
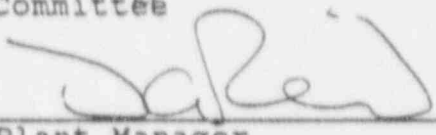


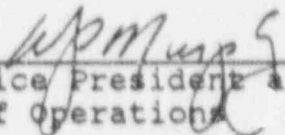
VERMONT YANKEE NUCLEAR POWER STATION

OFF-SITE DOSE CALCULATION MANUAL

REV. # 10

Reviewed  9-1-16 / 3/28/91  
Plant Operations Review  
Committee

Approved  / 4/1/91  
Plant Manager

Approved  / 4-4-91  
Vice President and Manager  
of Operations

## 1.0 INTRODUCTION

This ODCM (Off-Site Dose Calculation Manual) provides formal and approved methods for the calculation of off-site concentration, off-site doses, and effluent monitor setpoints in order to comply with the Vermont Yankee Technical Specifications 3.8/4.8 and 3.9/4.9, hereafter referred to as the Radiological Effluent Technical Specifications. The ODCM forms the basis for plant procedures and is designed for use by the procedure writer. In addition, the ODCM will be useful to the writer of periodic reports required by the NRC on the dose consequences of plant operation. The methods contained herein follow accepted NRC guidance (Regulatory Guide 1.109) unless otherwise noted in the text.

It shall be the responsibility of the Chemistry Supervisor and Radiation Protection Supervisor to ensure that the ODCM is used in the performance of the surveillance requirements of the appropriate portions of Technical Specifications. The administration of the program for the disposal of slightly contaminated septic waste, as described in Appendix B, is the responsibility of the Senior Environmental Program Manager.

All changes to the ODCM must be reviewed by PORC and approved by MOO, in accordance with Technical Specification 6.13, prior to implementation. All approved changes shall be submitted to the NRC for their information in the Semiannual Radioactive Effluent Report for the period in which the change(s) was made effective. The plant's Document Control Center (DCC) shall maintain the current version of the ODCM and issue under controlled distribution all approved changes to it.

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#### 4.0 ENVIRONMENTAL MONITORING PROGRAM

The radiological environmental monitoring stations are listed in Table 4.1. The locations of the stations with respect to the Vermont Yankee plant are shown on the maps in Figures 4-1 to 4-6.

##### 4.1 Intercomparison Program

All routine radiological analyses for environmental samples are performed at the Yankee Atomic Environmental Laboratory (YAEL). The YAEL participates in the U.S. Environmental Protection Agency's Environmental Radioactivity Laboratory Intercomparison Studies Program for all appropriate species and matrices offered by the agency.

##### 4.2 Airborne Pathway Monitoring

The environmental sampling program is designed to achieve several major objectives, including sampling air in predominant up-valley and down-valley wind directions, and sampling air in nearby communities and at a proper control location, while maintaining continuity with two years of preoperational data and 18 years of operational data (as of 1990). The chosen air sampling locations are discussed below.

To assure that an unnecessarily frequent relocation of samplers will not be required due to short-term or annual fluctuations in meteorology, thus incurring needless expense and destroying the continuity of the program, long term, site specific ground level D/Qs (five-year averages - 1978 through 1982) were evaluated in comparison to the existing air monitoring locations to determine their adequacy in meeting the above-stated objectives of the program and the intent of the NRC general guidance. The long-term average meteorological data base precludes the need for an annual re-evaluation of air sampling locations based on a single year's meteorological history.

