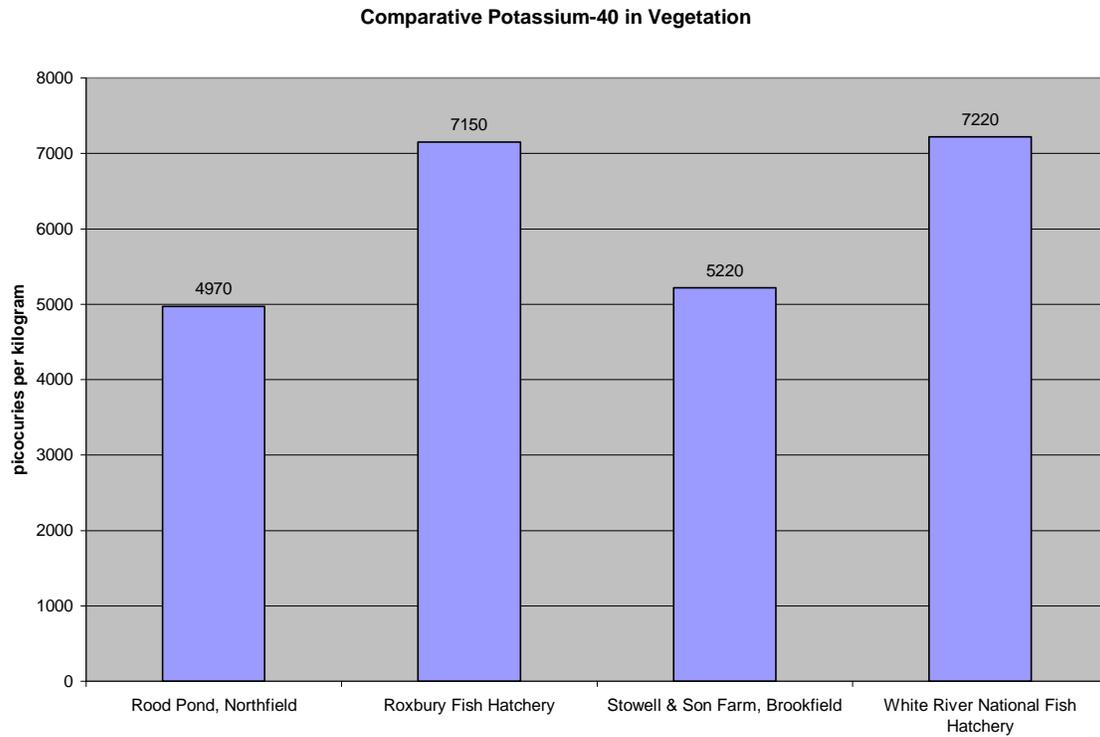


Figure 9



Map 12

Environmental Radiation Surveillance Stations
Vegetation Sample Locations

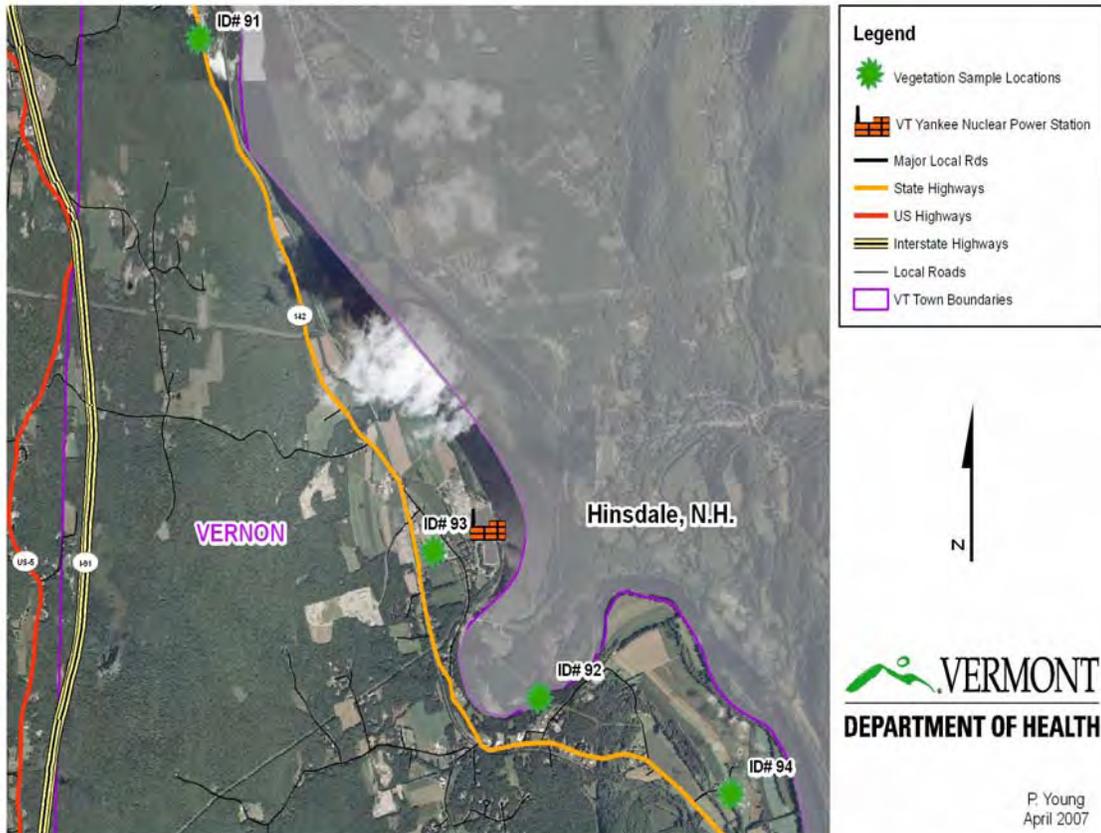


Table 24. 2008 Soil Sample Gamma Radioactivity Results

Sample Date	Sample Location	Results pCi/kg	Error pCi/kg	Results Nuclides	Comment
6/17/2008	White River National Fish Hatchery	12500	1000	K-40	Natural
6/17/2008	White River National Fish Hatchery	168	25	Cs-137	
6/17/2008	White River National Fish Hatchery	746	185	Be-7	Natural
6/17/2008	Stowell Farm, Brookfield	12300	1700	K-40	Natural
6/17/2008	Rood Pond, Northfield	18000	1400	K-40	Natural
6/17/2008	Vermont State Police, Royalton	8710	1220	K-40	Natural
6/17/2008	Vermont State Police, Royalton	86	27	Cs-137	

