

**1991 MONITORING PROGRAM
ENVIRONMENTAL SURVEILLANCE:**

OFF-SITE SURFACE WATER

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WFBCTCB Buttermilk Creek, Upstream of Cattaraugus Creek Confluence at Thomas Corners Road	Restricted surface waters receiving plant effluents <u>Reported in:</u> • Annual Environmental Monitoring Report	Timed continuous composite liquid	→ Biweekly	→ 26	→ pH
				Biweekly samples composited to 12	→ Monthly composite for gross alpha/beta, H-3*
				Biweekly samples composited to 4	→ Quarterly composite for gamma isotopic and Sr-90
WFFELBR Cattaraugus Creek at Felton Bridge	Unrestricted surface waters receiving plant effluents <u>Reported in:</u> • Monthly Environmental Monitoring Trend Analysis • Annual Environmental Monitoring Report	Timed continuous composite liquid	→ Weekly	→ 52	→ Gross alpha/beta, H-3, pH
				Weekly samples composited to 12	→ Flow-weighted monthly composite for gamma isotopic and Sr-90
WFBCBKG Buttermilk Creek near Fox Valley	Unrestricted surface water background <u>Reported in:</u> • Monthly Environmental Monitoring Trend Analysis • Annual Environmental Monitoring Report	Timed continuous composite liquid	→ Biweekly	→ 26	→ pH
				Biweekly samples composited to 12	→ Monthly composite for gross alpha/beta, H-3*
			Biweekly samples composited to 4	→ Quarterly composite for gamma isotopic, Sr-90, C-14, I-129, Pu/U isotopic, Am-241	
			Grab liquid	→ Semiannually	→ 2
WFBIGBR Cattaraugus Creek at Bigelow Bridge	Unrestricted surface water background	Grab liquid	→ Monthly	→ 12	→ Gross alpha/beta, H-3, Sr-90, and gamma isotopic

*Monthly composite is composited quarterly for NYSDOH.

Sampling Rationale

WFBCTCB DOE/EH-0173T, 5.10.1.1.

Buttermilk Creek is the surface water receiving all WVDP effluents. **WFBCTCB** monitors the potential influence of WVDP drainage into Buttermilk Creek upstream of confluence with Cattaraugus Creek.

WFFELBR DOE/EH-0173T, 5.10.1.1.

Since Buttermilk Creek is the surface water that receives all WVDP effluents and empties into Cattaraugus Creek, then **WFFELBR** monitors the potential influence of WVDP drainage into Cattaraugus Creek directly downstream of confluence with Buttermilk Creek.

WFBCBKG DOE/EH-0173T, 5.10.1.1.

Monitors background conditions of Buttermilk Creek upstream of the WVDP. Allows for comparison to downstream conditions.

WFBIGBR DOE/EH-0173T, 5.10.1.1.

Monitors background conditions of Cattaraugus Creek at Bigelow Bridge, upstream of the WVDP. Allows for comparison to downstream conditions.

**1991 MONITORING PROGRAM
ENVIRONMENTAL SURVEILLANCE:**

OFF-SITE DRINKING WATER

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/Composite Frequency
WFWEL Series Wells near WVDP outside WNYNSC Perimeter WFWEL01 3.0 km WNW WFWEL02 1.5 km NW WFWEL03 4.0 km NW WFWEL04 3.0 km NW WFWEL05 2.5 km SW WFWEL06 (background) 29 km S WFWEL07 4.0 km NNE WFWEL08 2.5 km ENE WFWEL09 3.0 km SE WFWEL10 7.0 km N	Drinking water supply; → groundwater near facility <u>Reported in:</u> • Annual Environmental Monitoring Report	→ Grab liquid	→ Annual	→ 1 each location	→ Gross alpha/beta, H-3, gamma isotopic, pH, conductivity

Sampling Rationale

Off-Site Drinking Water WFWEL Series	<p>DOE 5400.1, IV.9; DOE/EH-0173T, 5.10.1.2.</p> <p>Eight of the ten listed off-site private residential drinking water wells represent the nearest unrestricted uses of groundwater close to the WVDP. The ninth sample (WFWEL10) is from a public water supply from deep wells. The tenth drinking water well, WFWEL06, is located 29 km south of the Project and is considered a background drinking water source.</p>
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**1991 MONITORING PROGRAM
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OFF-SITE AIR

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
AFFXVRD 3.0 km SSE at Fox Valley	Particulate air samples around WNYNSC perimeter <u>Reported in:</u> • Annual Environmental Monitoring Report • Monthly Environmental Monitoring Trend Analysis (AFBOEHN, AFRT240, AFRSPRD, and AFGRVAL only)	Continuous air particulate filter	→ Weekly	→ 52 each location Weekly filters composited to 4 each location	→ Gross alpha/beta → Quarterly composite for Sr-90, gamma isotopic, U-isotopic**, Pu-isotopic**, Am-241**
AFTCORD 3.7 km NNW at Thomas Corners Road					
AFSPRVL 7 km N at Springville					
AFWEVAL 6 km SSE at West Valley					
AFDNKRRK 50 km W at Dunkirk (background)					
AFBOEHN 2.3 km SW on Dutch Hill Road					
AFRT240 2.0 km NE on Route 240					
AFRSPRD 1.5 km NW on Rock Springs Road	Continuous desiccant column for water vapor collection	→ Weekly	→ 52 each location (AFRSPRD and AFGRVAL only)	→ H-3	
AFGRVAL 29 km S at Great Valley	Continuous charcoal cartridge	→ Monthly	→ 12 composited to 4 each location (AFRSPRD and AFGRVAL only)	→ Quarterly composite for I-129	

**U-isotopic, Pu-isotopic and Am-241 analyses conducted at AFRSPRD and AFGRVAL only.

Sampling Rationale

AFFXVRD DOE/EH-0173T, 5.7.4.

AFTCORD

AFRT240 Air samplers put into service by NFS as part of the site's original monitoring program. Perimeter locations chosen to obtain data from places most likely to provide highest concentrations, based on meteorological data. Sample heads are placed 4 meters above the ground.

Note: The remaining air sampling heads are positioned within the human breathing zone above ground.

AFRSPRD Perimeter location chosen to obtain data from the place most likely to provide highest ground-level release concentrations based on meteorological data. AFRSPRD is on WVDP property but outside the main plant operations fence line. I-129 and H-3 are sampled here because the sampling trains were easy to incorporate and the location was most likely to receive effluent releases.

AFBOEHN Perimeter location chosen to obtain data from the place most likely to provide highest elevated release concentrations based on meteorological data. AFBOEHN is located on privately owned property at the perimeter.

AFGRVAL DOE/EP-0023, 4.2.3

Off-site (remote) sampler considered to be representative of natural background radiation. Located on privately owned property 29 km south of the site (typically upwind). I-129 and H-3 sampled here also.