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Table 4.1

Radiological Environmental Monitoring Stations<sup>(1)</sup>

<u>Exposure Pathway and/or Sample</u>	<u>Sample Location and Designated Code<sup>(2)</sup></u>	<u>Distance (km)<sup>(6)</sup></u>	<u>Direction<sup>(6)</sup></u>
1. AIRBORNE (Radioliodine and Particulate)			
	AP/CF-11 River Station No. 3.3	1.9	SSE
	AP/CF-12 N. Hinsdale, NH	3.6	NNW
	AP/CF-13 Hinsdale Substation	3.1	E
	AP/CF-14 Northfield, MA	11.3	SSE
	AP/CF-15 Tyler Hill Road <sup>(4)</sup>	3.2	WNW
	AP/CF-21 Spofford Lake	16.1	NNE
2. WATERBORNE			
a. Surface	WR-11 River Station No. 3.3	1.9	Downriver
	WR-21 Rt. 9 Bridge	12.8	Upriver
b. Ground	WG-11 Plant Well	--	On-Site
	WG-12 Vernon Nursing Well	2.0	SSE
	WG-22 Skibniowsky Well	14.3	N
c. Sediment	SE-11 Shoreline Downriver	0.8	On-Site
From	SE-12 North Storm	0.15	On-Site
Shoreline	Drain Outfall <sup>(3)</sup>		
3. INGESTION			
a. Milk	TM-11 Miller Farm <sup>(4)</sup>	0.8	WNW
	TM-12 Dominick <sup>(5)</sup>	5.2	E
	TM-13 Newton Farm	5.1	SSE
	TM-14 Brown Farm	2.6	S
	TM-16 Tall Oaks Farm	4.7	WNW
	TM-24 County Farm	22.5	N
b. Mixed Grasses	TG-11 River Station No. 3.3	1.9	SSE
	TG-12 N. Hinsdale, NH	3.6	NNE
	TG-13 Hinsdale Substation	3.1	E
	TG-14 Northfield, MA	11.3	SSE
	TG-15 Tyler Hill Rd. <sup>(4)</sup>	3.2	WNW
	TG-21 Spofford Lake	16.1	NNE

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Table 4.1  
(continued)

Radiological Environmental Monitoring Stations(1)

<u>Exposure Pathway and/or Sample</u>	<u>Sample Location and Designated Code (2)</u>	<u>Distance (km) (6)</u>	<u>Direction (6)</u>
c. Silage	TC-11 Miller Farm(4)	0.8	WNW
	TC-12 Dominick(5)	5.2	E
	TC-13 Newton Farm	5.1	SSE
	TC-14 Brown Farm	2.6	S
	TC-16 Tall Oaks Farm	4.7	WNW
	TC-24 County Farm	22.5	N
d. Fish	FH-11 Vernon Pond	--	On-Site
	FH-21 Rt. 9 Bridge	12.8	Upriver

4. DIRECT RADIATION

DR-1	River Station No. 3.3	1.6	SSE
DR-2	N. Hinsdale, NH	3.9	NNW
DR-3	Hinsdale Substation	3.0	E
DR-4	Northfield, MA	11.0	SSE
DR-5	Spofford Lake	16.3	NNE
DR-6	Vernon School	0.46	WSW
DR-7	Site Boundary	0.27	W
DR-8	Site Boundary	0.25	SW
DR-9	Inner Ring	2.1	N
DR-10	Outer Ring	4.6	N
DR-11	Inner Ring	2.0	NNE
DR-12	Outer Ring	3.6	NNE
DR-13	Inner Ring	1.4	NE
DR-14	Outer Ring	4.3	NE
DR-15	Inner Ring	1.4	ENE
DR-16	Outer Ring	2.9	ENE
DR-17	Inner Ring	1.2	E
DR-18	Outer Ring	3.0	E
DR-19	Inner Ring	3.5	ESE
DR-20	Outer Ring	5.3	ESE
DR-21	Inner Ring	1.8	SE
DR-22	Outer Ring	3.2	SE
DR-23	Inner Ring	1.8	SSE
DR-24	Outer Ring	3.9	SSE
DR-25	Inner Ring	2.0	S

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Table 4.1  
(continued)

Radiological Environmental Monitoring Stations<sup>(1)</sup>

<u>Exposure Pathway and/or Sample</u>	<u>Sample Location and Designated Code<sup>(2)</sup></u>	<u>Distance (km)<sup>(6)</sup></u>	<u>Direction<sup>(6)</sup></u>
	DR-26 Outer Ring	3.7	S
	DR-27 Inner Ring	1.0	SSW
	DR-28 Outer Ring	2.2	SSW
	DR-29 Inner Ring	0.7	WSW
	DR-30 Outer Ring	2.3	SW
	DR-31 Inner Ring	0.8	W
	DR-32 Outer Ring	5.0	WSW
	DR-33 Inner Ring	0.9	WNW
	DR-34 Outer Ring	4.9	W
	DR-35 Inner Ring	1.4	WNW
	DR-36 Outer Ring	4.7	WNW
	DR-37 Inner Ring	3.0	NW
	DR-38 Outer Ring	7.7	NW
	DR-39 Inner Ring	3.2	NNW
	DR-40 Outer Ring	5.8	NNW