Figure 10

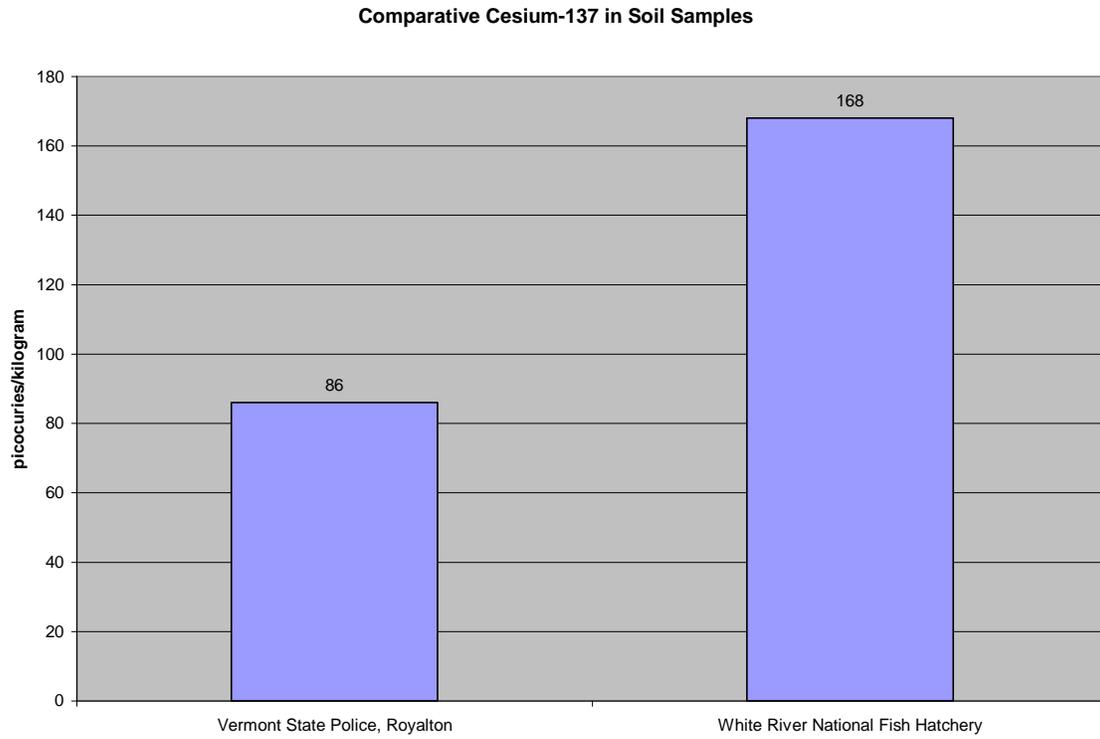
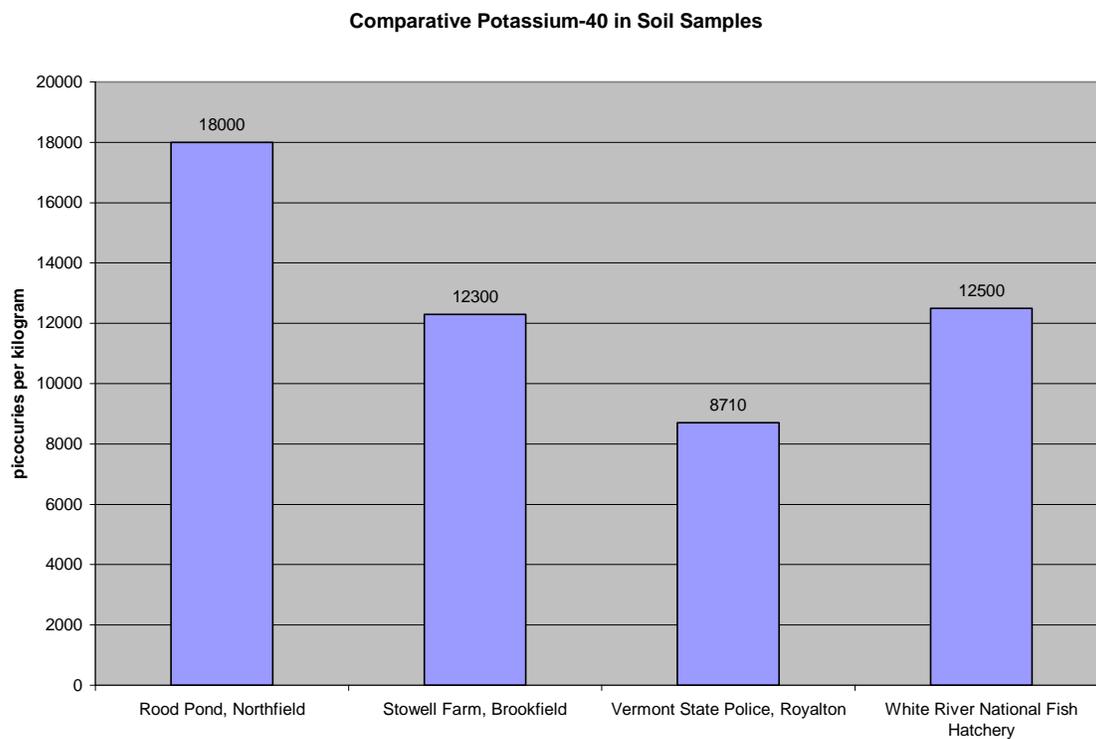