AFDNKRK DOE/EP-0023, 4.2.3

Off-site (remote) sampler considered to be representative of natural background radiation. Located 50 km west of the site (upwind) on privately owned property.

AFWEVAL DOE/EP-0023, 4.2.3

Off-site (remote) sampler located on private property in nearby community within 15 km of the site (southeast).

AFSPRVL DOE/EP-0023, 4.2.3.

Off-site (remote) sampler located on private property in nearby community within 15 km of the site (north).

**1991 MONITORING PROGRAM
ENVIRONMENTAL SURVEILLANCE:**

FALLOUT, SEDIMENT AND SOIL

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
AFDHFOP 2.5 km SW AFFXFOP 3.0 km SSE AFTCFOP 3.7 km NNW AF24FOP 2.0 km NE ANRGFOP Met tower on-site	Collection of fallout particulate and precipitation around WNYNSC perimeter <u>Reported in:</u> • Annual Environmental Report	Integrating liquid	→ Monthly	→ 12 each location	→ Gross alpha/beta, H-3, pH
SF Soil Series Surface Soil (at each of nine air samplers)	Long-term fallout accumulation <u>Reported in:</u> • Annual Environmental Monitoring Report	Surface plug composite soil	→ Annually	→ 1 each location	→ Gamma isotopic, Sr-90, Pu-239, Am-241, plus U-isotopic at SFRSPRD, SFBOEHN and SFGRVAL
SFCCSED Cattaraugus Creek at Felton Bridge SFSDSED Cattaraugus Creek at Springville Dam SFBISED Cattaraugus Creek at Bigelow Bridge (background)	Deposition in sediment downstream of facility effluents <u>Reported in:</u> • Annual Environmental Monitoring Report	Grab stream sediment	→ Semiannually, (1st sample of SFBCSED and SFSDSED each spring split with NYSDOH)	→ 2 each location	→ Gross alpha/beta, gamma isotopic and Sr-90
SFTCSSED Buttermilk Creek at Thomas Corners Road SFBCSED Buttermilk Creek at Fox Valley Road (background)			→ Annually	→ 1 each location (SFTCSSED and SFBCSED only)	→ U/Pu isotopic, Am-241
SN On-site Soil Series: SNSW74A (Near WNSW74A) SNSWAMP (Near WNSWAMP) SNSP006 (Near WNSP006)	<u>Reported in:</u> • Special Report	Surface plug or grab	→ Annual	→ 1 each location	→ Gamma isotopic, Sr-90, Pu-239, Am-241, U-isotopic, also metals and organic analytes to be determined

Sampling Rationale

AFDHFOP	DOE/EP-0023, 4.7.
AFFXFOP	
AFTCFOP	
AF24FOP	Collection of fallout particles and precipitation around the site perimeter established air sampling locations. Indicates short-term effects.
ANRGFOP	Collection of fallout particles and precipitation on-site at the meteorological tower. Indicates short-term effects.
SF Soil Series	DOE/EH-0173T, 5.9.1. SFWEVAL (West Valley), SFFXVRD (Fox Valley Road), SFSPRVL (Springville), SFTCORD (Thomas Corners), SFRT240 (Route 240), SFDNKRK (Dunkirk), SFBOEHN (Boehn Road-Dutch Hill), SFGRVAL (Great Valley), SFRSPRD (Rock Springs Road): Collection of long-term fallout data at established air sampler locations via soil sampling.
SFTCSED	Sediment deposition in Buttermilk Creek immediately downstream of all facility liquid effluents.
SFBCSED	Sediment deposition in Buttermilk Creek upstream of facility effluents (background).
SFCCSED	Sediment deposition in Cattaraugus Creek at Felton Bridge. Location is first access point of Cattaraugus Creek downstream of the confluence with Buttermilk Creek.
SFSDSED	Sediment deposition in Cattaraugus Creek at Springville dam. Reservoir provides ideal settling and collection location for sediments downstream of Buttermilk Creek confluence. Located downstream of SFCCSED.
SFBISED	Sediment deposition in Cattaraugus Creek at Bigelow Bridge. Location is upstream of the Buttermilk Creek confluence and serves as a Cattaraugus Creek background location.
SN Soil Series	DOE/EH-0173T, 5.9.1. On-site soil.
SNSW74A	Surface soil near WNSW74A . Location to be specifically defined by geographic coordinates. Corresponds to site drainage pattern flow (i.e., most likely area of radiological deposition/accumulation).
SNWSWAMP	Surface soil near WNSWAMP . Location to be specifically defined by geographic coordinates. Corresponds to site drainage pattern flow (i.e., most likely area of radiological deposition/accumulation).
SNSP006	Surface soil near WNSP006 . Location to be specifically defined by geographic coordinates. Corresponds to site drainage pattern flow (i.e., most likely area of radiological deposition/accumulation).

Sampling Rationale

BFFCATC DOE/EH-0173T, 5.11.1.1.

BFFCATD

Radioactivity may enter a food chain in which fish are a major component and are consumed by the local population.

BFFCTRL Background control fish sample.

BFMREED DOE/EH-0173T, 5.8.2.1.

BFMCOBO

BFMWIDR Milk from animals foraging around facility perimeter. Milk is consumed by all age groups and is frequently the most important food that could contribute to the radiation dose. Dairy animals pastured near the site and at two background locations allow adequate monitoring.

BFMCTLS Background control milk samples collected far from site.

BFMCTLN

**1991 MONITORING PROGRAM
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OFF-SITE BIOLOGICAL

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
BFVNEAR Nearby Locations BFVCTRL Remote Locations (16 km or more from facility) BFHNEAR Beef cattle/milk cow forage from near-site location	Fruit and vegetables grown near facility perimeter downwind if possible <u>Reported in:</u> • Annual Environmental Monitoring Report	Grab biological (fruits and vegetables)	→ Annually, at harvest (BFVNEAR and BFVCTRL)	→ 3 each (split with NYSDOH)	→ Gamma isotopic and Sr-90 analysis of edible portions, H-3 in free moisture
BFHCTLS or BFHCTLN Beef cattle/milk cow forage from control location south or north		Grab biological	→ Annually (BFHNEAR, BFHCTLS, or BFHCTLN)	→ 1 each location	→ Gamma isotopic, Sr-90
BFBNEAR Beef animal from nearby farm in downwind direction BFBCTRL Beef animal from control location 16 km or more from facility	Meat (beef foraging near facility perimeter, downwind if possible) <u>Reported in:</u> • Annual Environmental Monitoring Report	Grab biological	→ Semiannually	→ 2 each location	→ Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture
BFDNEAR Deer in vicinity of the site BFDCTRL Control deer 16 km or more from facility		Individual collection biological	→ Annually, during hunting season (BFDNEAR sample split with NYSDOH) During year as available (BFDCTRL sample split with NYSDOH)	→ 3 → 3	→ Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture → Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture

Sampling Rationale

BFVNEAR DOE/EH-0173T, 5.8.2.2.