- (1) Sample locations are shown on Figures 4.1 to 4.6.
- (2) Station 1Xs are indicator stations and Station 2Xs are control stations (for all but the direct radiation stations).
- (3) To be sampled and analyzed semiannually.
- (4) Non-Tech Spec station.
- (5) Non-Tech Spec station. Sample will be collected as available.
- (6) Distance and direction from the center of the Turbine Building for direct radiation monitors; from the plant stack for all others.

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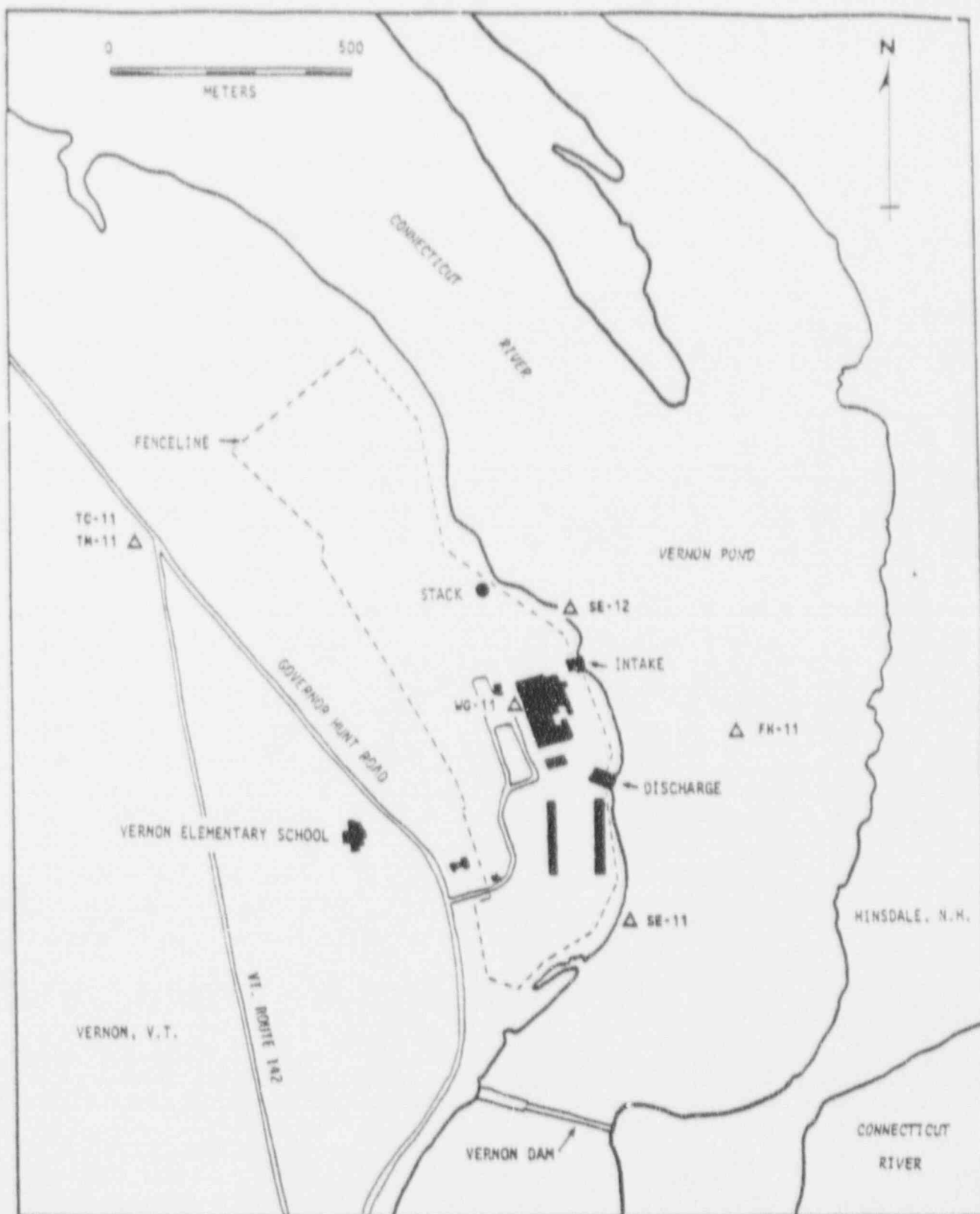