Figure 11



Map 13

Environmental Radiation Surveillance Stations
Soil Sample Locations

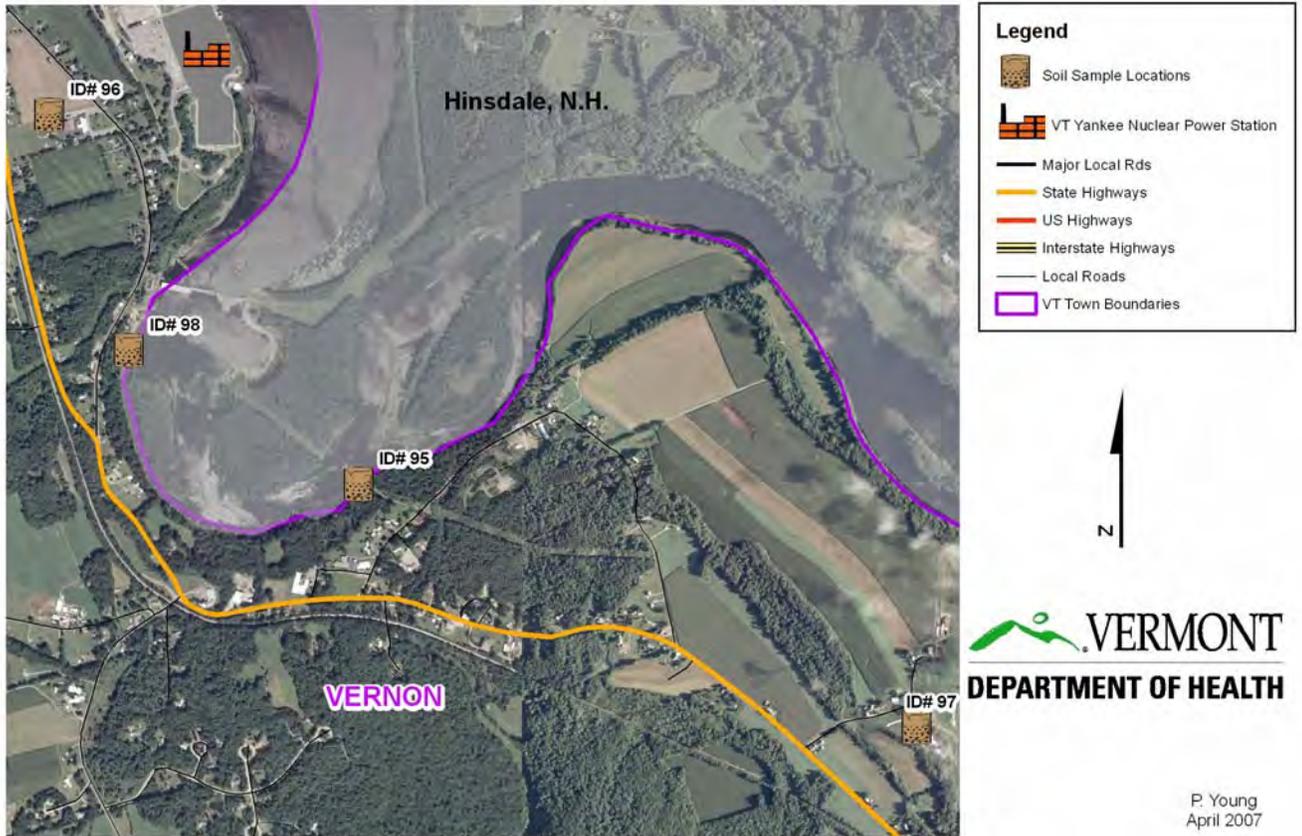


Figure 12, Sediment Sample Locations

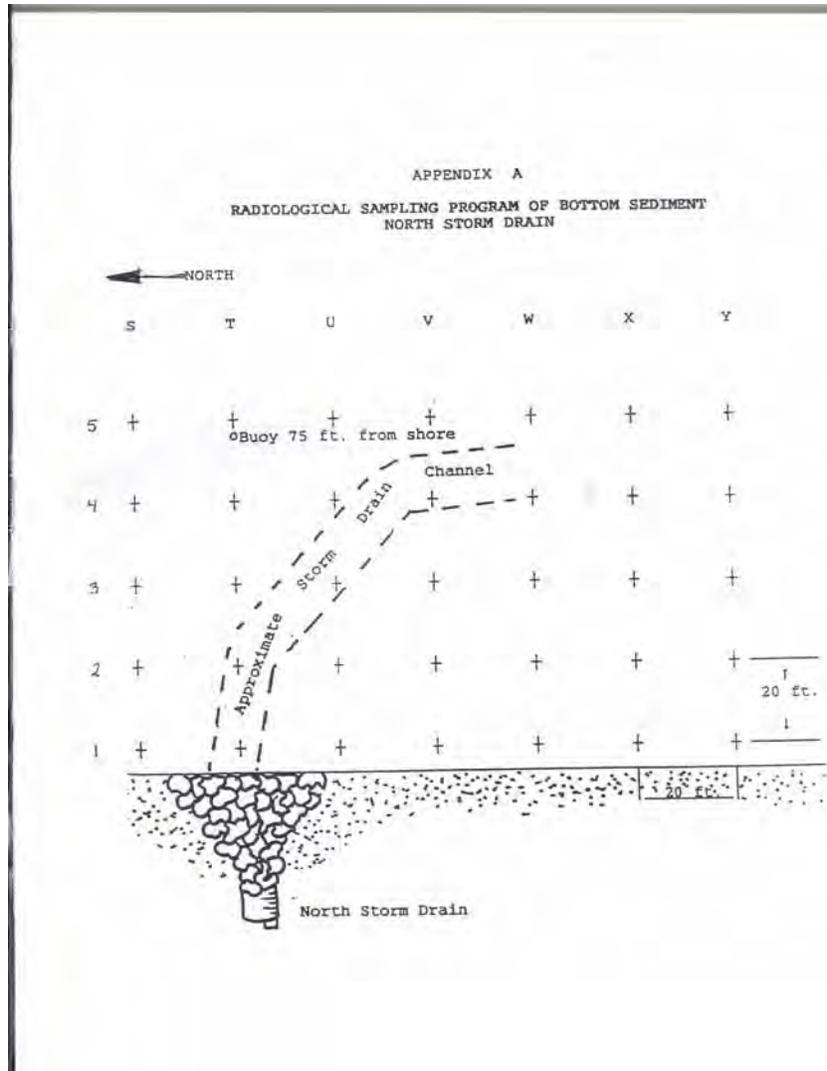


Figure 13

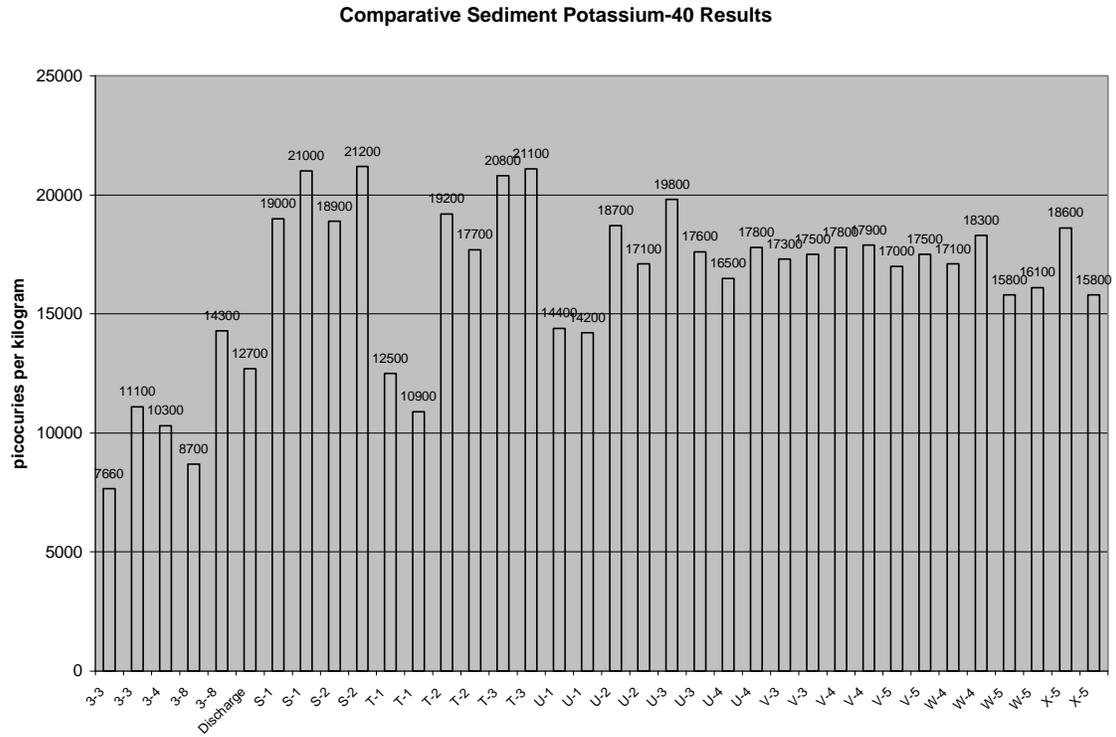


Figure 14

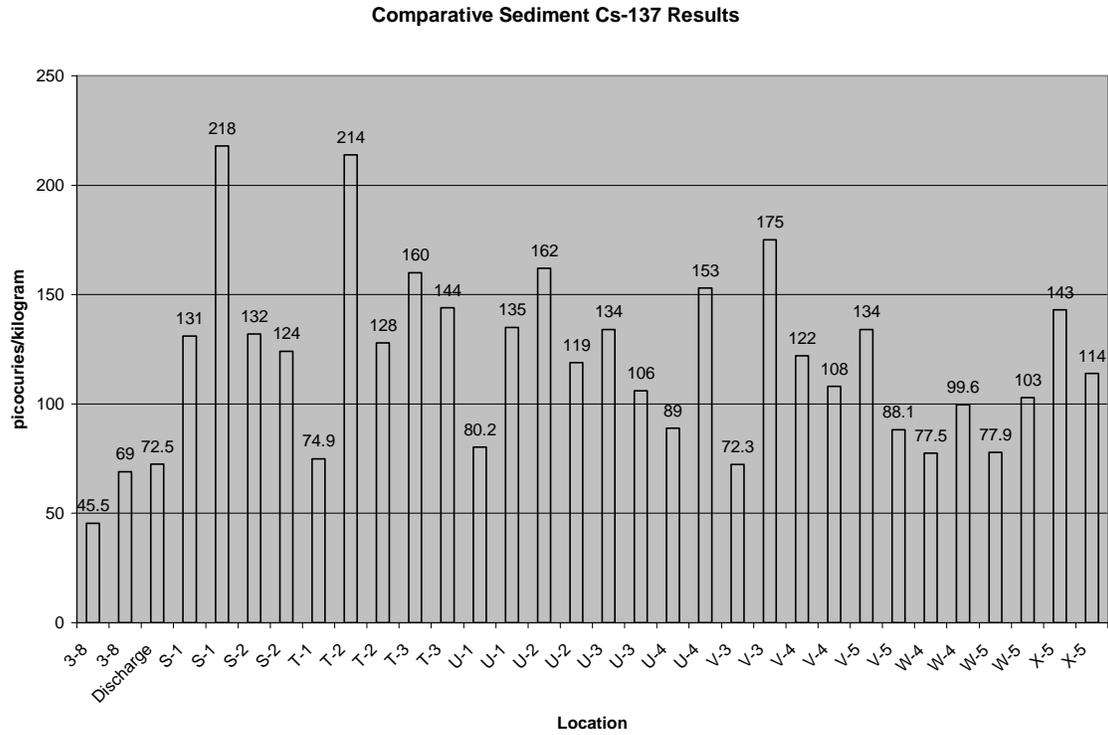


Table 25. 2008 Sediment Sample Gamma Radioactivity Results

Sample Date	Sample Location	Results Nuclides	Results pCi/kg	Error pCi/kg	Comment
5/15/2008	3-8	K-40	8700	1210	Natural
5/15/2008	3-8	Cs-137	45.5	17	
5/15/2008	3-4	K-40	10300	1400	Natural
5/15/2008	S-1	Cs-137	131	32	
5/15/2008	S-1	K-40	19000	2600	Natural
5/15/2008	S-2	K-40	18900	1500	Natural
5/15/2008	S-2	Cs-137	132	36	
5/15/2008	T-1	K-40	12500	1000	Natural
5/15/2008	T-1	Cs-137	74.9	26.7	
5/15/2008	T-2	K-40	19200	2700	Natural
5/15/2008	T-2	Cs-137	214	55	
