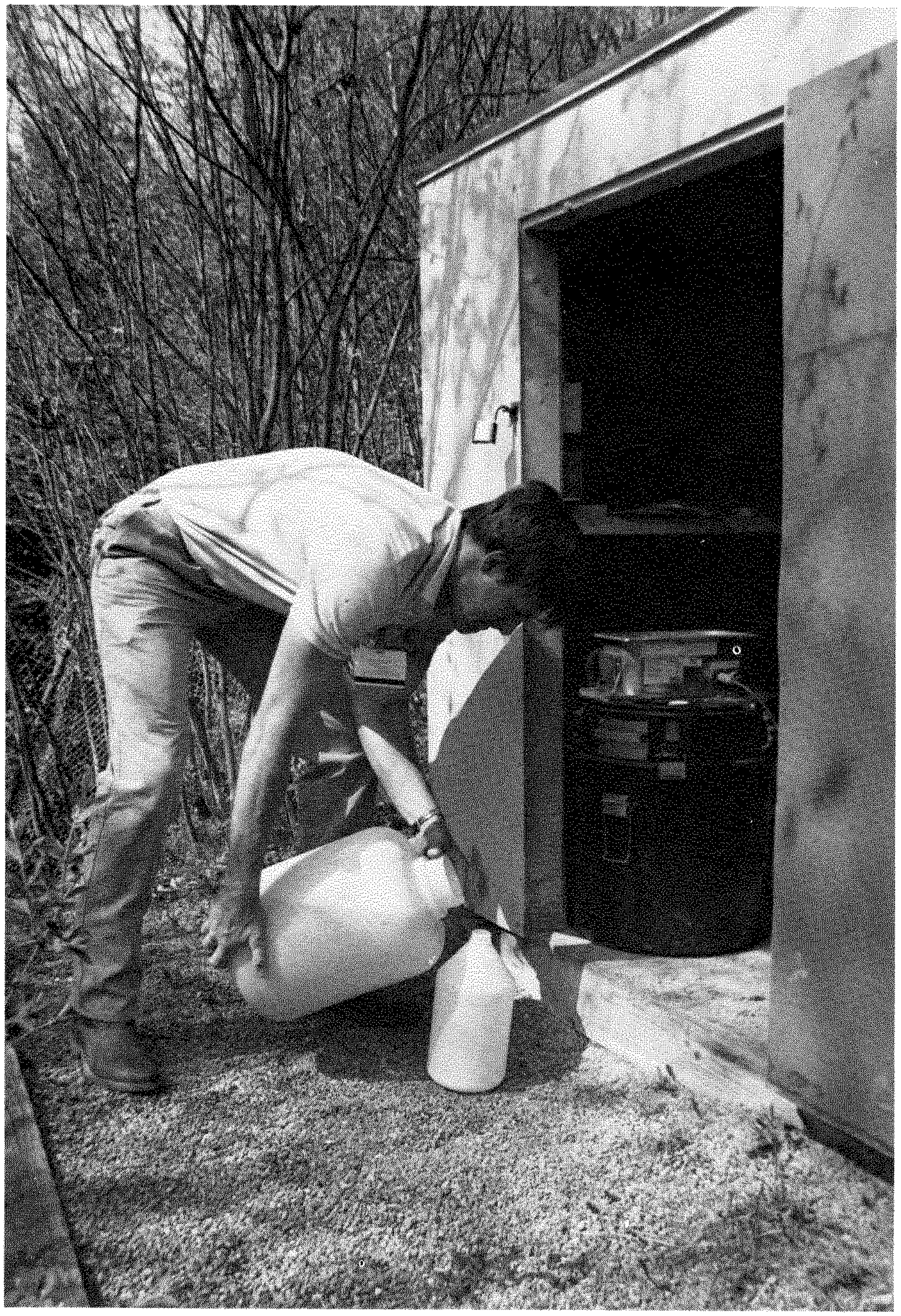

Collecting a Composite Water Sample at the Project Boundary

Environmental Monitoring

Pathway Monitoring

The effluent and environmental monitoring program provides data on soils, sediments, food and produce, and on the effluent air and liquids that could provide pathways for the movement of radionuclides or hazardous substances from the facility to the public. Both radiological and nonradiological parameters are monitored in order to ascertain the effect of Project activities.

Sediments are sampled upstream and downstream of the WVDP. The food pathway is monitored by collecting samples of hay, milk, and produce at both near-site and remote locations, samples of fish downstream of the site, and venison samples from the on-site deer herd. Direct radiation on-site, at the perimeter of the site, and at background locations also is monitored to provide additional data.

The primary focus of the monitoring program, however, is on air and water pathways, as these would be the major means of transport of radionuclides from the site.

Air and Liquid Effluent Pathways

Air and liquid effluents are monitored on-site by collecting samples at locations where small amounts of radioactivity or other regulated substances are normally released or might be released, such as plant ventilation stacks or various water effluent outfalls or weirs.

Surface Water Pathways

Surface water samples are collected from the creeks that flow through the 3,345-acre WNYNSC (tributaries of Cattaraugus Creek) and from drainage channels within the site. Surface water is also sampled at the on-site water supply reservoirs and low-level waste treatment lagoons.

Both air and water samples are also collected at remote locations as well in order to provide background concentration data and at perimeter locations where the highest concentrations of transported radionuclides might be found.

Sampling Codes

The complete monitoring schedule is detailed in *Appendix A*. This schedule provides information on monitoring and reporting requirements and the types and extent of sampling and monitoring at each location. An explanation of the codes that identify the sample medium and the specific sampling or monitoring location also is found in *Appendix A*.

These codes are used throughout this report for ease of reference. For example, a sample location code such as AFGRVAL indicates an air sample (A), off-site (F), at the Great Valley (GRVAL) sampling station.

Air Sampler Location and Operation

Air samplers are located at points remote from the West Valley Demonstration Project site, at the perimeter of the site, and on the site itself. Figure 2-1 shows the locations of the on-site air samplers; Figure 2-2 shows the location of the perimeter and remote air samplers.

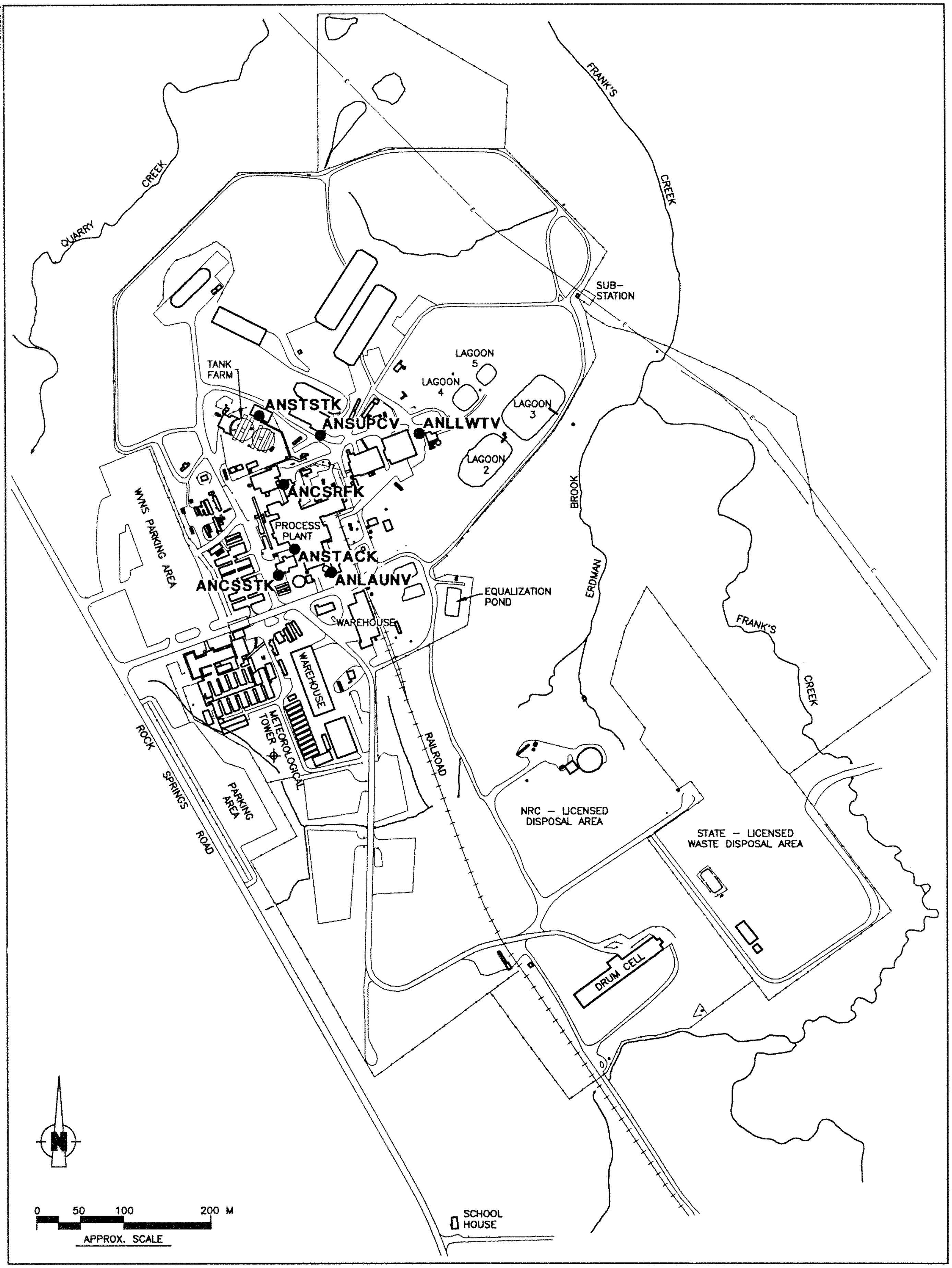

Figure 2-1. Location of On-Site Air Effluent Points.