Figure 4-1 Environmental Sampling Locations in Close Proximity to Plant

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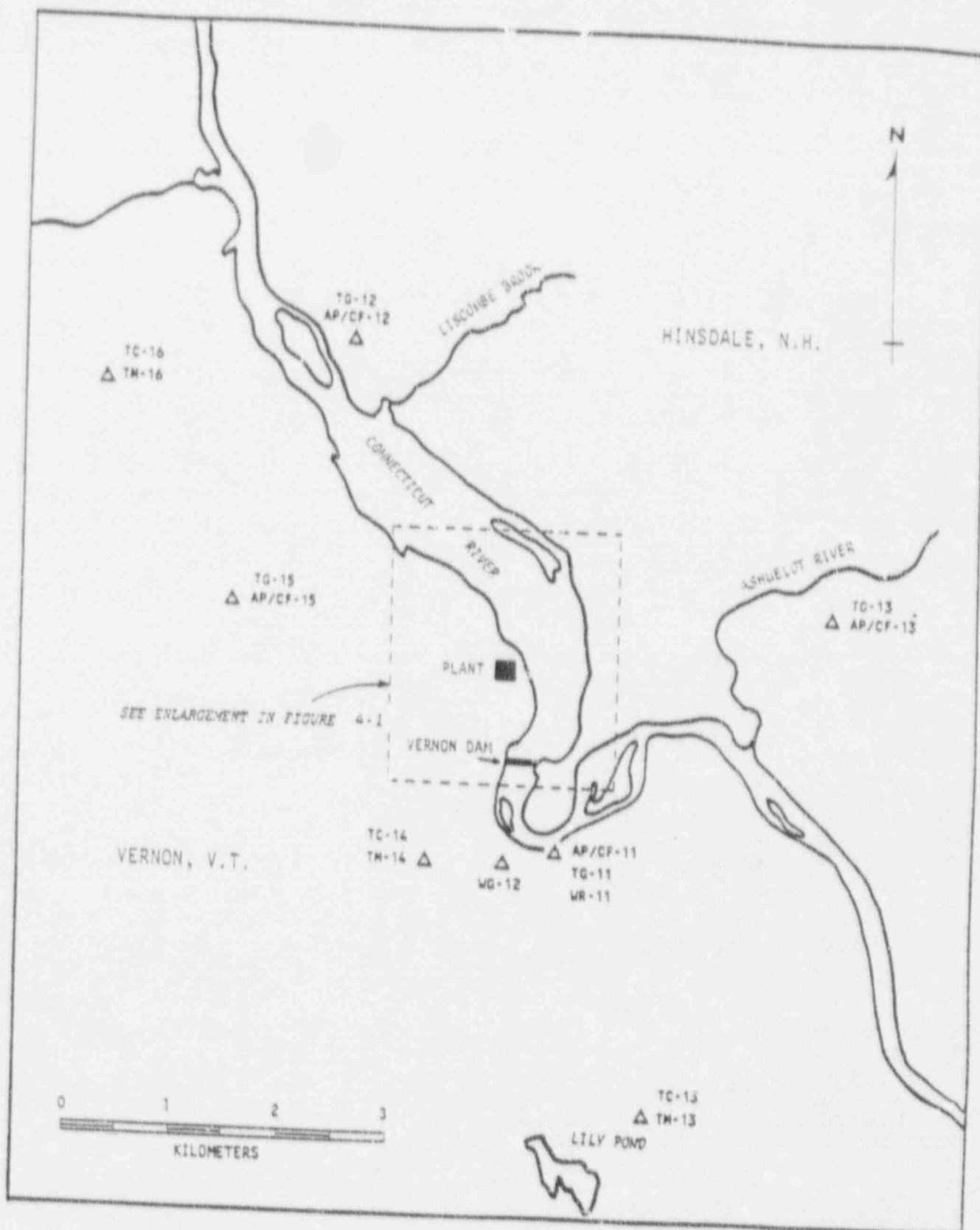