5/15/2008	T-3	K-40	20800	1700	Natural
5/15/2008	T-3	Cs-137	160	46	
5/15/2008	U-1	K-40	14400	1200	Natural
5/15/2008	U-1	Cs-137	80.2	34.3	
5/15/2008	U-2	K-40	18700	2600	Natural
5/15/2008	U-2	Cs-137	162	34	
5/15/2008	U-3	K-40	19800	1600	Natural
5/15/2008	U-3	Cs-137	134	34	
5/15/2008	U-4	K-40	16500	2300	Natural
5/15/2008	U-4	Cs-137	89	33.7	
5/15/2008	V-3	K-40	17300	1400	Natural
5/15/2008	V-3	Cs-137	72.3	31.1	
5/15/2008	V-4	K-40	17800	2500	Natural
5/15/2008	V-4	Cs-137	122	35	
5/15/2008	V-5	K-40	17000	1400	Natural
5/15/2008	V-5	Cs-137	134	47	
5/15/2008	W-4	K-40	17100	2400	Natural
5/15/2008	W-4	Cs-137	77.5	29.9	
5/15/2008	W-5	K-40	15800	1300	Natural
5/15/2008	W-5	Cs-137	77.9	25.8	
5/15/2008	X-5	K-40	18600	2600	Natural
5/15/2008	X-5	Cs-137	143	46	
5/15/2008	3-3	K-40	7660	680	Natural
5/15/2008	3-8	K-40	8700	1210	Natural
5/15/2008	3-8	Cs-137	45.5	17	