Fruits and vegetables collected from areas near the site. Collected, if possible, from areas near the site predicted to have worst case downwind concentrations of radionuclides in air and soil. Sample analysis reflects steady state/chronic uptake or contamination of foodstuffs as a result of site activities. Possible pathway to humans or indirectly through animals.

BFVCTRL DOE/EH-0173T, 5.8.2.2

Fruits and vegetables collected from area remote from the site. Background fruits and vegetables collected for comparison with near-site samples. Collected in area(s) of no possible site impact.

BFHNEAR DOE/EH-0173T, 5.8.2.2

Hay collected from areas near the site. Same as for near-site fruits and vegetables (**BFVNEAR**). Indirect pathway to humans through animals. Collected with either beef or milk sample location.

BFHCTLS DOE/EH-0173T, 5.8.2.2.

BFHCTLN

Hay collected from areas remote from the site. Background hay collected for comparison with near-site samples. Collected in area(s) of no possible site impact.

BFBNEAR DOE/EH-0173T, 5.8.2.3.

Beef collected from animals raised near the site. Following the rationale for vegetable matter collected near site (**BFVNEAR** and **BFHNEAR**), edible flesh portion of beef animals is analyzed to determine possible radionuclide content passable directly to humans. For animals foraging downwind in areas of maximum probable site impact.

BFBCTRL DOE/EH-0173T, 5.8.2.3.

Beef collected from animals raised far from the site. Background beef collected for comparison with near-site samples. Collected in area(s) of no possible site impact.

BFDNEAR DOE/EH-0173T, 5.8.3.

Venison from deer herd found living near the site. Same as for beef (**BFBNEAR**).

BFDCCTRL DOE/EH-0173T, 5.8.3.

Venison from deer herd living far from the site. Background deer meat collected for comparison with near-site samples. Collected in area(s) of no possible site impact.

**1991 MONITORING PROGRAM
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OFF-SITE DIRECT RADIATION

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
<p>DFTLD Series Thermoluminescent Dosimetry (TLD) Off-Site:</p> <p>#1-16 At each of 16 compass sectors, at nearest accessible perimeter point</p> <p>#17 "5 Points" landfill, 19 km SW (background)</p> <p>#20 1500 m NW (downwind receptor)</p> <p>#21 Springville 7 km N</p> <p>#22 West Valley 5 km SSE</p> <p>#23 Great Valley 9 km S (background)</p> <p>#37 Dunkirk 50 km NW (background)</p> <p>#41 Sardinia-Savage Road 24 km NE (background)</p>	<p>Direct radiation around facility</p> <p><u>Reported in:</u></p> <ul style="list-style-type: none"> • Monthly Environmental Monitoring Trend Analysis • Annual Environmental Monitoring Report 	<p>Integrating LiF TLD</p>	<p>→ Quarterly</p>	<p>→ 5 TLDs at each of 23 locations collected 4 times per year</p>	<p>→ Quarterly gamma radiation exposure</p>

Sampling Rationale

DOSIMETRY DOE/EH-0173T, 5.5 and DOE/EP-0023, 4.6.3.

Off-Site

TLDs offer continuous integrated environmental gamma-ray monitoring and have been deployed systematically about the site. Off-site TLDs are used to verify that site activities have not adversely affected the surrounding environs.

In addition to general NRC crosschecks, a biennial HPIC gamma radiation measurement is completed at all TLD locations.

**1991 MONITORING PROGRAM
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ON-SITE DIRECT RADIATION

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
<p>DNTLD Series Thermoluminescent Dosimetry (TLD) Onsite:</p> <p>#18, #19, #33 At three corners of SDA</p> <p>#24, #26-32, #34 (9) at security fence around site</p> <p>#35, #36, #38-40 (5) On-site near operational areas</p> <p>#25 Rock Springs Road 500 m NNW of plant</p>	<p>Direct radiation on facility grounds</p> <p><u>Reported in:</u></p> <ul style="list-style-type: none"> • Monthly Environmental Monitoring Trend Analysis • Annual Environmental Monitoring Report 	<p>Integrating LiF TLD</p>	<p>→ Quarterly</p>	<p>→ 5 TLDs at each of 18 sites collected 4 times per year</p>	<p>→ Quarterly gamma radiation exposure</p>

Sampling Rationale

DOSIMETRY DOE/EH-0173T, 5.4 and 5.5.

On-site

On-site TLDs monitor waste management units and verify that the potential dose rate to the general public (i.e., Rock Springs Road), is below 100 mrad/annum from site activities.

Potential TLD sampling locations are continually evaluated with respect to site activities.