Figure 4-2 Environmental Sampling Locations Within 5 km of Plant

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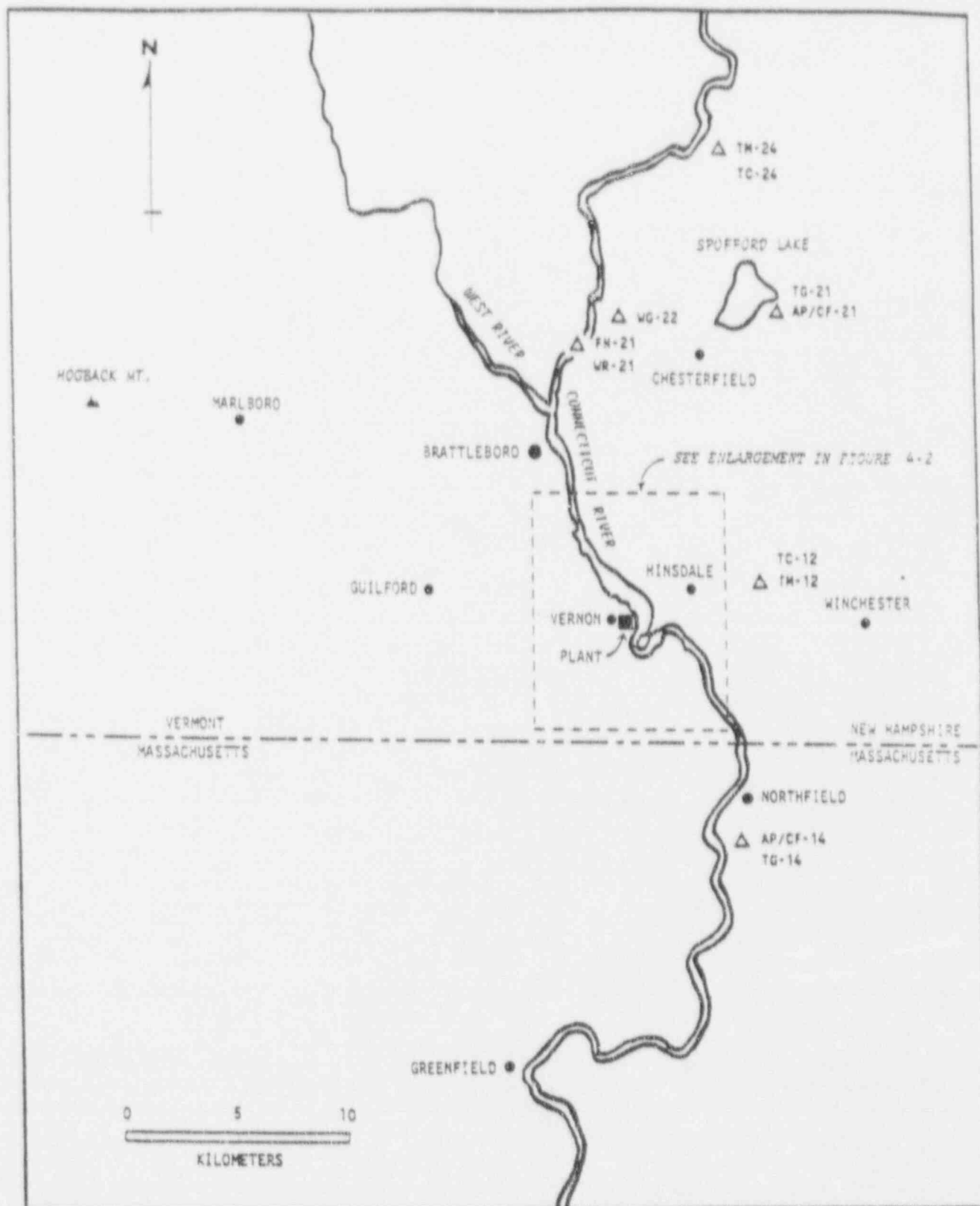