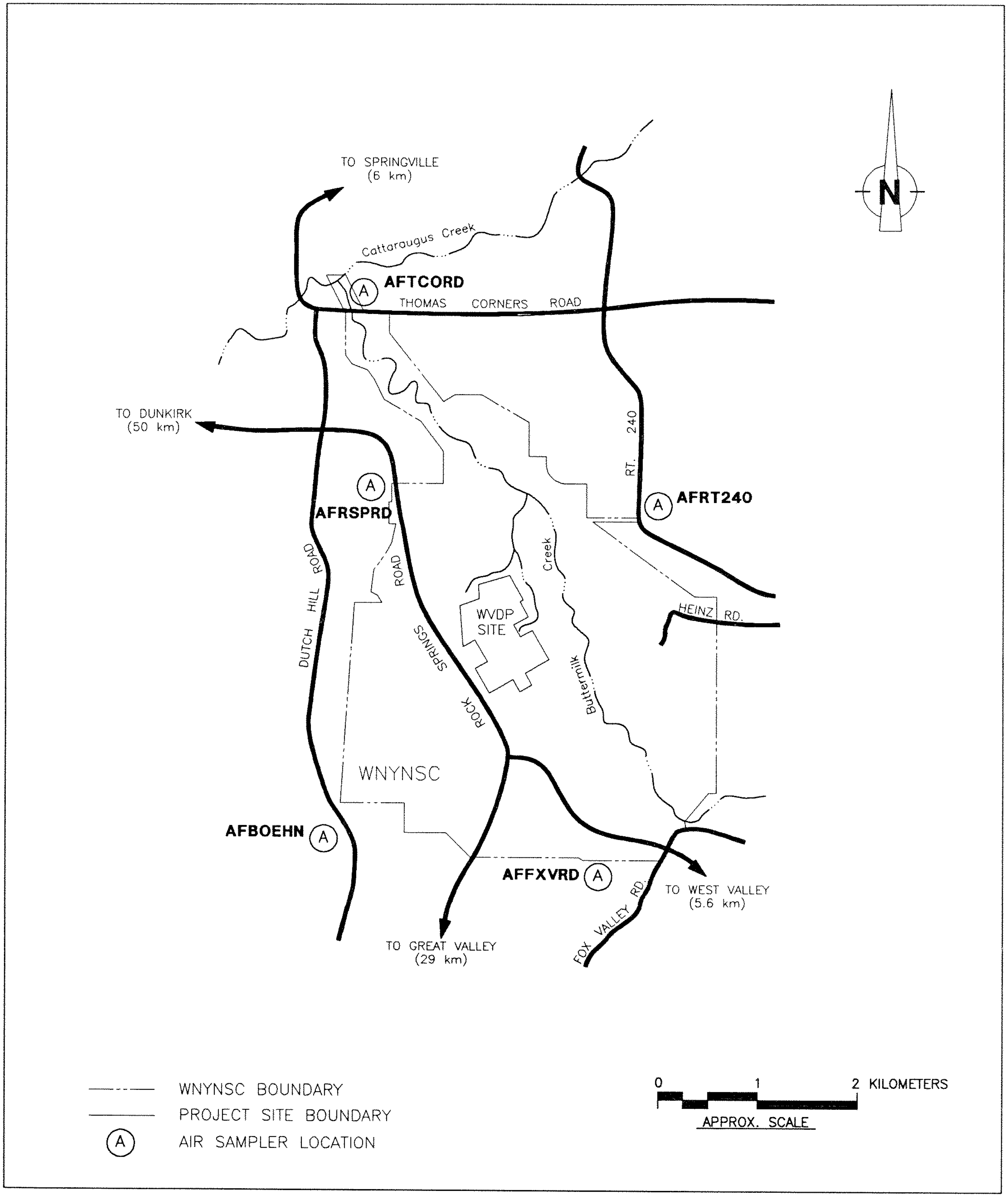

Figure 2-2. Location of Perimeter Air Samplers.

Air samples are collected by drawing air through a very fine filter with a vacuum pump. The total volume of air drawn through the sampler is measured and recorded. The filter traps particles of dust that are then tested in the laboratory for radioactivity. At the Rock Springs Road and Great Valley locations samples are also collected for iodine-129 analysis using activated carbon cartridges. (A more detailed description of the air sampling program follows below.)

Water Sampler Location and Operation

Automatic samplers collect surface water at points along drainage channels within the WNYNSC that are most likely to show any radioactivity released from the site and at a background station upstream of the site. Figure 2-3 shows the location of the on-site surface water monitoring points; Figure 2-4 shows the location of the off-site surface water monitoring points. (On-site locations are WNSP006, WNNDADR, and WNSW74A. Off-site locations are WFBCTCB, WFFELBR, and the background location, WFBCBKG.)

Water samplers draw water through a tube extending to an intake below the stream surface. An electronically controlled battery-powered pump first blows air through the sample line to clear any debris. The pump then reverses to collect a sample, reverses again to clear the line, then resets itself. The pump and sample container are housed in an insulated and heated shed to allow sampling throughout the year. (A more detailed description of the water sampling program follows below.)

Radiological Monitoring

Air Monitoring

On-site Ventilation Systems

Permits obtained from state and federal agencies allow air to be released from plant ventilation stacks during normal operations. The air released must meet certain federal and state criteria that ensure that the environment and the public's health and safety are not adversely affected by these releases.

Parameters measured include gross alpha and gross beta, tritium, and various isotopes such as cesium-137 and strontium-90. To provide conservatively high values, alpha and beta radioactivity is assumed to come from americium-241 (alpha radiation) and strontium-90 (beta radiation), as the derived concentration guides (DCGs) for these isotopes are the most stringent. (Department of Energy standards and DCGs for radionuclides of interest at the West Valley Demonstration Project are found in *Appendix B*.)

The exhaust from each permitted fixed ventilation system serving the site's facilities is continuously filtered, monitored, and sampled as it is released to the atmosphere. Specially designed isokinetic sampling nozzles continuously remove a representative portion of the exhaust air, which is then drawn through very fine, glass fiber filters to trap any particles. Sensitive detectors continuously measure the radioactivity on these filters and provide remote readouts of alpha and beta radioactivity levels to monitored display panels.

The air released must meet federal and state criteria that ensure that the environment and the public's health and safety are not adversely affected.

A separate sampling unit on the ventilation stack of each system contains another filter that is removed every week and tested in the laboratory. This sampling system also may contain an activated carbon cartridge used to collect a sample that is analyzed for iodine-129.

In addition to these samples, water vapor from the main plant ventilation stack (ANSTACK) is collected by trapping moisture on silica gel desiccant columns. The trapped water is distilled from the silica gel desiccant and analyzed for tritium.

Because tritium, iodine, and other isotopic concentrations are quite low, the large-volume samples collected weekly from the main plant stack and from other emission-point samplers provide the only practical means of determining the amount of specific radionuclides released from the facility.