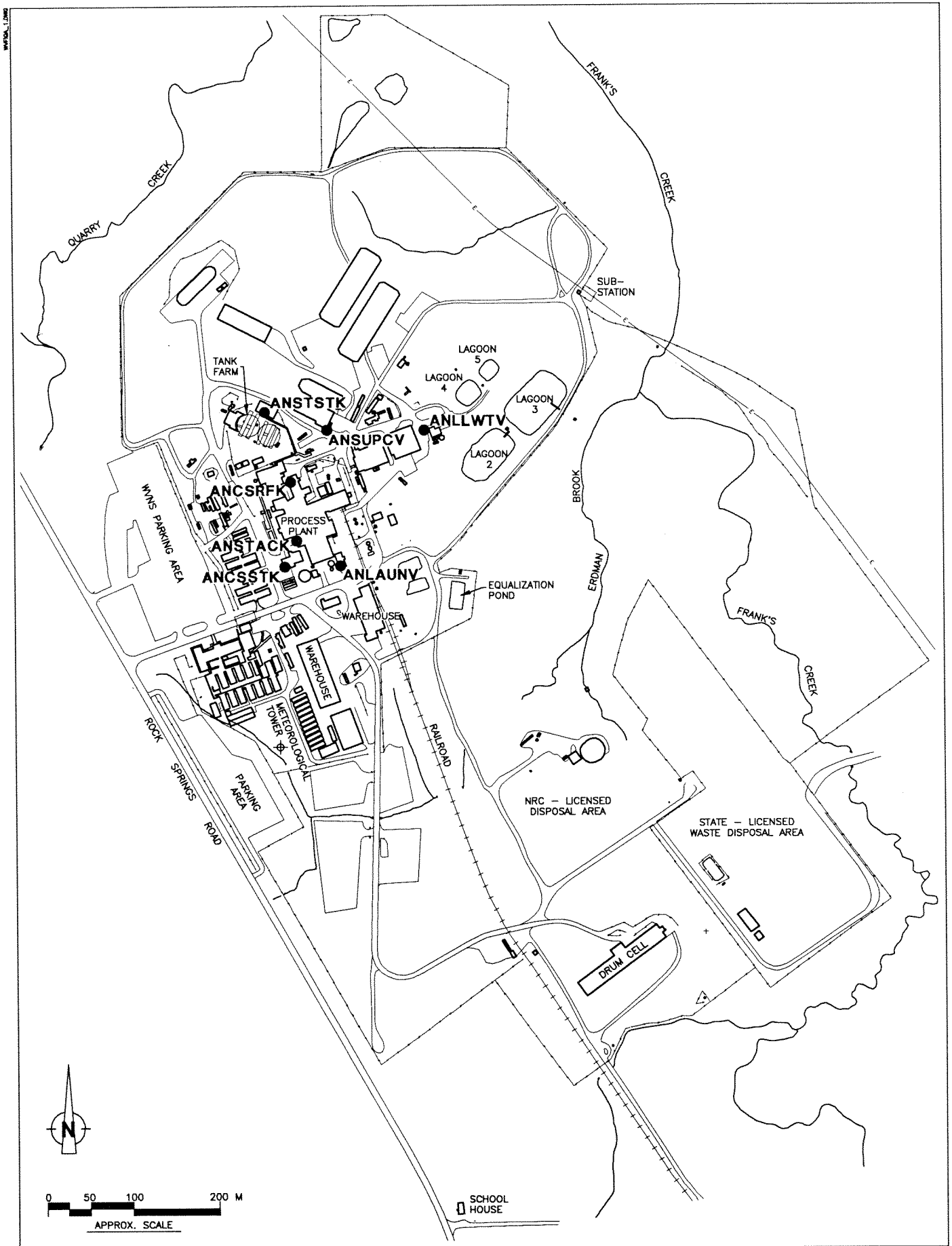


Figure A-1. Location of On-Site Air Effluent Points.

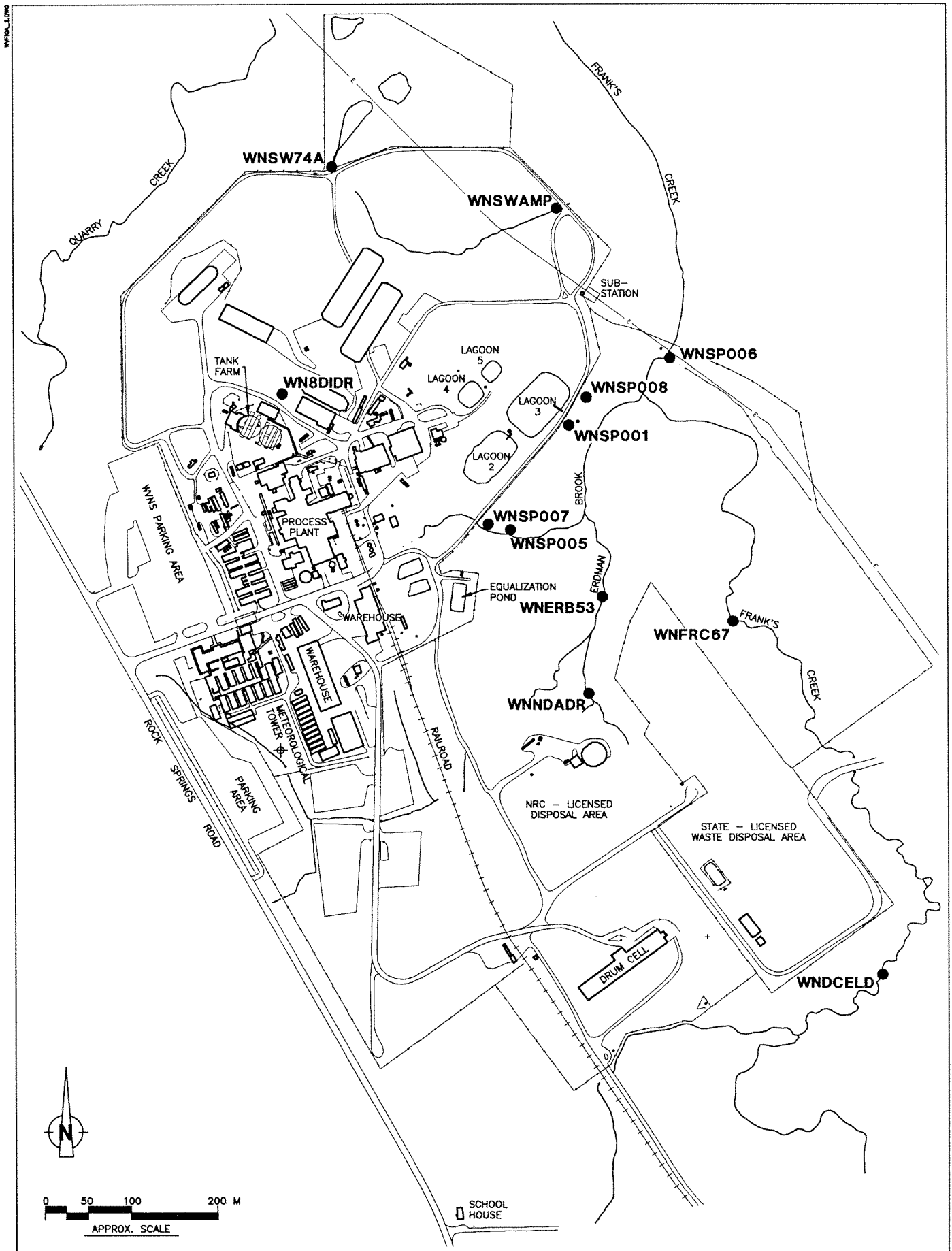


Figure A-2. Sampling Locations for On-Site Surface Water.