Figure 4-3 Environmental Sampling Locations Greater than 5 km from Plant

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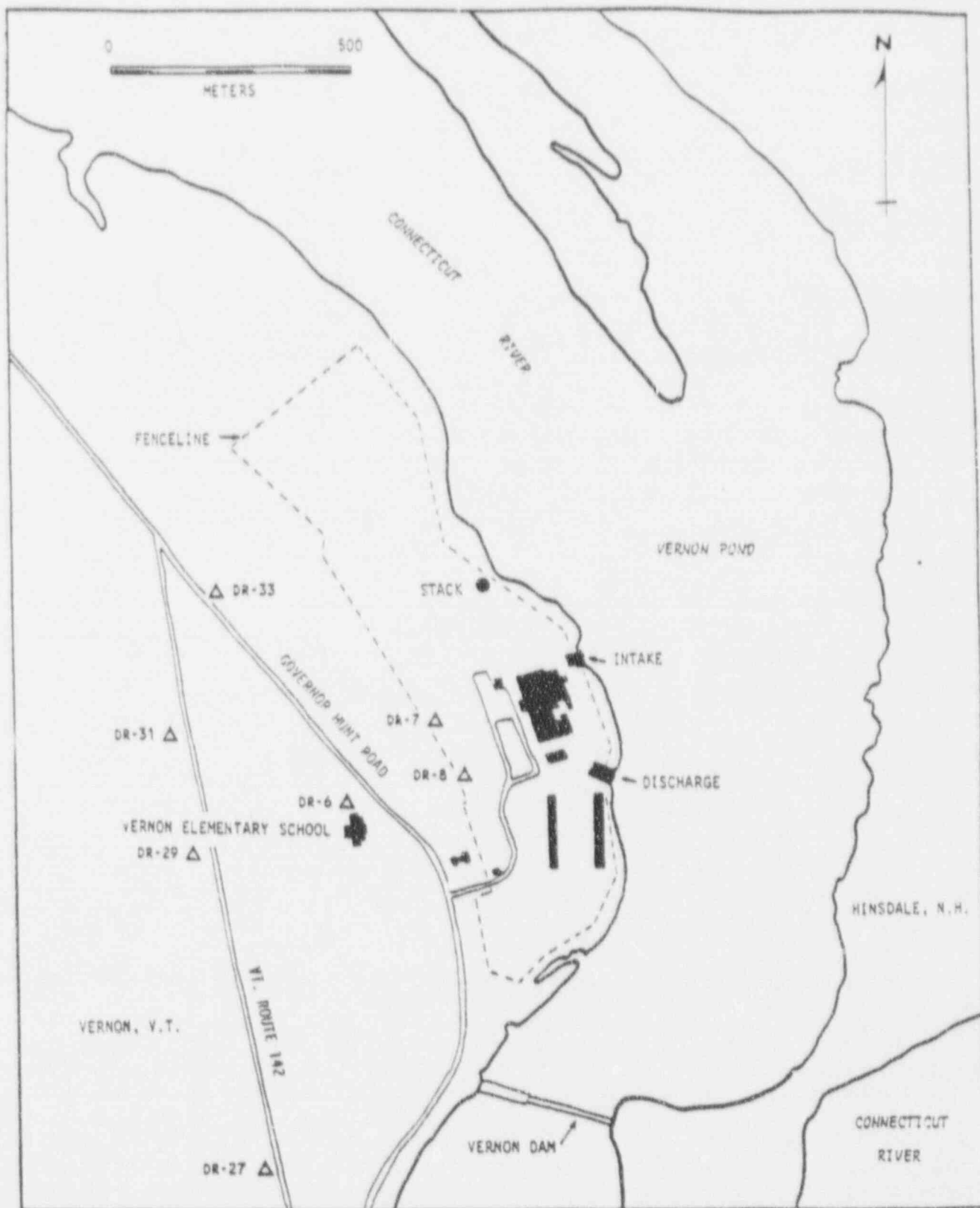