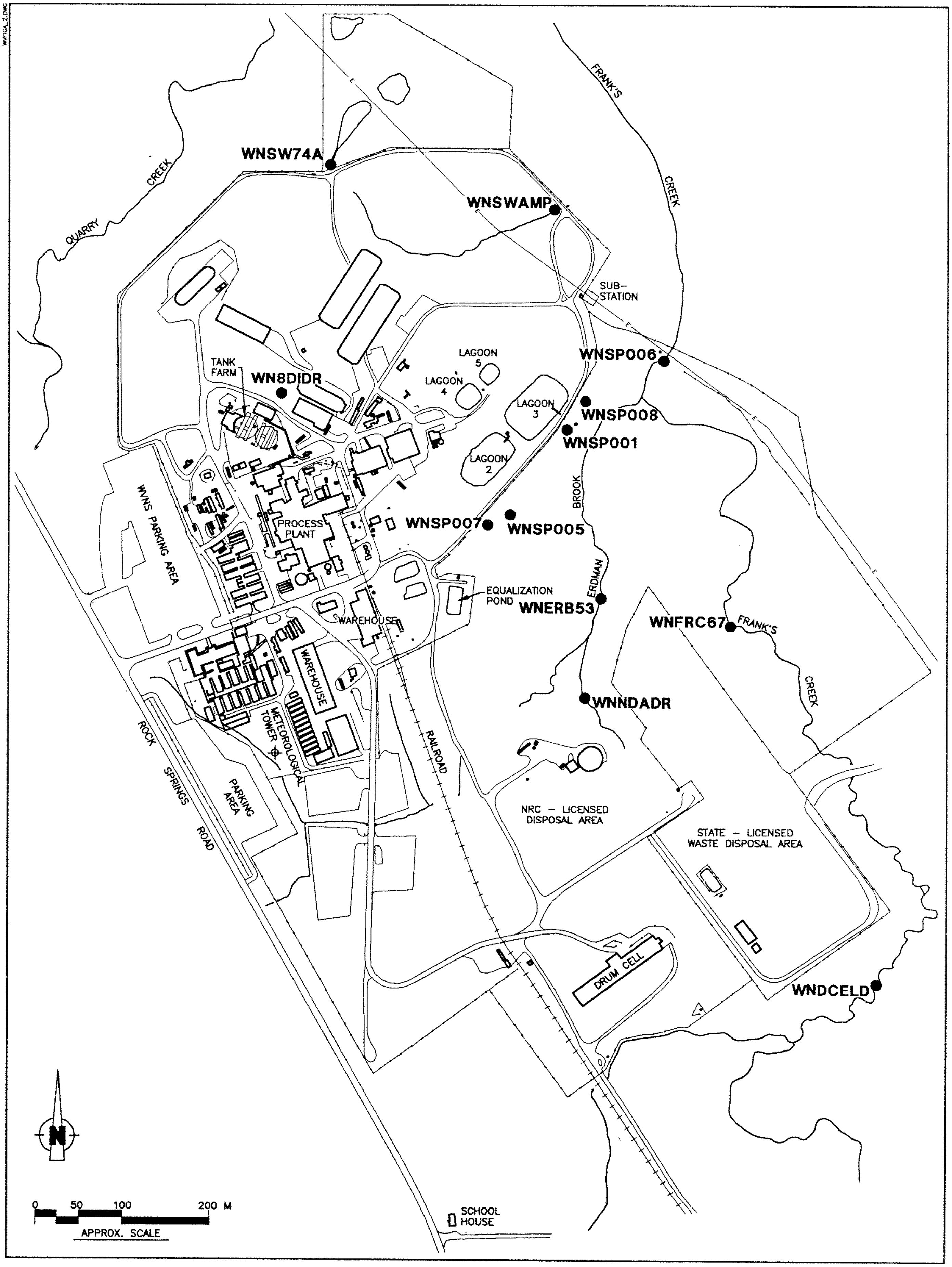

Figure 2-3. Sampling Locations for On-Site Surface Water.

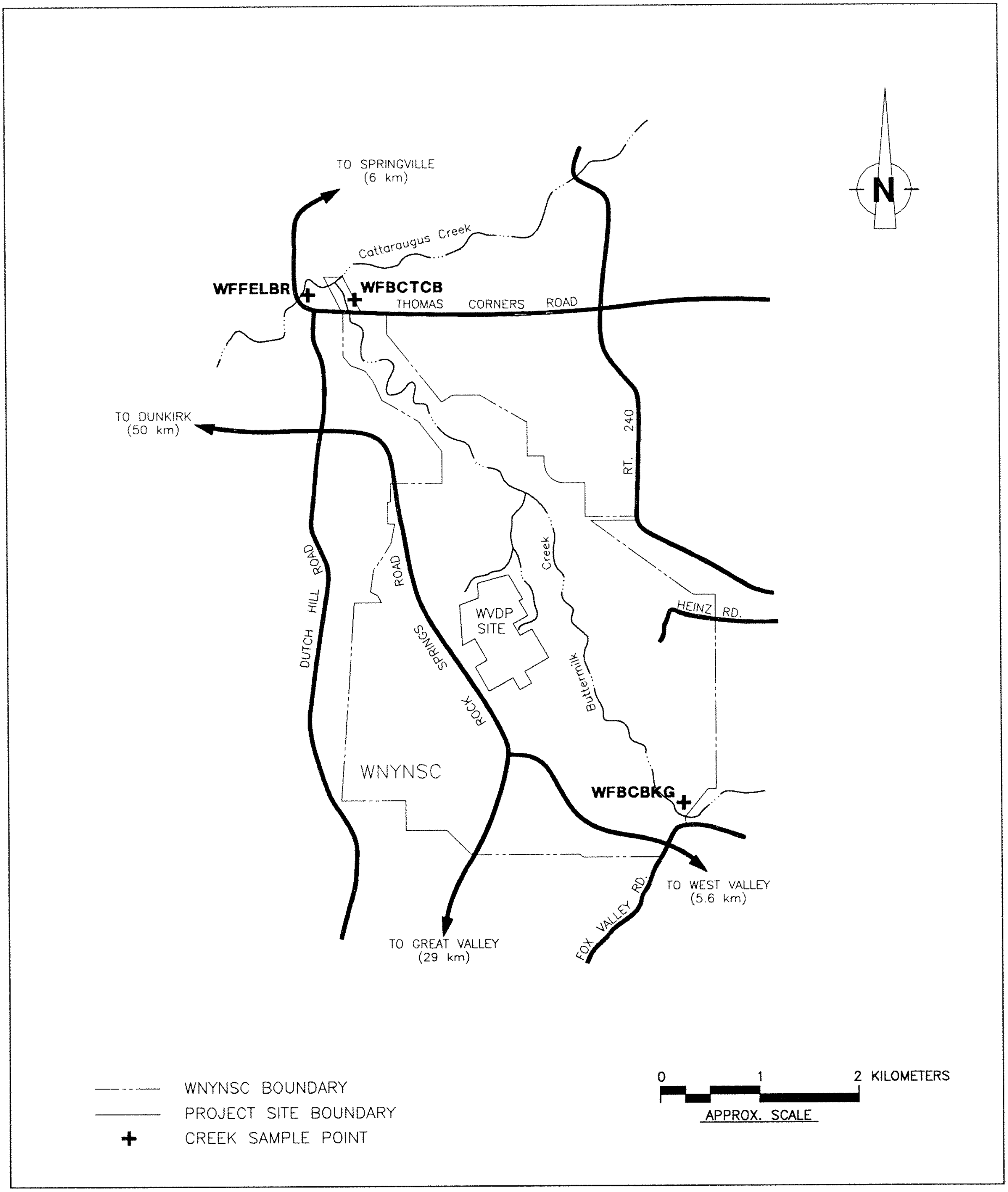

Figure 2-4. Location of Off-Site Surface Water Samplers.

- The Main Plant Ventilation Stack (ANSTACK)

The main ventilation stack (ANSTACK) sampling system is the most significant airborne effluent point. A high sample collection flow rate through multiple intake nozzles ensures a representative sample for both the weekly filter sample and the on-line monitoring system. The total quantity of gross alpha, gross beta, and tritium released each month from the main stack, based on weekly filter measurements, is shown in *Appendix C-2*, Table C-2.1.

Analyses of specific radionuclides in the four quarterly composites of the main stack effluent samples are listed in Table C-2.2. A comparison of the average concentrations of these measured isotopes with Department of Energy derived concentration guides (DCGs) in Table C-2.3 shows that at the point of discharge, average radioactivity levels were already below concentration guidelines for airborne radioactivity in an unrestricted environment. Further dilution from the stack to the site boundary reduces the concentration by an average factor of about 200,000.

At the point of discharge, average radioactivity levels were already below concentration guidelines for airborne radioactivity.

- Other On-site Sampling Systems

Sampling systems similar to those of the main stack monitor airborne effluents from the cement solidification system ventilation stack (ANCSSTK), the contact size-reduction facility ventilation stack (ANCSRFK), and the supernatant treatment system ventilation stack (ANSTSTK). The 1991 samples showed detectable gross radioactivity, including specific beta- and alpha-emitting isotopes, but did not approach any Department of Energy effluent limitations. Tables C-2.4 through C-2.9 in *Appendix C-2* show monthly totals of gross alpha and beta radioactivity and concentrations of specific radionuclides for each of these sampling locations.

Three other operations are routinely monitored for airborne radioactive releases: the low-level waste treatment facility ventilation system (ANLLWTF), the contaminated clothing laundry ventilation system (ANLAUNV), and the supercompactor volume reduction ventilation system (ANSUPCV).

Perimeter and Remote Air Sampling

As in previous years, airborne particulate radioactive samples were collected continuously at five locations around the perimeter of the site and at four remote locations at Great Valley, West Valley, Springville, and at Dunkirk, New York. (See Fig. 2-2.)

Perimeter locations — on Fox Valley Road, Rock Springs Road, Route 240, Thomas Corners Road, and Dutch Hill Road — were chosen to provide historical continuity or because the location would probably provide the highest annual average airborne concentrations of radioactivity.

The remote locations provide data from nearby communities — West Valley and Springville — and from natural background areas. Concentrations measured at Great Valley (AFGRVAL, 29 km south of the site) and Dunkirk (AFDNKRK, 50 km west of the site) are considered representative of natural background radiation.

Three of the four perimeter samplers, mounted on towers 4 meters high, maintain an average flow of about 40 L/min (1.4 ft^3/min) through a 47-mm glass fiber filter. The remaining perimeter sampler and the four remote samplers operate with the same air flow rate as the three samplers mounted on towers, but the sampler head is set at 1.7 meters above the ground, the height of the average human breathing zone.

Perimeter locations provide historical continuity in the air sampling program.

Filters from off-site and perimeter samplers are collected weekly and analyzed after a seven-day "decay" period to remove interference from short-lived naturally occurring radioactivity. Gross alpha and gross beta measurements of each filter are made using a low-background gas proportional counter.