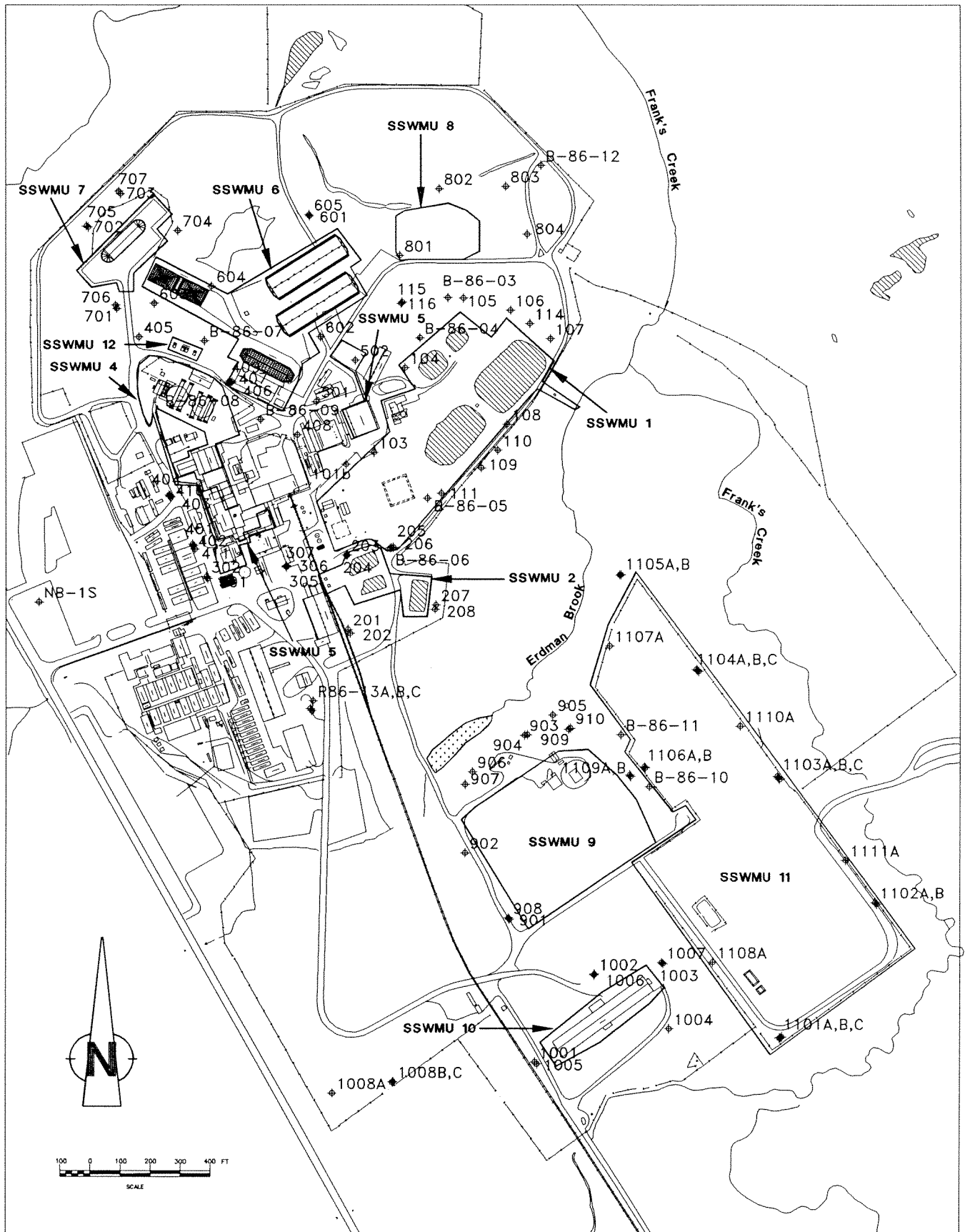


Figure A-3. Location of On-site Groundwater Monitoring Network Wells

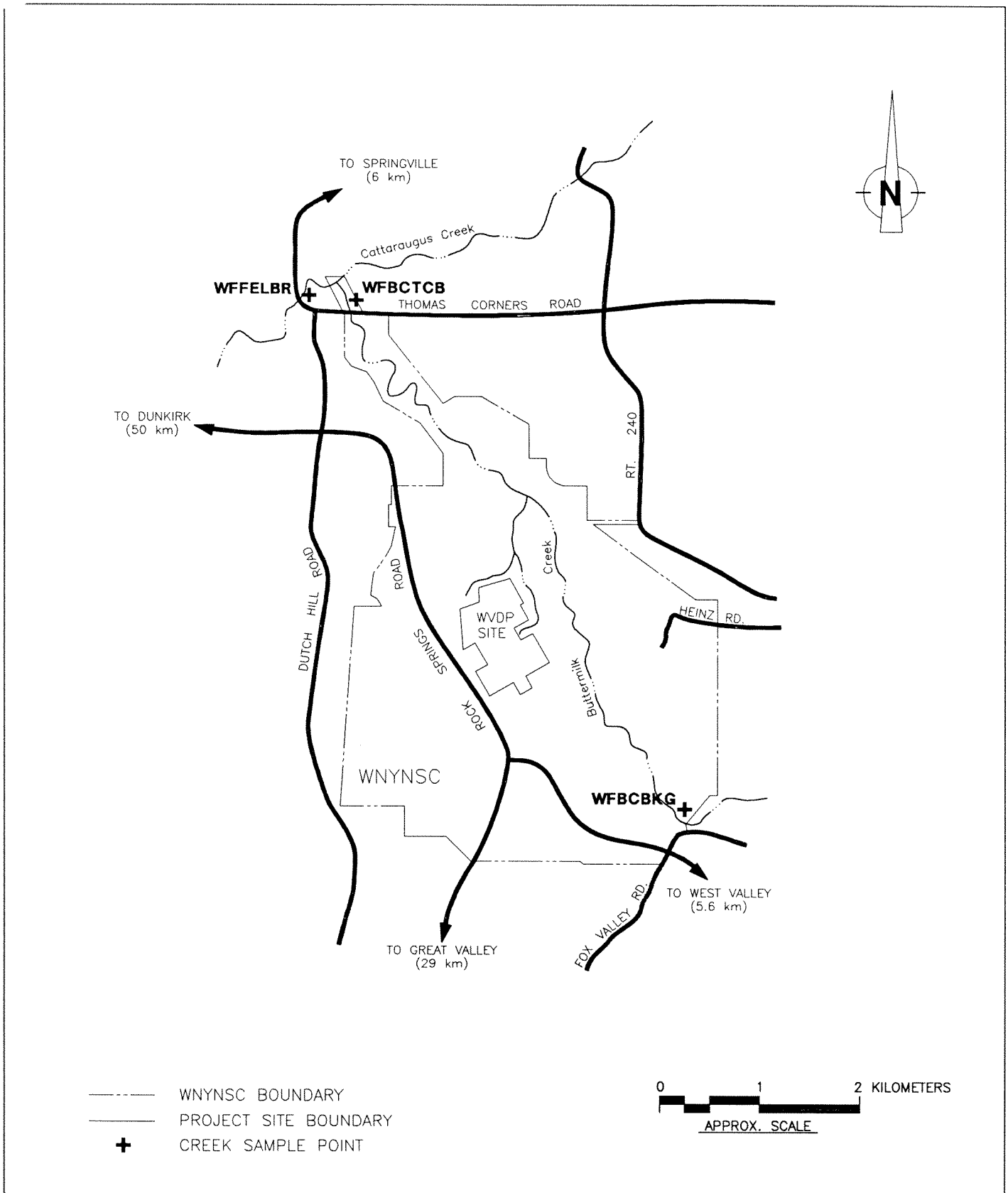


Figure A-4. Location of Off-Site Surface Water Samplers.