Table 25. 2008 Sediment Sample Gamma Radioactivity Results (continued)

Sample Date	Sample Location	Results Nuclides	Results pCi/kg	Error pCi/kg	Comment
10/30/2008	3-3	K-40	11100	900	Natural
10/30/2008	Discharge	K-40	12700	1800	Natural
10/30/2008	Discharge	Cs-137	72.5	24.8	
10/30/2008	X-5	K-40	15800	1300	Natural
10/30/2008	X-5	Cs-137	114	35	
10/30/2008	W-5	K-40	16100	2200	Natural
10/30/2008	W-5	Cs-137	103	26	
10/30/2008	W-4	K-40	18300	1400	Natural
10/30/2008	W-4	Cs-137	99.6	32.2	
10/30/2008	V-5	K-40	17500	2400	Natural
10/30/2008	V-5	Cs-137	88.1	27.1	
10/30/2008	V-4	K-40	17900	1400	Natural
10/30/2008	V-4	Cs-137	108	30	
10/30/2008	V-3	K-40	17500	2400	Natural
10/30/2008	V-3	Cs-137	175	42	
10/30/2008	U-4	K-40	17800	1400	Natural
10/30/2008	U-4	Cs-137	153	42	
10/30/2008	U-3	K-40	17600	2400	Natural
10/30/2008	U-3	Cs-137	106	31	