In addition, quarterly composites consisting of thirteen weekly filters from each sample station are analyzed. Data from these samplers are provided in *Appendix C-2*, Tables C-2.12 through C-2.20.

Radioactivity Concentrations at On-site Air Sampling Locations

The total amount of radioactivity discharged from facilities other than the main ventilation stack is less than 1% of the airborne radioactivity released from the site and was not a significant factor in the airborne pathway in 1991.

Radioactivity Concentrations at Perimeter and Remote Air Sampling Locations

Air samples are measured weekly and the values averaged each month. The maximum and minimum monthly average values are presented as concentrations that reflect normal seasonal variations.

The average monthly concentrations at the perimeter and remote locations ranged from 1.51E-14 µCi/mL to 1.94E-14 µCi/mL (5.6E-04 Bq/m^3 to 7.2E-04 Bq/m^3) of beta activity and from 9.43E-16 µCi/mL to 1.71E-15 µCi/mL (3.5E-05 Bq/m^3 to 6.3E-05 Bq/m^3) of alpha activity. In all cases, the measured monthly gross radioactivities were well below 3E-12µCi/mL (1.1E-1 Bq/m^3) beta and 2E-14 µCi/mL (7.4E-4 Bq/m^3) alpha, the most stringent acceptable limits or DCGs set by the Department of Energy for any of the isotopes present at the WVDP. Iodine-129 was not detected at either the Rock Springs Road location (AFRSPRD) or the Great Valley location (AFGRVAL). Tables C-2.13 and C-2.18 in *Appendix C-2* contain the data for these two samplers.

The 1991 data for the three samplers that have been in operation since 1982 — Fox Valley, Thomas Corners, and Route 240 — averaged about 1.73E-14 µCi/mL (6.4E-04 Bq/m^3) of gross beta activity in air. This average is comparable to 1990 data. The average gross beta concentration at the Great Valley background station was 1.64E-14 µCi/mL (6.1E-04 Bq/m^3) in 1990, and in 1991 averaged 1.63E-14 µCi/mL (6.0E-04 Bq/m^3).

Global Fallout Sampling

Global fallout is also sampled at four of the perimeter air sampler locations and at the base of the on-site meteorological tower. Precipitation from all of the locations is collected and analyzed every month. Results from these measurements are reported in nCi/m2 per month for gross alpha and gross beta and in mCi/mL for tritium. (The 1991 data from these analyses are found in Appendix C-2, Table C-2.21. Table C-2.22 contains precipitation pH measurement data.)

Fallout pot data indicate short-term effects; the reporting units for gross alpha and gross beta indicate a rate of deposition rather than the actual concentration of activity within the collected water. Long-term deposition is measured by surface soil samples collected annually near each sampling station. Soil sample data are found in Table C-1.11 of Appendix C-1.

Surface Water and Sediment Monitoring

On-site Surface Water Sampling: the Low-level Waste Treatment Facility

The largest single source of radioactivity released to surface waters from the Project is the discharge from the low-level waste treatment facility (LLWTF) through the lagoon 3 weir (WNSP001, Fig. 2-3) into Erdman Brook, a tributary of Frank's Creek. There were six batch releases totaling about 33.5 million liters (8.85 million gals) in 1991. In addition to composite samples collected near the beginning and end of each discharge, forty-eight daily effluent grab samples were collected and analyzed.

Off-site Surface Water Sampling

An off-site sampler (WFFELBR) is located on Cattaraugus Creek at Felton Bridge just downstream of Cattaraugus Creek's confluence with Buttermilk Creek, which is the major surface drainage from the Western New York Nuclear Service Center. (See Fig. 2-4.) The sampler periodically collects an aliquot (a small volume of water, approximately 100 mL/hr) from the creek. A chart recorder registers the stream depth during the sampling period so that a flow-weighted weekly sample can be proportioned into a monthly composite based on relative stream discharge. The samples are analyzed for gross alpha, gross beta, and tritium each week, and the composite is analyzed for strontium-90 and gamma-emitting isotopes.

In addition to the Cattaraugus Creek sampler, two surface water monitoring stations are located on Buttermilk Creek both upstream and downstream of the WVDP. Samplers collect water from a background location upstream of the Project at Fox Valley Road (WFBCBKG) and from a location at Thomas Corners

Road that is downstream of the plant and upstream of Buttermilk Creek's confluence with Cattaraugus Creek (WFBCTCB).

The samplers collect a 25-mL aliquot every half-hour. Samples are retrieved biweekly, composited monthly, and analyzed for tritium, gross alpha, and gross beta radioactivity. A quarterly composite of the biweekly samples is analyzed for gamma-emitting isotopes and strontium-90. (Table C-1.3 shows monthly and quarterly radioactivity totals upstream of the site at Fox Valley; Table C-1.4 shows monthly and quarterly radioactivity totals downstream of the site at Thomas Corners.)

The fourth station (WNSP006) is located on Frank's Creek where Project site drainage leaves the security area. (See Fig. 2-3). This sampler collects a 50-mL aliquot every half-hour. Samples are retrieved weekly and composited both monthly and quarterly. Weekly samples are analyzed for tritium and gross alpha and beta radioactivity. The monthly composite is analyzed for strontium-90 and gamma-emitting isotopes. (See Table C-1.5.) A quarterly composite is analyzed for carbon-14, iodine-129, and alpha-emitting isotopes. (See Table C-1.6.)

Radioactivity Concentrations at the Low-level Waste Treatment Facility

The total amounts of radioactivity from specific radionuclides in the lagoon 3 effluent are listed in Table C-1.1. During 1991 approximately 494,000 liters (130,000 gals) of lagoon 3 effluent originated in the New York State-licensed disposal area (SDA) rather than from current or previous Project operations. This represents about 1.5% of the total liquid effluent.

The annual average concentrations from the lagoon 3 effluent discharge weir, including all measured isotope fractions, were less than 30% of the DCGs (Table C-1.2 in *Appendix C-1*).

Radioactivity Concentrations at Off-site Surface Water Sampling Locations

Radiological concentration data from these sample points show that average gross radioactivity concentrations generally tend to be higher in Buttermilk Creek below the WVDP site, presumably because small amounts of radioactivity from the site enter Buttermilk Creek via Frank's Creek. The range of gross beta activity, for example, was from 2.2E-09 to 7.5E-09 µCi/mL (8.1E-02 to 2.8E-01 Bq/L) upstream in Buttermilk Creek at Fox Valley (WFBCBKG), and from 4.2E-09 to 3.6E-08 µCi/mL (1.6E-01 to 1.3E+00 Bq/L) in Buttermilk Creek at Thomas Corners Bridge (WFBCTCB).

These data show that concentrations downstream of the site are only marginally higher than background concentrations upstream of the site. To establish a perspective on these data, note that if the maximum beta concentration in Buttermilk Creek downstream of the Project at Thomas Corners Bridge, to which dairy cattle have access, were assumed to be entirely from iodine-129, which is the most restrictive beta-emitting isotope, then the radioactivity would represent 7.1% of the Department of Energy's derived concentration guide (DCG) for unrestricted use.

At sampling location WNSP006 at the Project security fence (see Fig. 2-3) more than 4 kilometers from the nearest public access point, the most significant beta-emitting radionuclides were measured at 3.62E-08µCi/mL(1.3E+00Bq/L) for cesium-137 and 6.91E-08 µCi/mL(2.6E+00Bq/L) for strontium-90 during the month of highest concentration. This corresponds to 1.2% of the DCG for cesium-137 and 6.9% of the DCG for strontium-90.

At WNSP006 the annual average concentration of cesium was 0.8% of the DCGs and 2.4% of the strontium DCG. Tritium, at an annual average of 1.50E-06 µCi/mL (5.6E+01 Bq/L), was 0.1% of the DCG value. Of the fifty-two samples collected and analyzed for gross alpha during 1991, six were above the detection limit. The annual average was 1.33E-09 µCi/mL or 4.4% of the DCG for americium-241.

The highest concentrations in monthly composite water samples from Cattaraugus Creek during 1991 show strontium-90 to be less than 0.7% of the DCGs for drinking water. No gamma-emitting fuel cycle isotopes were detected in Cattaraugus Creek during 1991. (See Table C-1.7.) Yearly averages for Cattaraugus Creek at Felton Bridge are not significantly higher statistically than background levels.

Sediment Sampling

Sediments are grab-sampled semiannually at or near the water sampling locations. Downstream locations are Buttermilk Creek at Thomas Corners Road (SFTCSED), Cattaraugus Creek at Felton Bridge

(SFCCSED), and Cattaraugus Creek at the Springville Dam (SFSDSED). Upstream locations are Buttermilk Creek at Fox Valley Road (SFBCSED) and Cattaraugus Creek at Bigelow Bridge (SFBISED).