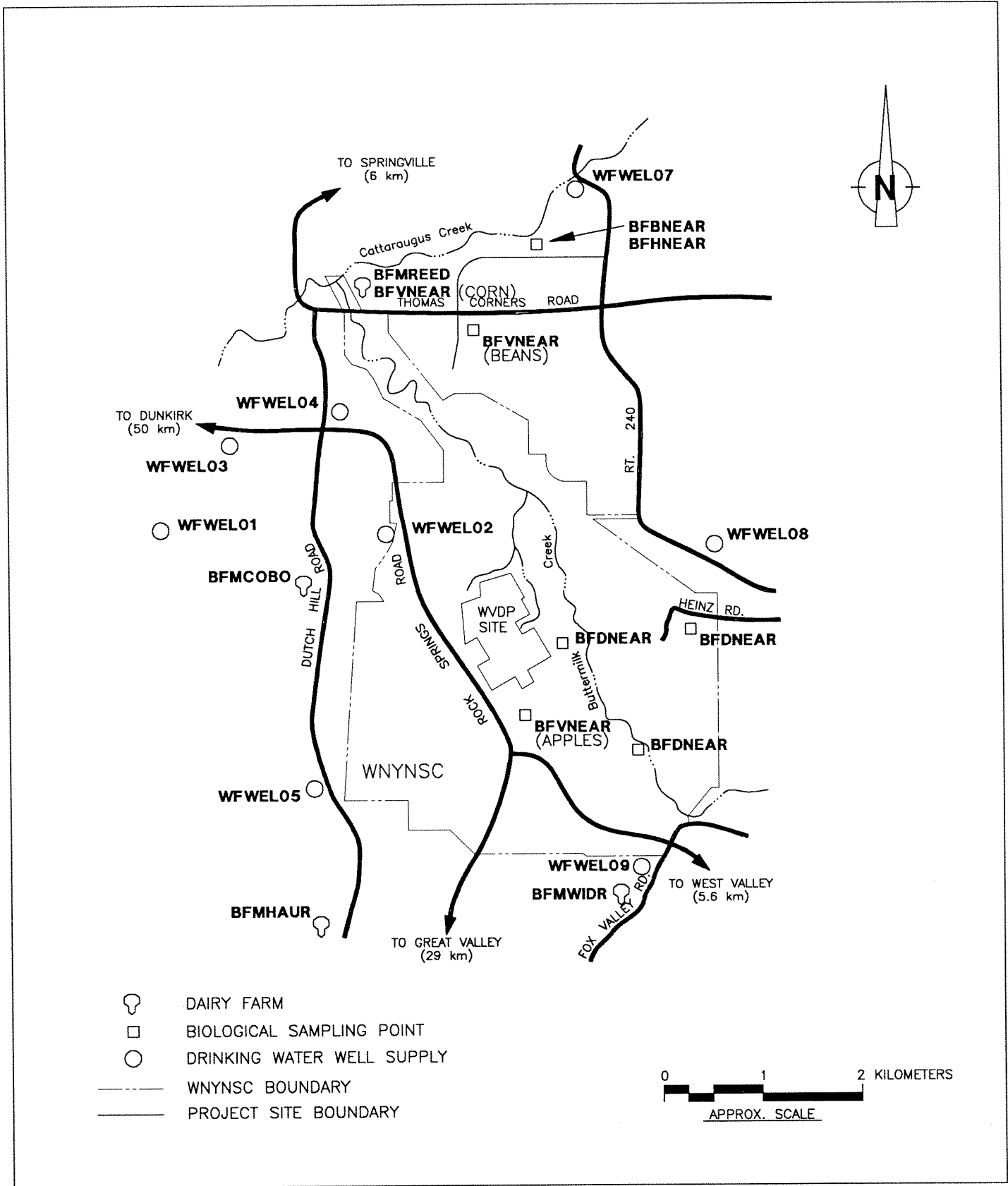


Figure A-5. Near-Site Drinking Water and Biological Sampling Points – 1991.