Figure 4-4 TLD Locations in Close Proximity to Plant

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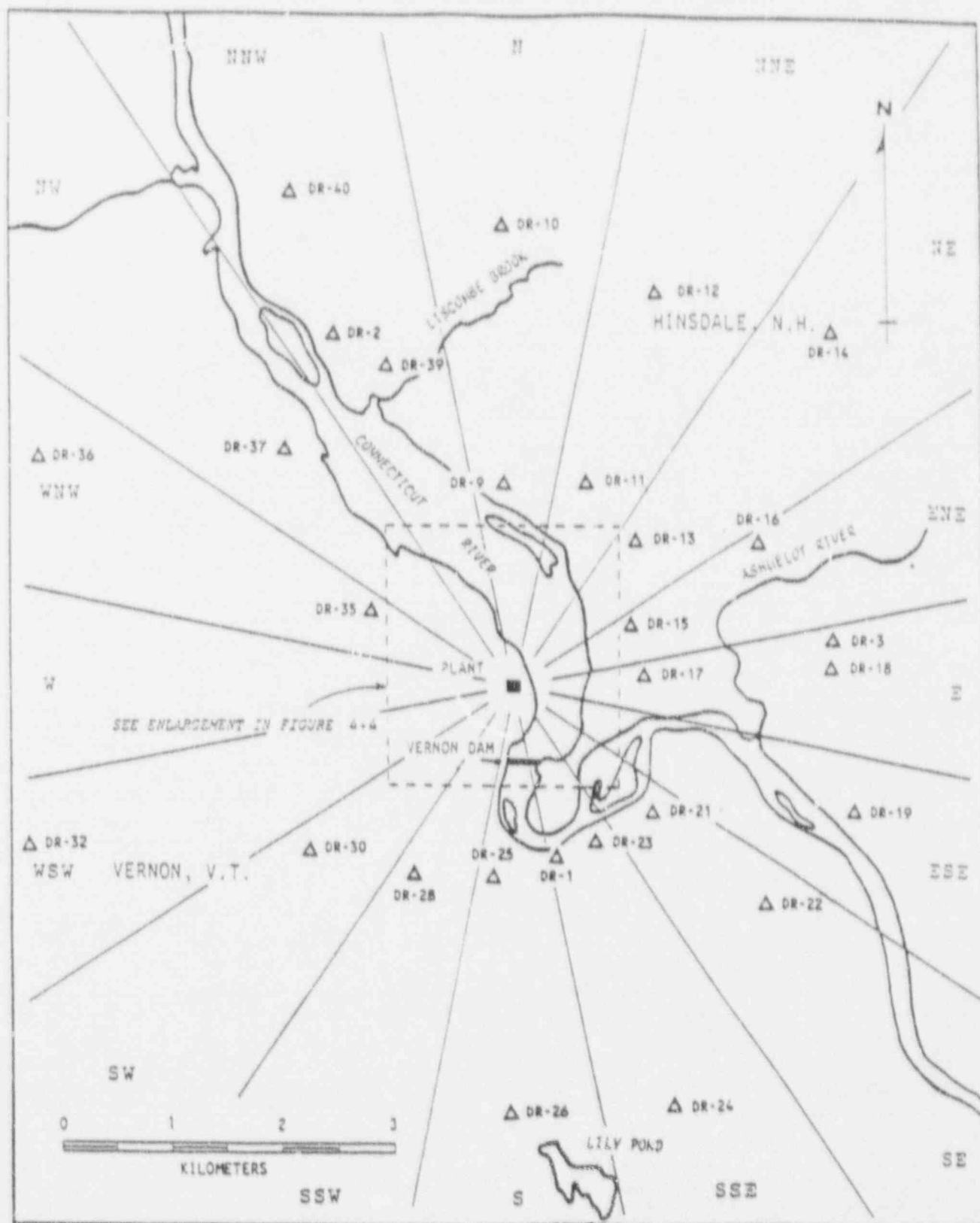