A comparison of annual averaged 1986-1991 cesium-137 concentrations for these five sampling locations is found in Figure 2-5. As the figure indicates, cesium-137 concentrations are decreasing or staying constant with time for the locations downstream of the Project

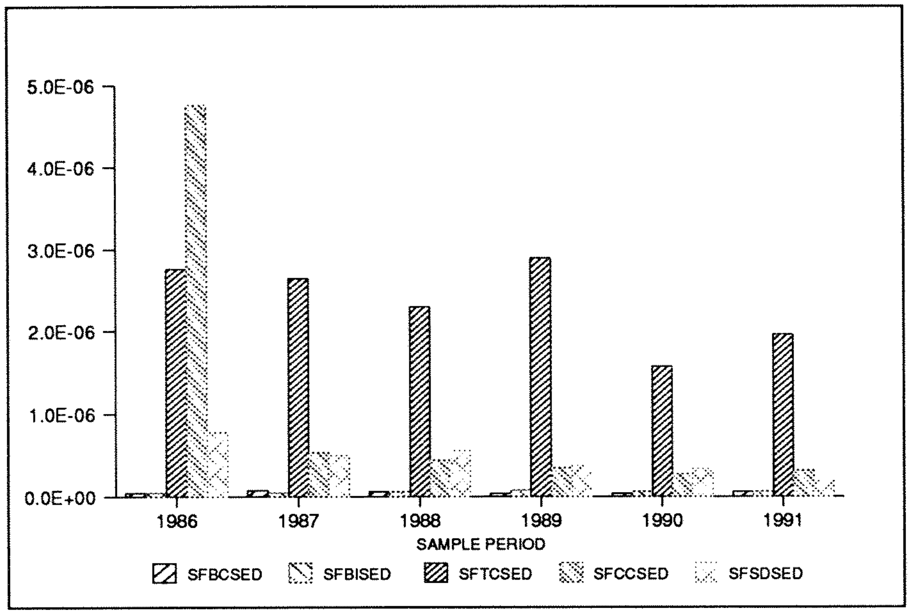

Figure 2-5. Annual Averages of Cs-137 (µCi/g) in Stream Sediment for Two Locations Upstream and Three Locations Downstream of the WVDP.

(SFTCSED, SFCCSED, and SFSDSED). Concentrations of cesium-137 at the upstream locations (SFBCSED and SFBISED) have remained consistent throughout the time period.

A comparison of cesium-137 to naturally occurring potassium-40 (Fig. 2-6) for the downstream location nearest the Project (Buttermilk Creek at Thomas Corners Road — SFTCSED) indicates that cesium-137 is present at levels lower than naturally occurring gamma emitters. Results of sediment sampling upstream and downstream of the Project are tabulated in Appendix C-1, Table C-1.9.

Radioactivity in the Food Chain

Each year food samples are collected both near the site and from remote locations. Fish and deer are collected during periods when they would normally be taken by sportsmen for consumption. In addition, milk is collected monthly and beef semiannually from cows grazing near the site and at remote locations. Hay, corn, apples, and beans are collected at the time of harvest.

Fish

Fish samples are collected semiannually above the Springville dam from the portion of Cattaraugus Creek that is downstream of WNYNSC drainage (BFFCATC). Fish samples are also taken from Cattaraugus Creek below the dam, including species that migrate nearly forty miles upstream from Lake Erie (BFFCATD). These specimens are representative of sport fishing catches in the creek downstream of the dam at Springville.

Ten fish were collected from this section of the stream during one annual collection period in 1991 and the strontium-90 content and gamma-emitting isotopes (cesium-134,-137, and strontium-90) in flesh were determined. (See Table C-3.4 in *Appendix C-3.)*

A similar number of fish are taken from waters that are not influenced by site runoff (BFFCTRL) and their edible portions are analyzed for the same isotopes. These control samples, containing only natural background radiation, provide comparisons with the concentrations found in fish taken from site-influenced waters. The control samples are representative of the species collected in Cattaraugus Creek downstream from the WVDP. Ten fish were collected during each semiannual collection period in 1991.

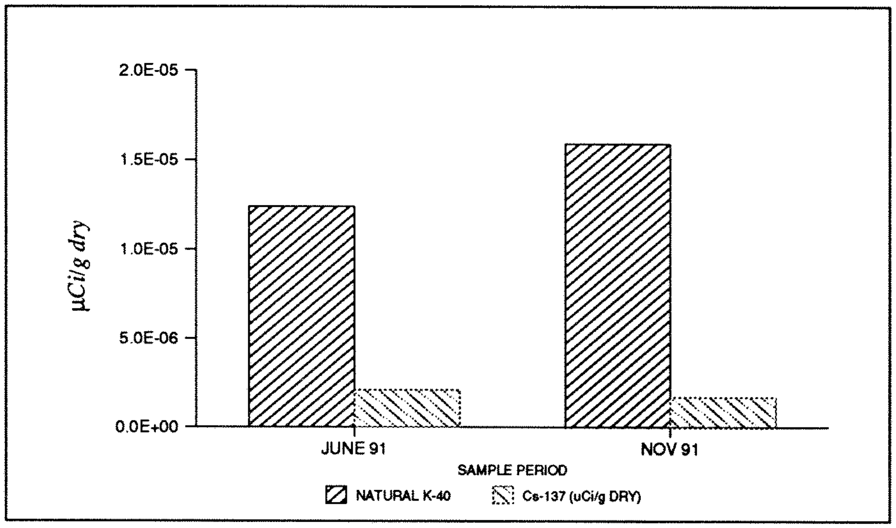

Figure 2-6. Comparison of Cs-137 with Naturally Occurring K-40 Concentrations at Downstream Sampling Location SFTCSED.

Radioactivity Concentrations in Venison

Venison from three deer taken from a resident herd on the WNYNSC were analyzed and the data compared with data on deer collected near Olean, New York, which is 65 kilometers southeast of the WNYNSC. The low levels of radioactivity for both near-site and control samples appear to be the same or slightly lower than the 1990 levels. There is no apparent difference in radioactivity concentrations between the control deer and the near-site deer.

Radioactivity Concentrations in Fish Samples

Detectable strontium-90 in fish collected downstream of the Project in Cattaraugus Creek was slightly above the median values seen in the previous six years. Strontium-90 concentrations in fish samples from the first half of 1991 were higher than the concentrations in samples from the second half. However, within the range of variations for analytical methods and sample population statistics, no upward trend of strontium-90 in fish was indicated.

As in previous years, no detectable concentrations of cesium-134 or cesium-137 were found, using isotopic gamma analyses of the edible fish flesh. Strontium-90 levels in fish taken below the first upstream barrier from Lake Erie on Cattaraugus Creek were at or below background levels. No cesium-134 or cesium-137 isotopes were found in these below-dam downstream fish in 1991.

Venison

Specimens from an on-site deer herd also are analyzed for radioactive components. Historically, concentrations of radioactivity in deer flesh have been very low and site activities have not been shown to affect the local herd.

Meat and Milk

Beef samples taken semiannually from near-site and remote locations are analyzed for strontium-90 and gamma-emitting isotopes such as cesium-137 and 134.

The concentration of strontium-90 in beef from the near-site sample appeared to be similar to the control (background) samples.

Radioactivity Concentrations in Beef Samples

Cesium analysis of both near-site and control samples yielded near detection limit values (see Glossary). Positive cesium-137 values were detected in two background beef samples and one near-site sample. The concentrations were approximately the same for all three samples. The positive values, however, were lower than the 1990 detection limit values for the same locations. Historically, very little difference in isotope concentration has been observed between near-site and control herds.

Milk samples were taken in 1991 from dairy farms near the site (Fig. 2-7) and from control farms at some distance from the site. Besides the quarterly composite of monthly samples from the maximally exposed herd to the north (BFMREED), a quarterly composite of milk also was taken from a nearby herd to the northwest (BFMCOBO). Single annual samples were taken from