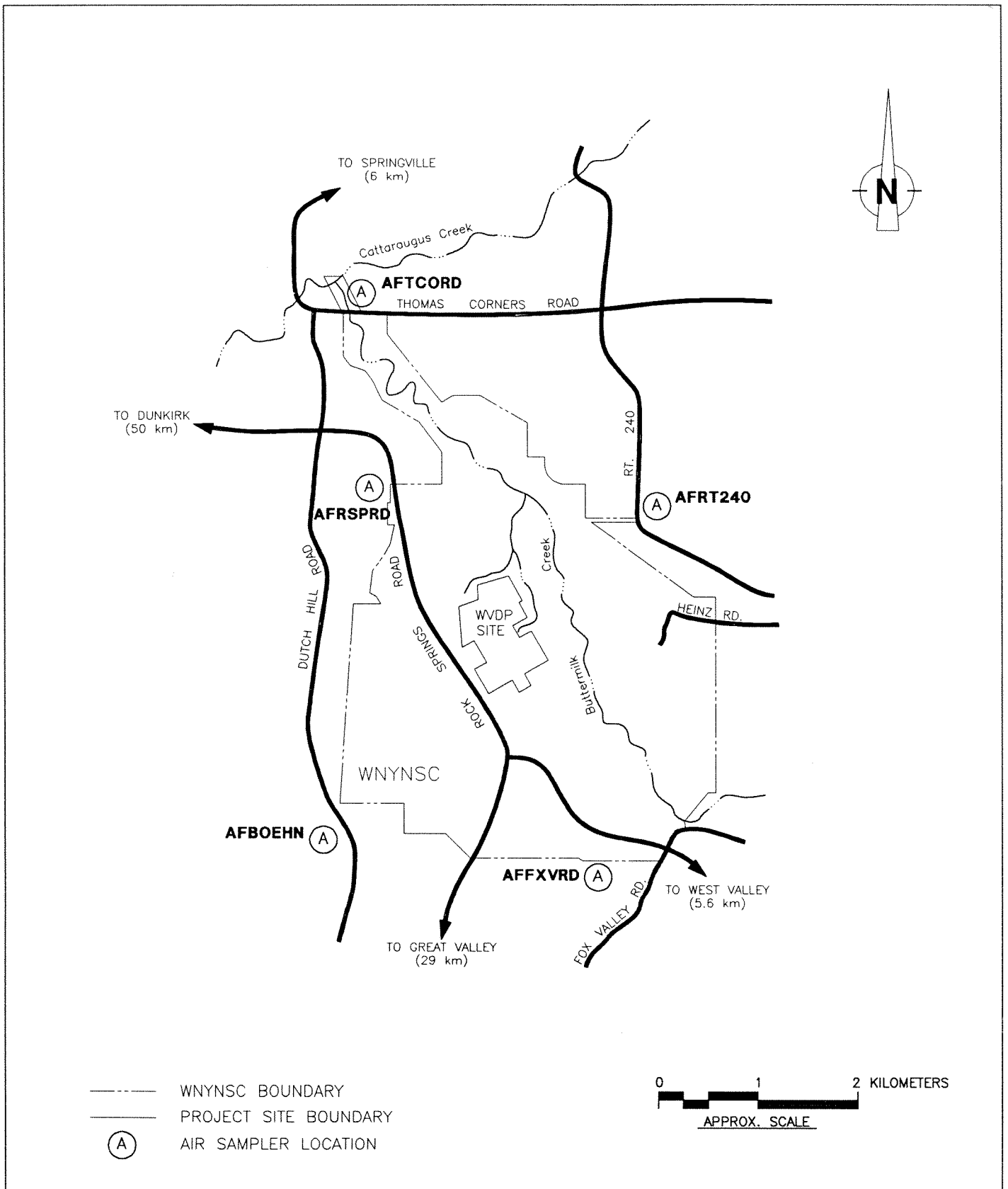


Figure A-6. Location of Perimeter Air Samplers.

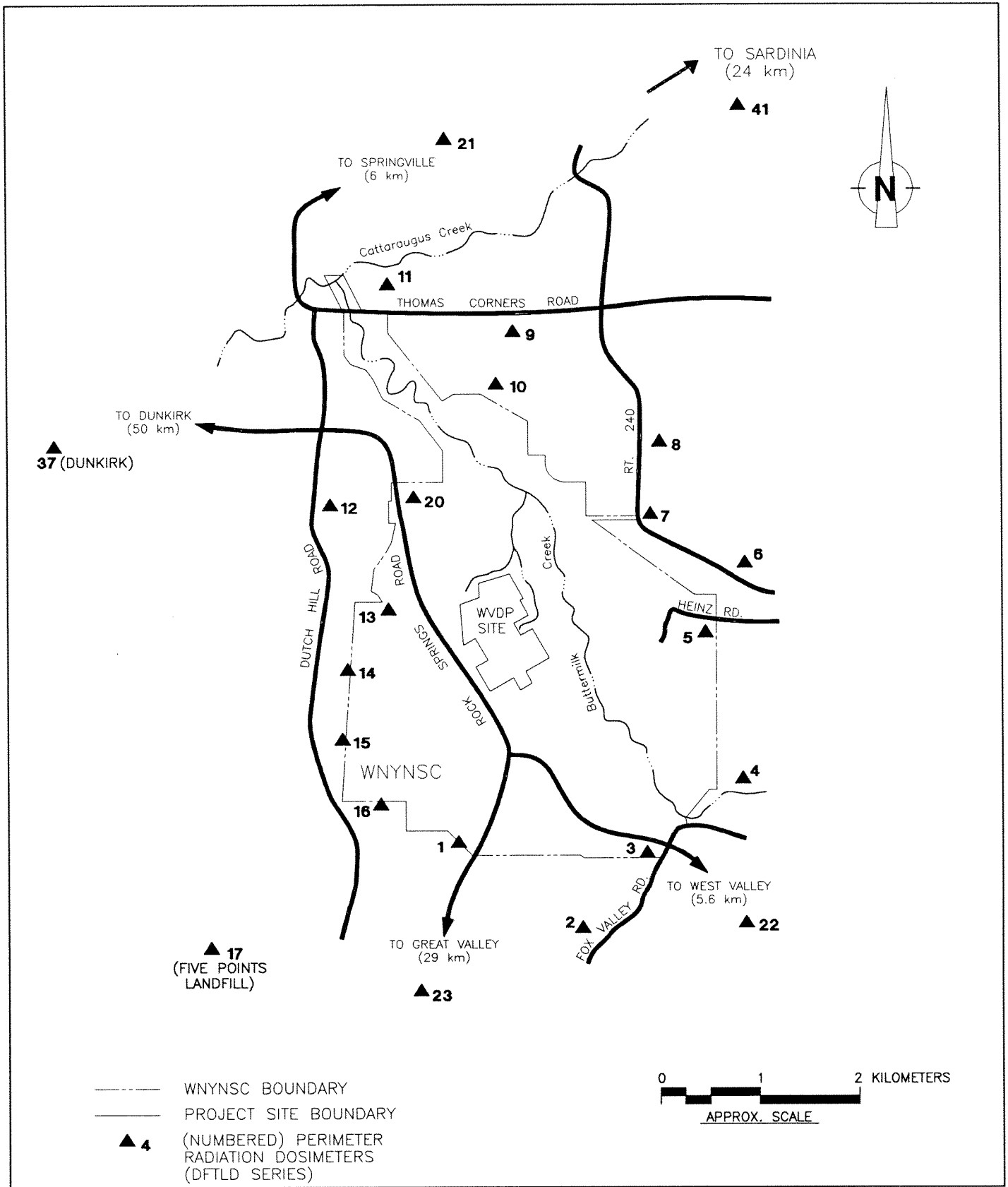


Figure A-7. Location of Off-Site Thermoluminescent Dosimetry (TLD).