10/30/2008	U-2	K-40	17100	1300	Natural
10/30/2008	U-2	Cs-137	119	37	
10/30/2008	U-1	K-40	14200	2000	Natural
10/30/2008	U-1	Cs-137	135	31	
10/30/2008	T-3	K-40	21100	1700	Natural
10/30/2008	T-3	Cs-137	144	43	
10/30/2008	T-2	K-40	17700	2400	Natural
10/30/2008	T-2	Cs-137	128	32	
10/30/2008	T-1	K-40	10900	1500	Natural
10/30/2008	T-1	Be-7	628	238	Natural
10/30/2008	S-2	K-40	21200	1700	Natural
10/30/2008	S-2	Cs-137	124	41	
10/30/2008	S-1	K-40	21000	1700	Natural
10/30/2008	S-1	Cs-137	218	57	
10/30/2008	3--8	K-40	14300	2000	Natural
10/30/2008	3-8	Be-7	448	336	Natural
10/30/2008	3-8	Cs-137	69	24.6	

Table 26. 2008 Fish Sample Gamma Radioactivity Results

Sample Date	Sample Location	Results pCi/kg	Error pCi/kg	Results Nuclides
5/28/2008	3-4	2600	210	K-40
5/28/2008	3-8	2970	250	K-40
10/27/2008	3-8	2700	240	K-40
10/29/2008	3-4	2590	190	K-40