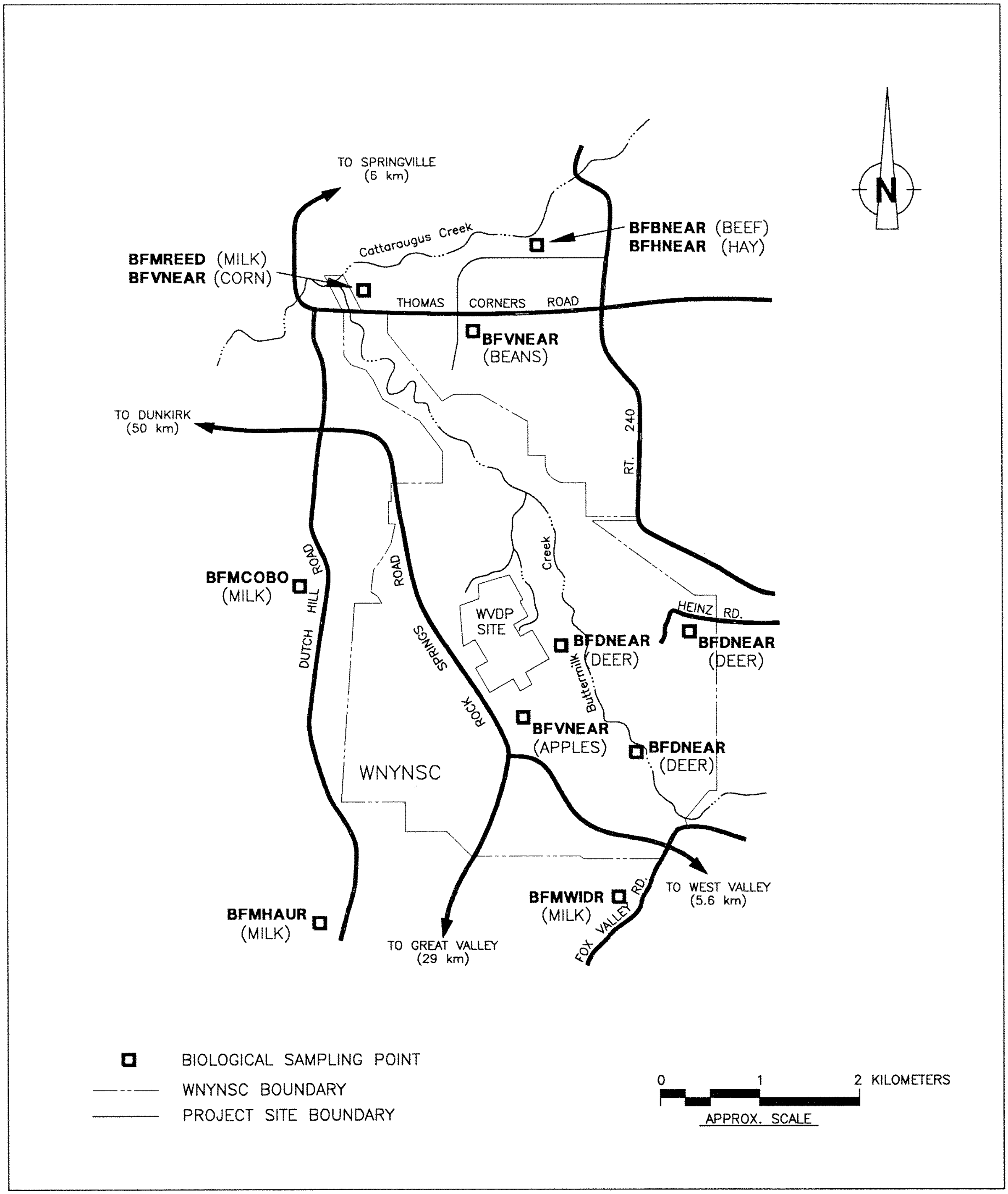

Figure 2-7. Near–Site Biological Sampling Points – 1991.

herds to the south (BFMWIDR) and the southwest (BFMHAUR). Monthly samples from control herds (BFMCTLN and BFMCTLS) were also collected as quarterly composites.

Radioactivity Concentrations in Milk Samples

Each sample or composite was analyzed for strontium-90, tritium, iodine-129, and gamma-emitting isotopes (cesium-137 and 134). Strontium-90 in samples from near the site ranged from 2.1E-10 to 7.9E-09 µCi/mL (7.6E-03 to 2.9E-1 Bq/L). Iodine was detected at 4.8E-10 µCi/mL(1.8E-02 Bq/L)in only one near-site sample. This value is very near the detection limit of 4.73E-10µCi/mL (1.76E-02 Bq/L). In all cases the iodine concentrations were lower than the 1990 detection limit of 9.9E-10 µCi/mL (3.7E-02 Bq/L). This may be because the laboratory used a more refined analytical technique. Although tritium values above detection limits were observed in milk samples taken from near-site farms in 1990, higher values were observed in samples taken from distant control locations. (See Table C-3.1.)

Fruit and Vegetables

Data from samples analyzed in 1991 (Table C-3.3) indicated no consistent differences in the concentration of tritium, strontium-90, or gamma-emitting isotopes in corn, beans, or apples grown either near the site or at remote locations.

Direct Environmental Radiation Monitoring

The current monitoring year, 1991, was the eighth full year in which direct penetrating radiation was monitored at the West Valley Demonstration Project using TL-700 lithium fluoride (LiF) thermoluminescent dosimeters (TLDs).

The dosimeters are processed on-site and are used solely for environmental monitoring, apart from the occupational dosimetry TLDs. The environmental TLD package consists of five TLD chips laminated on a thick card bearing the location identification and other information. These cards are placed at each monitoring location for one calendar quarter (three months) and are then processed to obtain the integrated gamma radiation exposure.

Monitoring points are located around the WNYNSC perimeter and the access road, at the waste management units, at the site security fence, and at background locations remote from the WVDP site. (See Figs. 2-8 and 2-9 below and Fig. A-9 in Appendix A.) The TLDs are numbered in order of their installation. The monitoring locations are as follows:

THE PERIMETER OF THE WNYNSC: TLDs #1-16, #20

THE PERIMETER OF THE WVDP SITE -SECURITY FENCE: TLDs #24, 26-29, 32-34

THE POINT OF CLOSEST PUBLIC ACCESS ON THE WVDP PERIMETER: TLD #25

ON-SITE SOURCES OR SOLID WASTE MANAGEMENT UNITS: TLDs #18 and #32-36 (RTS drum cell); #18 and 19 (SDA); #24 (component storage, near the WVDP site security fence); #25 (the maximum measured exposure rate at the closest point of public access); #38 (main plant and cement solidification system); #39 (parking lot security fence closest to the vitrification facility); #40 (high-level waste tank farm)

NEAR-SITE COMMUNITIES: TLDs #21 (Springville); # 22 (West Valley)

BACKGROUND: TLDS #17 (Five Points Landfill); #23 (Great Valley); #37 (Dunkirk); #41 (Sardinia)

The statistical uncertainty of individual results and averages was acceptable and measured exposure rates were comparable to those of 1990. There were no significant differences between the data collected from the background TLDs (#17, 23, 37, and 41) and from those on the WNYNSC perimeter for the 1991 reporting period.

Appendix C - 4 provides a summary of the results for each of the environmental monitoring locations by calendar quarter along with averages for comparison.

The quarterly averages and individual location results show very slight differences due to seasonal variation. The data obtained for all four calendar quarters compared favorably to the respective quarterly data in 1990 with no unusual situations observed. The quarterly average of the seventeen perimeter TLDs was 20.1 milliroentgen (19.3 mrem) in 1991.

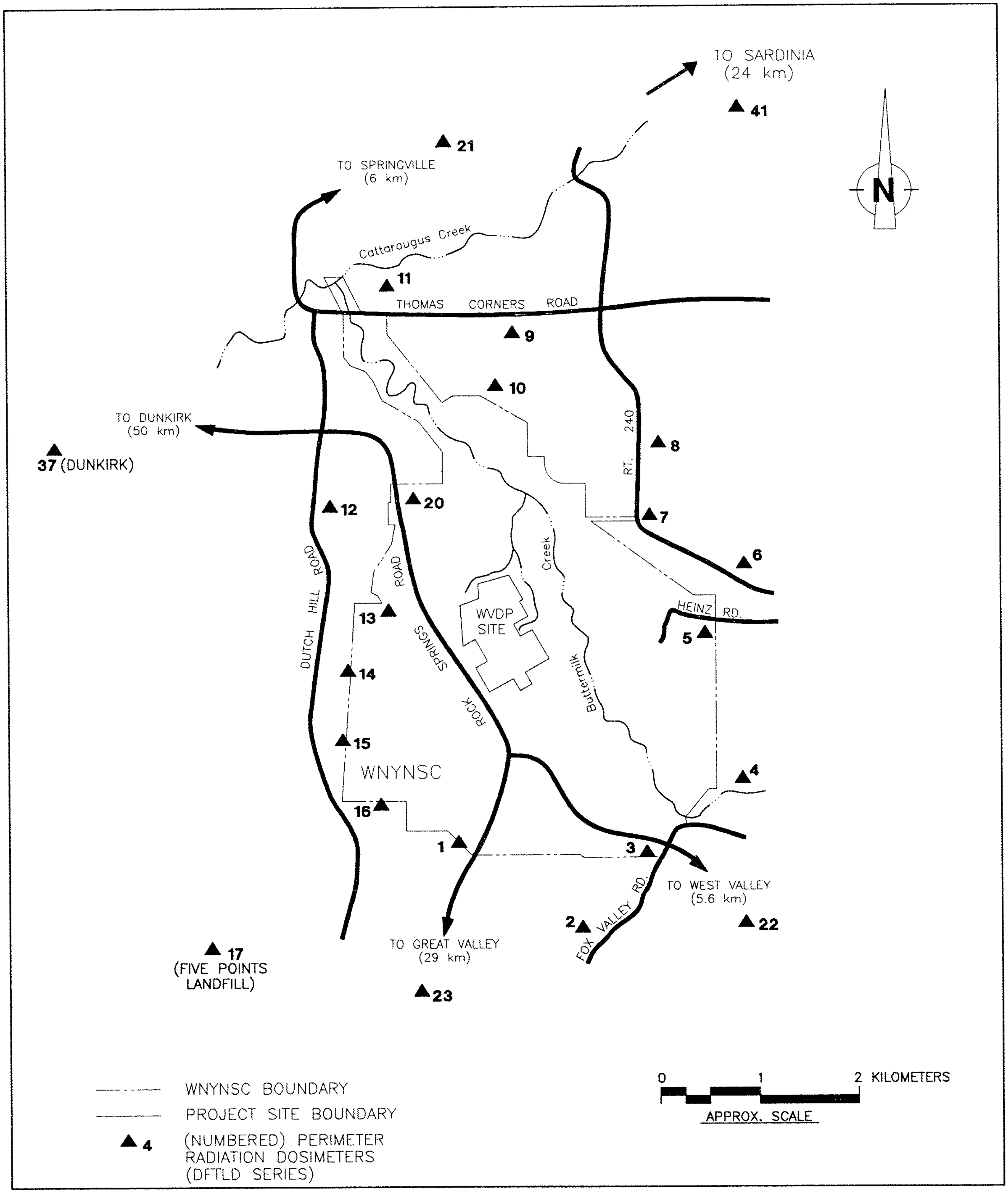

Figure 2-8. Location of Off-Site Thermoluminescent Dosimetry (TLD).