Figure 4-5 TLD Locations Within 5 km of Plant

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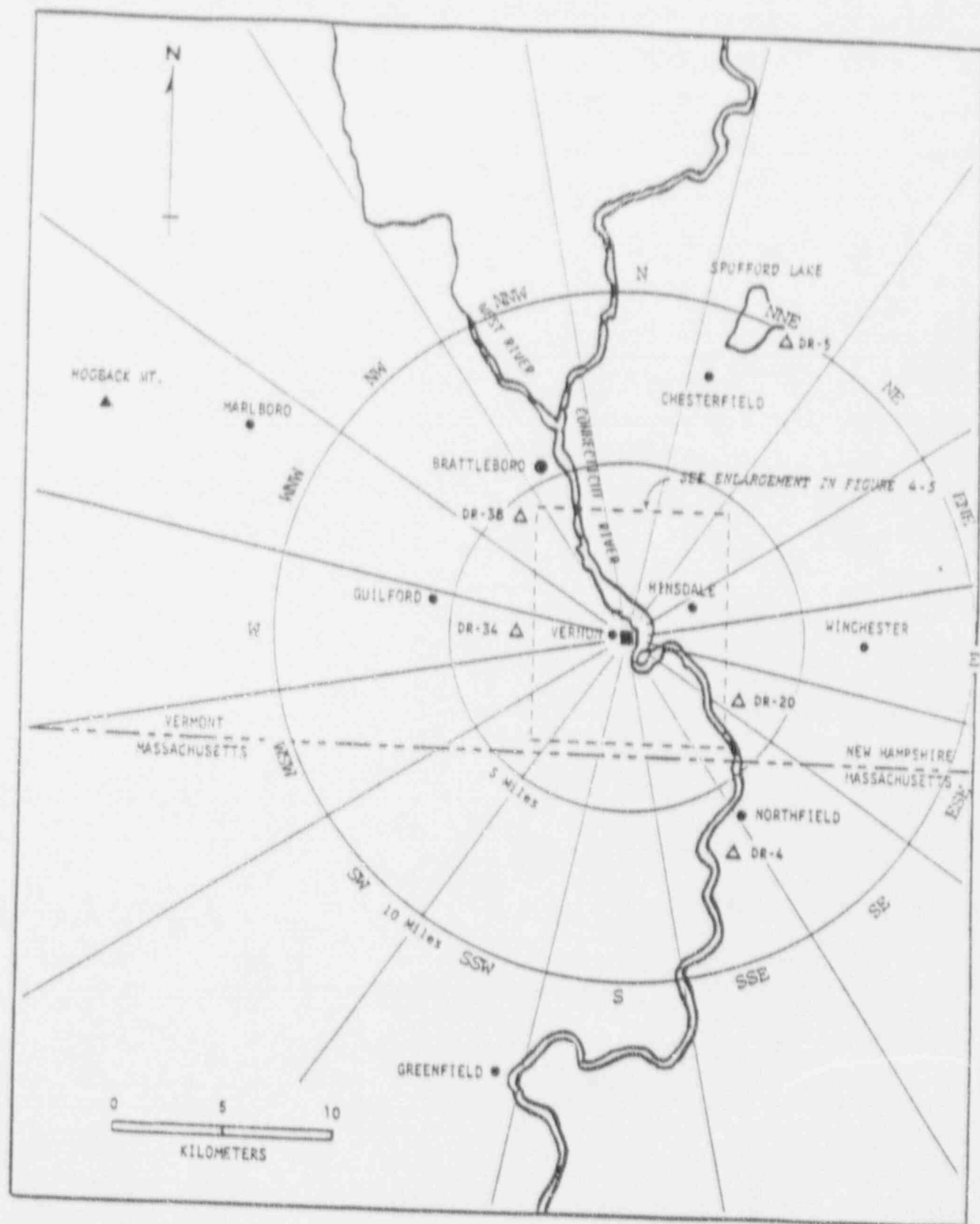


Figure 4-6 TLD Locations Greater than 5 km from Plant

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## APPENDIX I

### RADIOACTIVE LIQUID, GASEOUS, AND SOLID WASTE TREATMENT SYSTEMS

**Requirement:** Technical Specification 6.14.A requires that licensee initiated major changes to the radioactive waste systems (liquid, gaseous, and solid) be reported to the Commission in the Semiannual Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the Plant Operation Review Committee.

**Response:** There were no licensee initiated major changes to the radioactive waste systems (liquid, gaseous, and solid) during this reporting period.



APPENDIX J

ON-SITE DISPOSAL OF SEPTIC WASTE

Requirement: Off-Site Dose Calculational Manual, Appendix B requires that the dose impact due to on-site disposal of septic waste during the reporting year and from previous years be reported to the Commission in the Semiannual Radioactive Effluent Report filed after January 1, if disposals occur during the reporting year.

Response: No response is required for this reporting period.