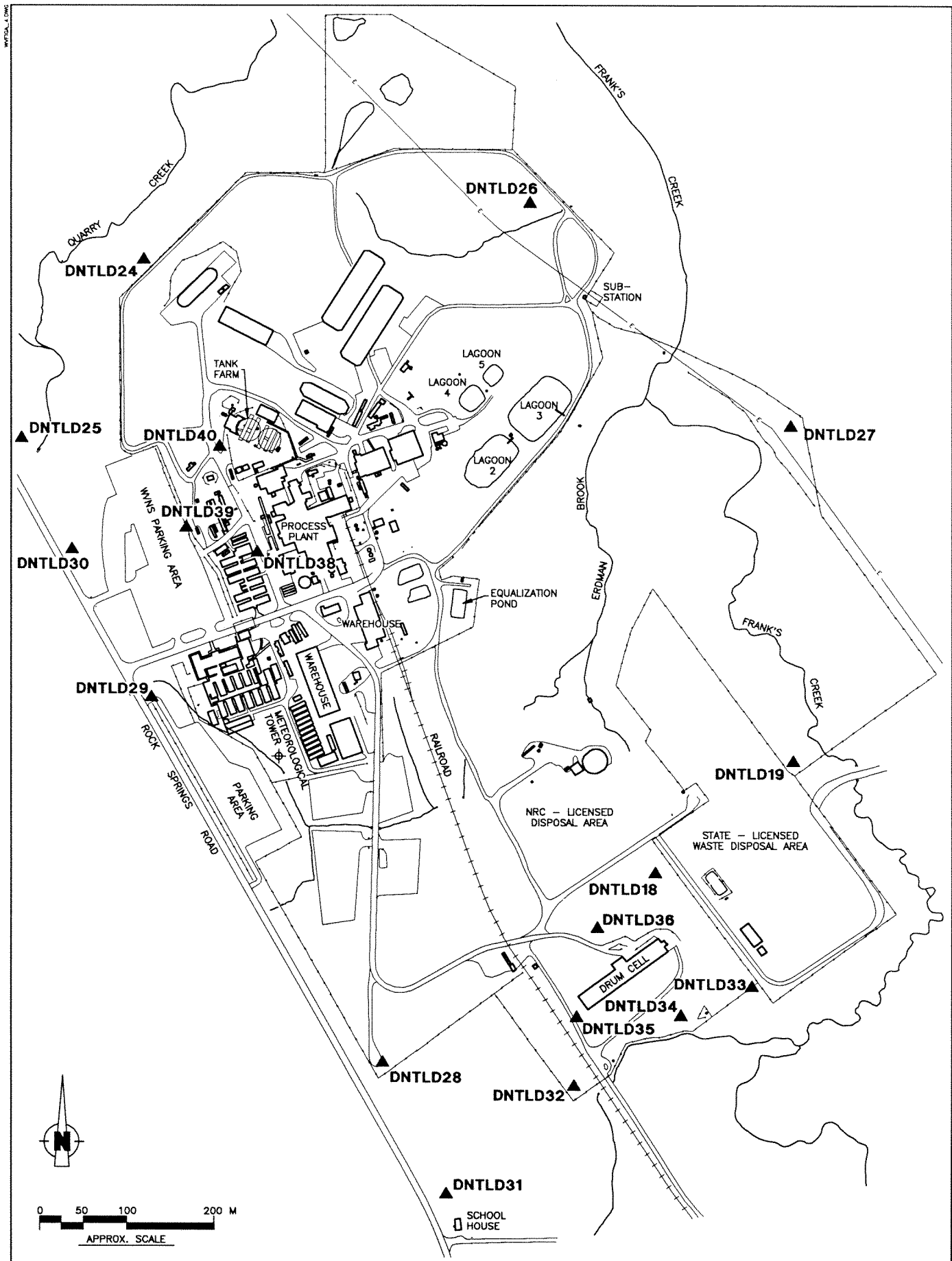
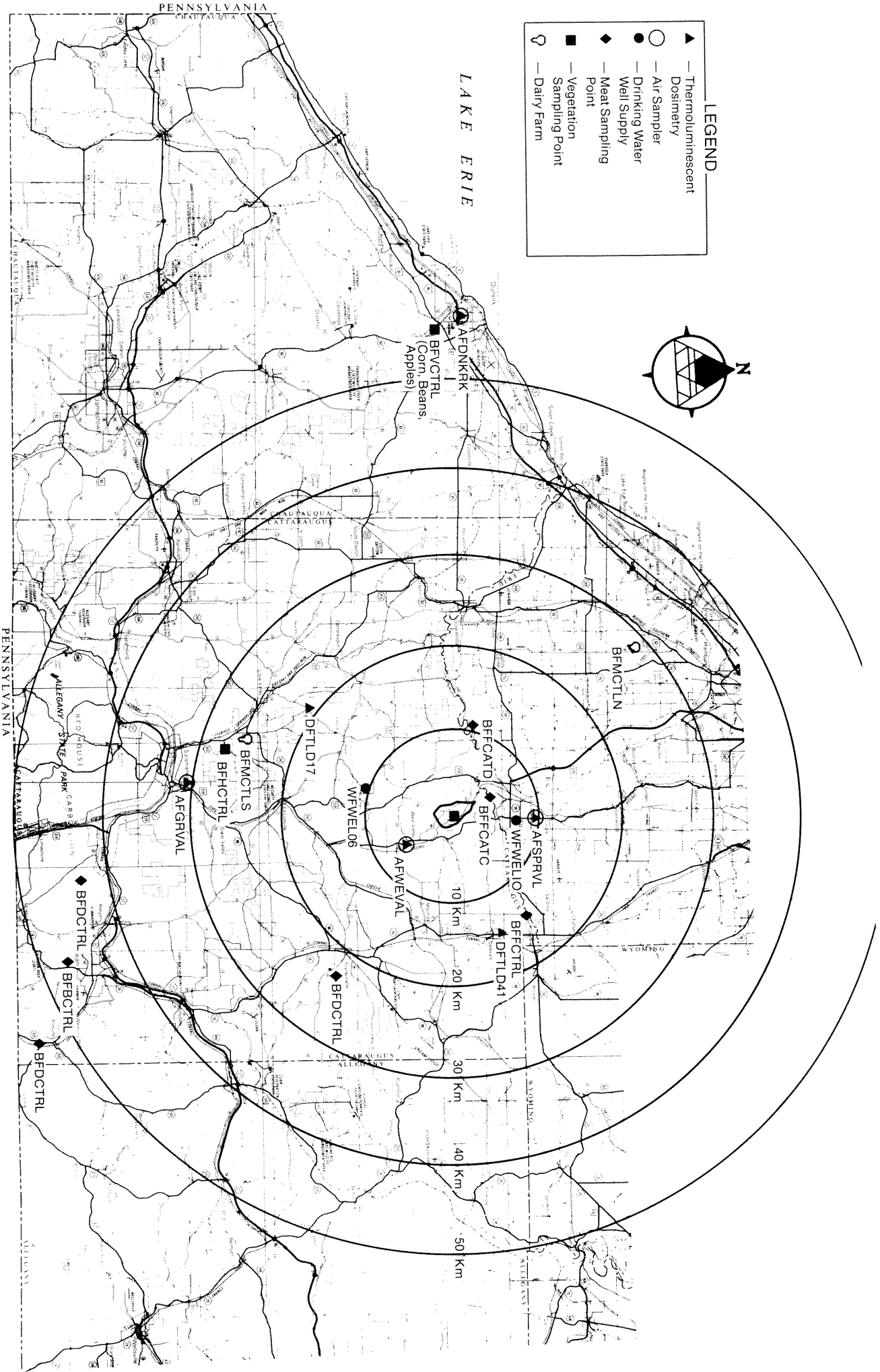


Figure A-8. Location of On-Site Thermoluminescent Dosimetry (TLD).



REF: NYS DOT, New York State Map — West Sheet,
1:250,000, Revised 1982



Figure A-9. Environmental Sample Points more than 5 km from the WVDP Site