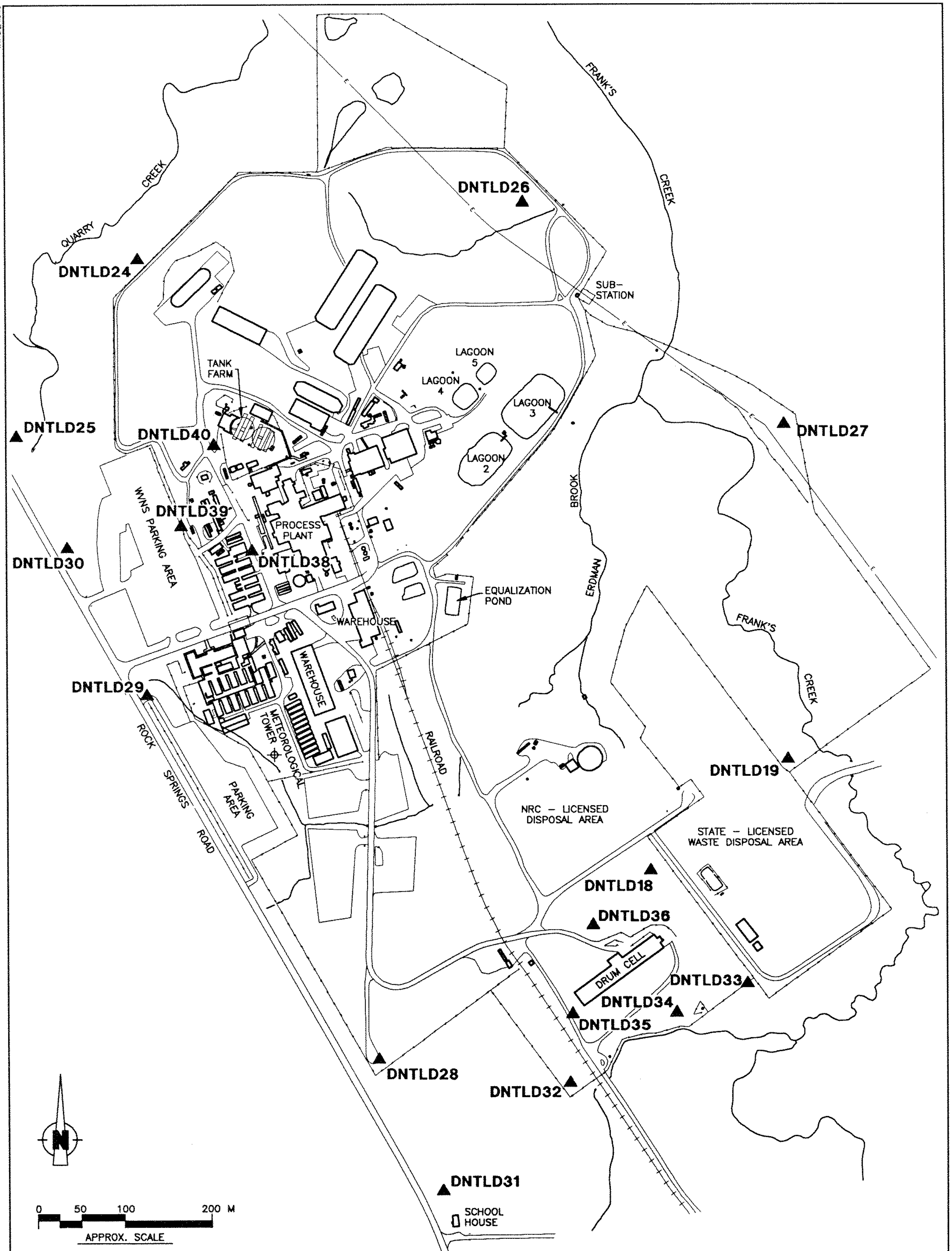

Figure 2-9. Location of On-Site Thermoluminescent Dosimetry (TLD).

On-site Radiation Monitoring

Certain locations show slight changes in radiation levels. Presumably because of its proximity to the low-level waste disposal area, the dosimeter at location #19 showed a small elevation in radiation exposure compared to the WNYNSC perimeter locations. Although above background, the readings are relatively stable from year to year. Location # 25, on the public access road through the site north of the facility, also showed a small elevation above background because decontamination wastes are stored near location #24 within the inner facility fence. (See *Appendix C - 4*, Table C-4.1.)

Location #24 on the north inner facility fence, like location #19, is not included in the off-site environmental monitoring program; however, it is a co-location site for one NRC TLD. (See *Appendix D*, Table D-7). This point received an average exposure of 0.57 milliroentgens (mR) per hour during 1991, as opposed to 0.63 mR/hr in 1990 and 0.67 mR/hr in 1989. Sealed containers of radioactive components and debris from the plant decontamination work are stored nearby. The storage area is well within the WNYNSC boundary (as is location #19) and is not readily accessible by the public.

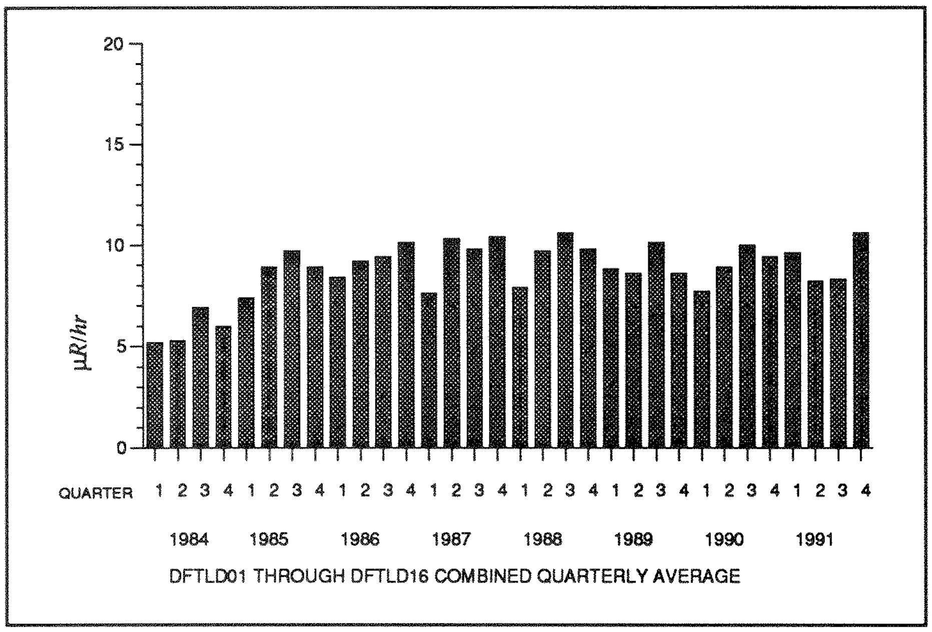

Figure 2-10. Trends of Environmental Radiation Levels (μR/hr)

Locations around the radwaste treatment storage (RTS) building — the drum cell — showed an increase in exposure rate. The average dose rate at these locations (TLDs #s18, 32, 33, 34, 35, and 36) was 0.026 mR/hr in 1991, compared to 0.022 mR/hr in 1990. This increase reflects the placement in the building of drums containing decontaminated supernatant mixed with cement. The drum cell and the surrounding TLD locations are well within the WNYNSC boundary and are not readily accessible by the public.

Perimeter and Off-site Radiation Monitoring

The perimeter TLDs (TLD#s 1-16 and 20) are located in the sixteen compass sectors around the facility near the WNYNSC boundary. The quarterly averages for these TLDs (Fig. 2-10) indicate no trends other than normal seasonal fluctuations. TLDs #s 17, 21-23, 37, and 41 monitor near-site community and background locations. The results from these monitoring points are statistically the same as the perimeter TLDs. Figure C-4.1 in *Appendix C-4* shows the average quarterly dose rate of each off-site TLD location. Figure C-4.2 shows the average quarterly dose rate of each on-site TLD.

Meteorological Monitoring

Meteorological monitoring at the WVDP provides representative and verifiable data that characterize the local and regional climatology of the site. These data are used to assess potential effects of routine and nonroutine releases of airborne radioactive materials and to calculate dispersion models for any releases that may exceed DOE effluent limits.

Since dispersive capabilities of the atmosphere are dependent upon wind speed, wind direction, and atmospheric stability, which is a function of the difference in temperature between the 10-meter and 60-meter elevations, these parameters are closely monitored at the WVDP and are available to the emergency assessment team at the WVDP.

The on-site 60-meter meteorological tower continuously monitors wind speed, wind direction, and temperatures at 60-meter and 10-meter elevations. In addition, an independent, remote 10-meter meteorological tower located approximately 5 kilometers south of the site on the top of Dutch Hill Road also continuously monitors wind speed and wind direction at the 10-meter elevation.

The two meteorological towers support the primary digital and analog data acquisition systems located within the Environmental Laboratory. All systems are run on line power with an uninterruptible power source battery backup in case of site power failure.

Figures C-6.1 and C-6.2 in *Appendix C-6* illustrate 1991 mean wind speed and wind direction at the 10-meter and 60-meter elecvations.

A chart-recording microbarograph, a digital barometric pressure sensor, and a digital, tipping-bucket heated precipitation gauge are also located near the site meteorological tower.

Cumulative total and weekly total precipitation data are illustrated in Figures C - 6.3 and C - 6.4 in *Appendix C-6*. Based upon the 30-year average for Western New York, the 1991 total of 32.66 inches of precipitation was 4.86 inches (12.9%) below normal levels.

Information such as meteorological system calibration records, site log books, and analog strip charts are stored on-site. Electronic files containing meteorological data are copied (downloaded) daily and stored off-site. Meteorological towers and instruments are examined three times weekly for proper function and calibrated semiannually and/or whenever instrument maintenance might affect calibration.

Special Monitoring

Stormwater Monitoring

The New York State Department of Environmental Conservation currently is accepting permit applications for stormwater run-off discharges as mandated by the U.S. Environmental Protection Agency NPDES (National Pollutant Discharge Elimination System) program.

Three locations on-site would be the primary conduits for run-off water in a storm: Frank's Creek at the security fence (WNSP006), the north swamp drainage (WNSW74A), and the northeast swamp drainage WNSWAMP. During 1991 baseline grab samples and samples taken during a storm were analyzed for a number of chemical and radiological parameters. Analysis results were included in a permit application for stormwater discharges. The application will be filed with the New York State Department of Environmental Conservation in 1992.

Solvent Contamination Monitoring

Radioactively contaminated solvent was first discovered at the northern boundary of the NRC-licensed disposal area (NDA) in 1983, shortly after the Department of Energy assumed control of the WVDP site. Extensive sampling and monitoring through 1989 revealed the possibility that the solvent could migrate. To contain this subsurface solvent migration an interceptor trench and liquid pretreatment system (LPS) were built. The interceptor trench was designed to halt and collect subsurface water, which could be carrying solvent, in order to prevent it from entering the surface water drainage ditch and, subsequently, the surface water system (Erdman Brook) that drains the WNYNSC.

The LPS was designed to separate the solvent from the water and to treat the collected water before its transfer to the low-level waste treatment facility. Pretreatment would remove the solvent and reduce the concentration of iodine-129. The separated solvent would be stored for subsequent treatment and disposal.

As of the publication of this report, no water containing solvent has been encountered in the trench, and thus no water or solvent has been treated by the LPS or the low-level waste treatment facility.

Nonradiological Monitoring

Air Monitoring

Nonradiological emissions and plant effluents are controlled and permitted under New York State Department of Environmental Conservation and U.S. Environmental Protection Agency regulations. The regulations that apply to the WVDP are listed in Table B-2 in *Appendix B*. The individual air permits held by the WVDP are identified and described in Table B-3.

The nonradiological air permits are for minor sources of regulated pollutants that include particulates, nitric acid mist, oxides of nitrogen, and sulfur. However, because of their insignificant concentrations and small mass discharge, monitoring of these parameters currently is not required.

New permits obtained in 1991 cover sources such as fume hoods for welding and paint fumes, a fume hood for process and instrumentation effluents, and a fume hood vent for a nitric acid storage tank.

Surface Water Monitoring

Liquid discharges are regulated under the State Pollutant Discharge Elimination System (SPDES).

The WVDP holds a SPDES permit that identifies the outfalls where liquid effluents are released to Erdman Brook (Fig. 2-11) and that specifies the sampling and analytical requirements for each outfall. This permit was modified in 1990 to include additional monitoring requirements at outfall WNSP001.

Three outfalls are identified in the permit:

- outfall WNSP001, discharge from the low-level waste treatment facility (LLWTF)
- outfall WNSP007, discharge from the sanitary and utility effluent mixing basin
- outfall WNSP008, groundwater effluent from the perimeter of the low-level waste treatment facility storage lagoons.

The conditions and requirements of the current SPDES permit are summarized in Table C-5.1 in *Appendix C-5*.

The most significant features of the SPDES permit are the requirements to report biochemical oxygen demand, iron, and ammonia data as flow-weighted concentrations and to apply a net discharge limit for iron. The net limit allows amounts of iron that are naturally present in the incoming water to be subtracted from the Project's effluent. The flow-weighted limits apply to the total discharge of Project effluents but allow the more dilute waste streams to have a maximum effect in determining compliance with effluent concentration limits specified in the permit.

Semiannual grab sampling at locations WNSP006 (Frank's Creek at the security fence), WNSWAMP (northeast swamp drainage), WNSW74A (north swamp drainage), and WFBCBKG (Buttermilk Creek at Fox Valley) was added to the surface water environmental monitoring program in 1991. These samples are screened for organic constituents and selected anions, cations, and metals. Results of these measurements for WNSP006 and WFBCBKG are found in Table C-1.2 in *Appendix C-1*.

The SPDES monitoring data for 1991 are graphically displayed in Figures C-5.2 through C-5.37 in *Appendix C-5*. The WVDP reported a total of three noncompliance episodes in 1991 (Table C-5.2). These are described above in the *Environmental Compliance Summary: Calendar Year 1991*.

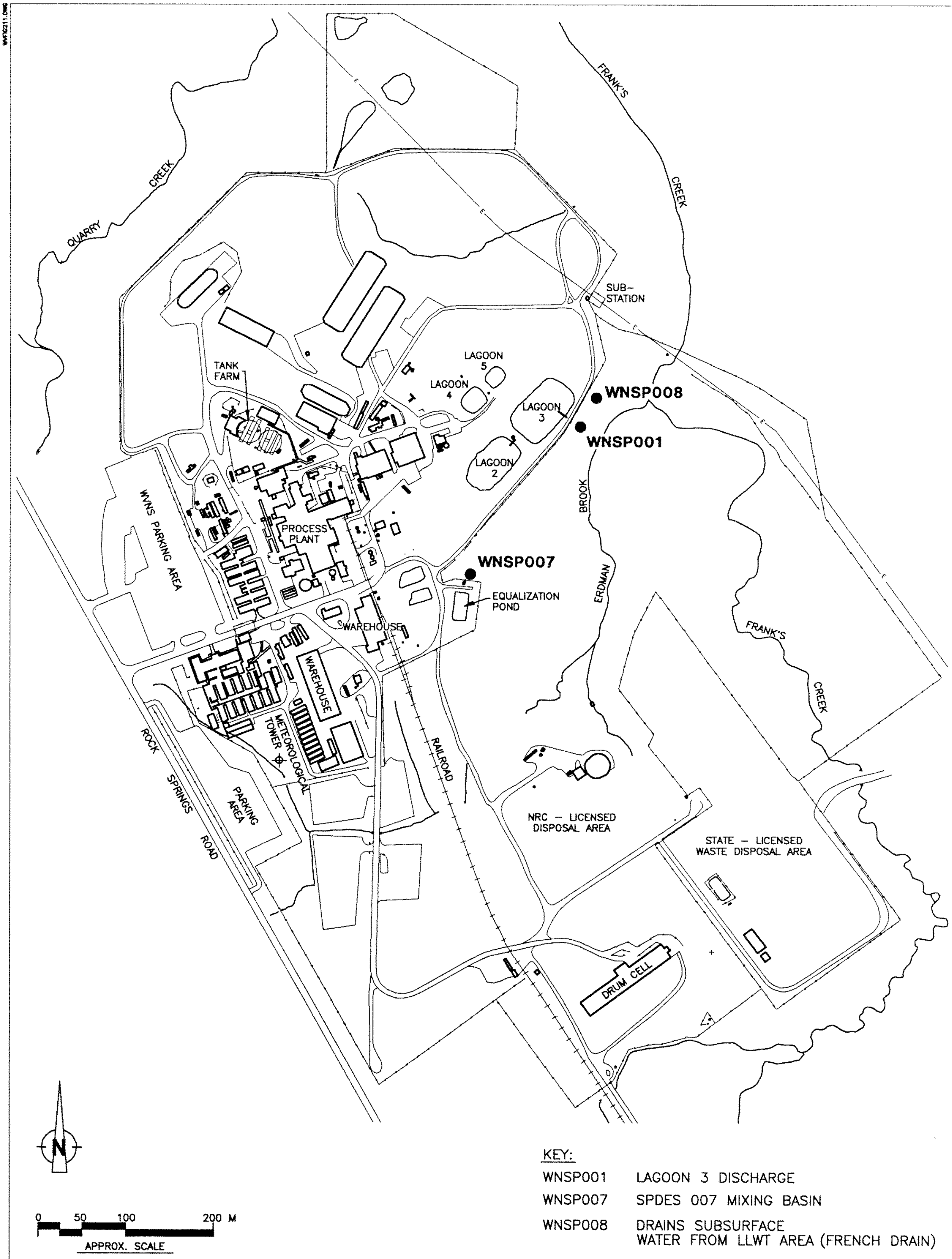

Figure 2-11. SPDES Monitoring Points.